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ON THE SUSTAINABLE DEVELOPMENT GOALS
“WHY IT MATTERS”
AS PART OF THE DECADE OF ACTION**

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SDGs, Islamic Banks and Economic Growth Nexus: A Case Study of Malaysia

Abdul-Wahab Abdul-Hamid (International Islamic University, Ghana) and
Hassanuddeen B. Abd. Aziz (International Islamic University, Malaysia)

Abstract

Purpose – The purpose of this paper is to examine the short-run and long-run relationships between Islamic banks' financing that are aligned with the SDGs and economic growth in Malaysia.

Design/methodology/approach – Utilizing quarterly data set for the duration of 2014 to 2018, this study applies the bound testing approach to cointegration and error correction model to analyse the data based on autoregressive distributed lag (ARDL) ARDL approach.

Findings – The results suggest that Islamic banks' financing in line with SDG2, SDG3, SDG4 and SDG11 have significant impact on economic growth in the short-run and long-run. However, while SDG2, SDG3 and SDG4 have negative impact on economic growth, SDG11 has a positive impact on economic growth.

Research limitations/implications – Thoughtful policies to encourage Islamic banks' financing in line with the SDGs while coping with slow economic growth will be imperative in achieving the SDGs in the long-run. This matters because with just eight years to go until the SDGs deadline of 2030, policymakers and Islamic banking regulators need to act fast by formulating strategies that will shift emphasis on GDP growth to financing the SDGs.

Originality/value of the paper – This paper is a pinioning effort in the application of the ARDL approach to investigate the nexus between the SDGs, Islamic banks and economic growth.

Keywords: SDGs, Islamic Banking, Economic Growth, Financing, ARDL, Malaysia

Introduction

Channelling global financial flows towards sustainable development is imperative to accomplish the 2030 Agenda. The 2030 Agenda for sustainable development will require financing to the tune of several trillions of dollars, while current levels of funding are nothing to write home about (UNSSC, 2019). Based on estimates, investments ranging from USD5 to USD7 trillion a year are required for clean energy, infrastructure, agriculture, water, and sanitation among others (Carney, 2016). Self-evidently, this requires tapping into other sources of finance to effectively channel financial flows from unsustainable areas towards sustainable avenues to achieve the Sustainable Development Goals (SDGs) (UNSSC, 2019).

Islamic finance has grown rapidly in the past few decades and it now stands as a potential contributor in supporting the SDGs. Particularly, Islamic banks have the potential to play a crucial role in supporting the achievement of the SDGs since they have untapped potential as a substantial source of financing for the SDGs (Alawode et al., 2018). The Islamic banking sector is one of the major sectors of the global Islamic financial system comprising about 72.4 percent of the entire Islamic financial services industry. Consequently, Islamic banks today are a vital part of the global economy and they have become systemically important in many jurisdictions. The number of jurisdictions with systemically important Islamic banking sectors increased slightly from 12 in 2018 to 13 in 2019, notwithstanding the global economy recorded its weakest pace of growth in 2019 since the Global Financial Crisis. Out of the 13 jurisdictions recorded in 2019, 12 witnessed an increase in share of Islamic banking assets relative to their total banking sector assets (IFSB, 2021).

Malaysia has consistently been among the countries where Islamic banking has achieved domestic systemic importance (IFSB, 2021). Currently, the Islamic banking assets in Malaysia reached USD 254 billion as at December 2019 with total funds placed with Islamic banks now representing 38 per cent of entire banking sector deposits (BNM, 2021). Despite this growth momentum, their contribution to economic growth, especially when their financing is aligned with the SDGs, remains under researched.

Numerous previous researches have investigated the impact of Islamic banking on economic growth in various jurisdictions (Gani and Bahari, 2020; Bougatef et al., 2020; Mohamad Yusof and Loong, 2020; Abduh and Omar, 2012; Kassim, 2016; Siddique et al., 2020; Kalim et al., 2016). Particularly, studies such as Abduh and Omar (2012), Kassim ((2016), Bougatef et al. (2020), Mohamad Yusof and Loong (2020), among others, demonstrated significant impact of various regressors including Islamic banks' financing on Gross domestic product (GDP) as a measure of economic growth. However, some researchers such as Coscieme et al. (2020), Eu-umweltbuero (2020), Adrangi and Kerr (2022) and Stiglitz et al. (2009) argued that economic growth as measured based on GDP growth makes it difficult to achieve the Sustainable Development Goals (SDGs). They suggested that focus should be on achieving the SDGs rather than GDP growth. The ongoing debate necessitates further research on this topic, particularly from the perspective of Malaysia. To the best of the authors' knowledge, there is limited work concerning the association between Islamic banks' financing in line with the SDGs and economic growth. This study thus extends the existing literature by empirically examining the relationship between Islamic banking and economic growth, utilizing Malaysian Islamic banks' financing data in line with the SDGs.

Literature Review

Islamic Banking and Economic Growth

Empirically speaking, early scholarly works devoted to the research concerning the nexus between Islamic financial development and economic growth were concentrated on examining the idea of Islamic banking and economic growth causality. Thus, some studies such as Gani and

Bahari (2020), Mohamad Yusof and Loong (2020), Bougatef et al. (2020), Kassim (2016), Abduh and Omar (2012), Barajas et al. (2013), Mifrahi and Tohirin (2020), Furqani & Mulyany (2009), Brahim and Omar (2012), and Benes and Kulhof (2012) addressed the connection between Islamic finance and economic growth with emphasis on the role of Islamic banks in supporting economic growth. Most of these studies, such as Mohamad Yusof and Loong (2020), Bougatef et al. (2020), Majid and Kassim (2016), and Abduh and Omar (2012) demonstrated significant impact of various regressors including Islamic banks' financing on Gross domestic product (GDP) as a measure of economic growth. However, some researchers such as Coscieme et al. (2020), Eu-umweltbuero (2020), Adrangi and Kerr (2022) and Stiglitz et al. (2009) argued that economic growth as measured based on GDP growth makes it difficult to achieve the Sustainable Development Goals (SDGs). They suggested that focus should be on achieving the SDGs rather than GDP growth.

The SDGs and Economic Growth

Achieving economic growth is one of the objectives of the 17 Sustainable Development Goals (SDGs). Specifically, the objective of Goal 8 (decent work and economic growth) is to achieve a minimum of 7% gross domestic product (GDP) growth each year in the least developed countries. Realising 7% growth every year is in the high range for least developed countries. Social and environmental issues may be compromised in an attempt to meet such a target. For instance, exporting labour-intensive goods may increase GDP while limiting wage growth. Likewise, exporting wood products can fuel growth while eventually causing environmental challenges (Hailu, 2015). Similarly, Coscieme et al. (2020) discussed the synergies and trade-offs evolving from the indicators used to measure improvement toward SDG goals. Their work noted that the role of GDP as an indicator for SDG 8 causes a problem since unrestrained GDP growth contradicts with the reality of limited natural resources. They further indicated how focussing on GDP growth may lead to difficulties in achieving the SDGs in general.

Consistent with Coscieme et al. (2020), Adrangi and Kerr (2022) analysed the metrics of the SDGs and their relationship with GDP in emerging economies. They used the feasible generalized least squares (FGLS) and the seemingly unrelated regressions (SUR) on panel data comprising five BRIC countries spanning 2000 through 2017. They then evaluated a regression model showing the association of SDGs with GDP. Their study came to a conclusion that focusing on GDP may not lead to achieving overall SDGs.

Eu-umweltbuero (2020) noted that a growing majority of people consider quality of life and well-being as crucial matters in the development of society. Measuring development by mainly looking at economic indicators such as GDP, overlooks the complexity of society and people as well as societal well-being. Correspondingly, Costanza et al. (2016) also argued that the use of GDP as the single measure of a country's well-being should be rejected. They noted that increasing economic growth, as measured by GDP, leads to destroying of natural resources, devastating the environment, and possibly contributing to climate change. Continuous increase in wealth has not improved income distribution, leading to inequality in societies. Thus, the current way of measuring GDP may have a negative impact on sustainable development and vice versa.

Consequently, some authors such as Stiglitz et al. (2009) recommended that GDP should not only focus on measuring production at market prices but rather should take into account non-market activities. Stiglitz et al. (2009) in a report by the “Commission on the Measurement of Economic Performance and Social Progress” suggested that the focus of GDP should not only be on measuring production at market prices but, instead, the focus should be on wealth, income and consumption at the household level, taking into account non-market activities such as domestic work, childcare, among others. The authors argued that, GDP per capita may go up while household income decreases leading to inequality.

Corresponding to the above, in an attempt to reduce inequality and boost economic growth in Malaysia, the government classified Malaysians based on household income into three different groups as the basis for various government initiatives. According to the Household Income & Basic Amenities Survey Report 2019 by the Department of Statistics Malaysia (DOSM), these household income classifications include Bottom 40% (B40), Middle 40% (M40) and Top 20% (T20) (Department of Statistics Malaysia, 2020). The B40 are the low-income group comprising 2.91 million households as at 2019, with income threshold between RM1 – RM4,849 (Department of Statistics Malaysia, 2020). The B40 income group most often struggle to keep up with the increasing cost of living and are particularly vulnerable to economic shocks. As a result, attention is most often on the B40 group and there are many affordable housing schemes reserved just for them. The affordable housing initiative is in the right direction towards achieving some of the SDGs along with economic growth since many low-income families are able to live and work in the cities.

Islamic Banking in Malaysia

Malaysia is home to one of the most developed Islamic banking markets in the world. The country has a long track record of building a successful domestic Islamic banking industry over the past 30 years, giving the country a solid foundation in the industry (BNM, 2021). Currently, the Islamic banking assets in Malaysia reached USD 254 billion as at December 2019 with total funds placed with Islamic banks now representing 38 per cent of entire banking sector deposits (BNM, 2021). To date, there are about 16 full-fledged Islamic banks with domestic branches of 2,246 and 10 Islamic banking windows with domestic branches of 2,170 (IFSB, 2021).

Notwithstanding the ongoing challenging economic conditions, the Malaysian Islamic banking sector remained profitable. This was as a result of the concentrated exposure of the Islamic banks to retail financing, which is less vulnerable to economic downturns as compared to corporate financing (IFSB, 2021). Given the high level of the Islamic banking sector assets, its increasing market share as well as general performance in Malaysia, it is timely and highly relevant to assess the contribution of Islamic banks' financing in line with the SDGs to economic growth. This is particularly important in the case of Malaysia, where Islamic finance is positioned to play an increasingly significant role in the economy. Accordingly, there are social finance instruments by Malaysian Islamic banks based on Value-Based Intermediation (VBI) initiative introduced by the Central Bank of Malaysia intended to assist the needy and reduce income inequality (Abd Rasid et al., 2020).

Methodology

Data Sources and Variables Measurements

Quarterly data of Islamic Banks' value of *Shari'ah*-compliant financing in different sectors of the Malaysian Islamic banking industry were collected from the IFSB database and categorized based on Sustainable Developments Goals (SDGs) and used in the study analysis over the period Q1 2014 to Q4 2018. In particular, the quarterly data of Banks' value of *Shari'ah*-compliant financing have been categorized into 10 SDGs namely SDG1 (No poverty), SDG2 (Zero Hunger), SDG3 (Good Health and Well-Being), SDG4 (Quality Education), SDG8 (Decent Work And Economic Growth), SDG9 (Industry, Innovation and Infrastructure), SDG10 (Reduced Inequalities), SDG11 (Sustainable Cities and Communities), SDG16 (Peace, Justice and Strong Institutions), and SDG17 (Partnerships for the Goals). Data on the Gross Domestic Product (GDP) on the other hand was collected from the statistical department of Malaysia.

Variables Measurement

The variables measurement was based on the SDGs objectives with cross section of Islamic banks *Shari'ah*-compliant financing in different sectors in the countries such as (a) agriculture, forestry, hunting and fishing; (b) mining and quarrying; (c) manufacturing; (d) electricity, gas, steam and air-conditioning supply; (e) water supply; sewerage and waste management; (f) construction; (g) wholesale and retail trade; repair of motor vehicles and motorcycles; (h) transportation and storage; (i) accommodation and food service activities; (j) information and communication; (k) financial and insurance activities; (l) real estate activities; (m) professional, scientific and technical activities; (n) administrative and support service activities; (o) public administration and defence; compulsory social security; (p) education; (q) human health and social work activities; (r) arts, entertainment and recreation; (s) other service activities (export); (t) activities of households as employers, (t*) other financing of households; (u) activities of extraterritorial organisations and bodies and (u*) financing to non-residents.

Method of Analysis

This study applied autoregressive distributed lag (ARDL) model that was introduced by Pesaran and Shin (1995), Pesaran et al. (1996) and Narayan (2004). The ARDL model analysis includes several steps namely lag determinants, the bound-test and long-run and short-run estimation of the variables' coefficients. The justification for utilizing ARDL model is due to the fact that it is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1) or mutually cointegrated, and it avoids problems resulting from non-stationary time series data (Pesaran et al., 1996 and Pesaran et al. 2001). In addition, it is more robust and achieves better outcomes for small sample sizes (Narayan, 2004).

Testing for Cointegration

After determining the optimal lag length for each variable by searching the $(p+1)^{k+1}$ in different ARDL models, the study applied “The Bound Test” to examine whether there is existence of cointegration relationships among variables under study using the F-statistics in the conditional unrestricted ARDL model as illustrated in equation (1).

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = \delta_8 = \delta_9 = \delta_{10} = \delta_{11} = 0 \quad (1)$$

$$H_1: \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0, \delta_5 \neq 0, \delta_6 \neq 0, \delta_7 \neq 0, \delta_8 \neq 0, \delta_9 \neq 0, \delta_{10} \neq 0, \delta_{11} \neq 0$$

The null hypothesis stated that, non-existence of long-run relationship among the variables in the ARDL model, while the alternative hypothesis stated the existence of the long-run relationship between the identified variables in the model. The computed F-statistic value will be evaluated with the critical values generated by conditional unrestricted ARDL model. If the value of F-statistic lies above the upper bound critical value for a given significance level; the decision is that there is existence of cointegration relationships among variables. If the value of the F-statistic falls below the lower bound critical value, the inference is that there is no existence of cointegration relationships among variables. However, if computed F-statistic falls within lower and upper bound, then the results are inconclusive (Narayan, 2004).

Long-run and Short-run Dynamics

After the cointegration is confirmed between the dependent and exploratory variables on the bound test, then the estimated coefficients of long-run relationship will be measured using the following ARDL ($m_1, m_2, m_3, m_4, m_5, m_6, m_7, m_8, m_9, m_{10}, m_{11}$) model:

$$\begin{aligned} GDP_t = & \alpha_0 + \sum_{i=1}^{m_1} \alpha_1 GDP_{t-i} + \sum_{i=0}^{m_2} \alpha_2 SDG1_{t-i} + \sum_{i=0}^{m_3} \alpha_3 SDG2_{t-i} + \sum_{i=0}^{m_4} \alpha_4 SDG3_{t-i} + \\ & \sum_{i=0}^{m_5} \alpha_5 SDG4_{t-i} + \sum_{i=0}^{m_6} \alpha_6 SDG8_{t-i} + \sum_{i=0}^{m_7} \alpha_7 SDG9_{t-i} + \sum_{i=0}^{m_8} \alpha_8 SDG10_{t-i} + \\ & + \sum_{i=0}^{m_9} \alpha_9 SDG11_{t-i} + \sum_{i=0}^{m_{10}} \alpha_{10} SDG16_{t-i} + \sum_{i=0}^{m_{11}} \alpha_{11} SDG17_{t-i} + \mu_t \quad (2) \end{aligned}$$

Where α_0 denotes the constants term, $\alpha_1 \dots \alpha_{11}$ refers to the coefficient of the long-run relationships of the variables, $[m_1, m_2, m_3, m_4, m_5, m_6, m_7, m_8, m_9, m_{10}, m_{11}]$ denotes the lag orders for each individual variable in the model, μ_t refers to the residual error term, t - denotes the time and i refers to time of the previous observation value.

The short-run estimated coefficients will be derived using the Error Correction Model of the following formula:

$$\begin{aligned} \Delta GDP_t = & \beta_0 + \sum_{i=1}^{p-1} \beta_1 \Delta GDP_{t-i} + \sum_{i=0}^{p-1} \beta_2 \Delta SDG1_{t-i} + \sum_{i=0}^{p-1} \beta_3 \Delta SDG2_{t-i} + \sum_{i=0}^{p-1} \beta_4 \Delta SDG3_{t-i} + \\ & \sum_{i=0}^{p-1} \beta_5 \Delta SDG4_{t-i} + \sum_{i=0}^{p-1} \beta_6 \Delta SDG8_{t-i} + \sum_{i=0}^{p-1} \beta_7 \Delta SDG9_{t-i} + \sum_{i=0}^{p-1} \beta_8 \Delta SDG10_{t-i} + \\ & \sum_{i=0}^{p-1} \beta_9 \Delta SDG11_{t-i} + \sum_{i=0}^{p-1} \beta_{10} \Delta SDG16_{t-i} + \sum_{i=0}^{p-1} \beta_{11} \Delta SDG17_{t-i} + \psi ECM_{t-1} + \mu_t \quad (3) \end{aligned}$$

Where, all variables are as previously defined, β_0 represents the constant term, $\beta_1 \dots \beta_{11}$ indicates the coefficient of the first difference variables, ψ represents adjustment coefficient of the error correction term (ECM_{t-1}), which is derived from the long-run relationship estimated in equation number (2). p represents the maximum number of lags lengths, μ_t refers to the white noise residual, t - represents the time and i denotes the time of the previous observation value.

Diagnostics Tests

Finally, diagnostics tests will be performed to ensure the validity and stability of the specified ARDL model. For instance, the LM-test and heteroscedasticity test will be performed to ensure that the model residual is free from serial correlation and heteroscedasticity effect. Further, normality test will be performed to ensure that the residual of ARDL model is normally distributed. The Cumulative Sum of Recursive Residuals (CUSUM), and Cumulative Sum of Squares of Recursive residuals (CUSUMsq) tests will be performed to confirm that the specified ARDL model is stable.

Findings and Discussions

This section covers five steps including the stationarity status of the variables using unit root tests, followed by testing the existence of long-run relationship among the variables through bounds F-test. The third and fourth steps involve estimations of the long-run and short-run coefficients, along with the error correction term of the models. Finally, the goodness of fit and structural stability of the models were investigated through diagnostic tests.

Unit Root Tests

Application of the ARDL approach to cointegration requires that the variables be integrated of order zero or one, i.e. $I(0)$ or $I(1)$, or a combination of both. The ARDL approach is however inappropriate if one of the variables is integrated of order two, i.e. $I(2)$. This is because as noted by Ouattara (2004), the presence of $I(2)$ variables renders the computed F-statistics provided by Pesaran et al., (2001) invalid. It is therefore necessary to conduct stationarity tests in order to verify that none of the variables is integrated of order two, i.e. $I(2)$. Thus, the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests for stationarity were employed.

The results of the unit root test as reported in Table 1 disclosed that the logs of GDP, SDG16 and SDG 17 are stationary at level, i.e. they have no unit roots at their levels and are integrated of order zero, $I(0)$. On the other hand, the logs of SDG1, SDG2, SDG3, SDG4, SDG8, SDG9, SDG10, SDG11 have unit roots at their levels. However, they become stationary upon taking the first difference, and thus, integrated of order one, $I(1)$. This combination of $I(0)$ and $I(1)$ variables has justified the use of the ARDL approach to cointegration, which accommodate such situation.

Results of the Cointegration Test: Bounds F-test

As noted earlier, the bounds tests approach to cointegration was adopted in this study and the results are presented in Table 2 below. The results indicated that, the calculated F-statistics is higher than the upper critical bounds at 1% level of significance ($200.108 > 2.97$). Accordingly, there is strong statistical evidence of the existence of long-run relationship between the variables in this study. This result suggests that Malaysian Islamic banks' financing based on the objectives of the SDGs have long-run relationship with economic growth.

Estimates of the Long-Run Relationship

The results of the estimated model are presented in Table 3 below. The results of long-run coefficients of the regressors were mixed. While coefficients for SDG2, SDG3 and SDG4 were found to have statistically significant negative impact on economic growth in the long-run, SDG11 on the other hand was found to have statistically significant positive impact on economic growth in the long-run. For instance, at 5% level of significance, a 1% change in Malaysian Islamic banks' financing in line with SDG2 (Zero hunger), leads to about 2.662% decrease in economic growth in the long-run. In the case of SDG3, at 10% level of significance, a 1% change in Malaysian Islamic banks' financing in line with SDG3 (Good health and well-being) leads to 14.014% decrease in economic growth. Similarly, with regards to SDG4, at 1% level of significance, a 1% change in Malaysian Islamic banks' financing in line with SDG4 (Quality education) leads to 5.441% decrease in economic growth in the long-run. Conversely, at 5% level of significance, a 1% change in Malaysian Islamic banks' financing in line with SDG11 (Sustainable cities and communities) leads to 0.572% increase in economic growth in the long-run. The above significant impact of the regressors on economic growth corroborates with some of the studies in the literature (such as Gani and Bahari, 2020; Bougatef et al., 2020; Mohamad Yusof and Loong, 2020; Kassim, 2016; and Abduh and Omar, 2012).

The findings are an indication that with the exception of SDG11, Malaysian Islamic banks' financing in line with SDG2, SDG3 and SDG4 involves some compromise in economic growth in the long-run. This SDGs-GDP trade-off is expected since not all the financing by Islamic banks such as *qard hasan* (benevolent loan), *zakat* (obligatory charity) and *sadaqa* (voluntary charity) are captured in the calculation of GDP. That is to say, non-market activities such as *zakat* and *sadaqa* are not taken into account in measuring GDP and that may be one of the reasons for the negative relationship. Stiglitz et al. (2009) in a report by the "Commission on the Measurement of Economic Performance and Social Progress" suggested that the focus of GDP should not only be on measuring production at market prices but, instead, the focus should be on wealth, income and consumption at the household level, taking into account non-market activities such as domestic work, childcare, among others. The authors argued that, GDP per capita may go up while household income decreases leading to inequality. This divergence justifies the inverse relationship between SDG2, SDG3 and SDG4, and economic growth. This implies that, focus should not be on GDP growth but rather on achieving the SDGs. Researchers such as Coscieme et al. (2020), Adrangi and Kerr (2022), Eu-umweltbuero (2020) and Costanza et al. (2016) indicated how focussing on GDP growth may lead to difficulties in achieving the SDGs in general.

Table 1. Unit Root Test Results for the Malaysian GDP and Islamic Banks' Shariah Compliant Financing Based on SDGs Objectives

| Name of Variables | On Levels | | On First Differences | | Stationarity Status |
|-------------------|---------------------|-----------|------------------------|--------------|---------------------|
| | Intercept and Trend | | Intercept and No Trend | | |
| | ADF | PP | ADF | PP | |
| GDP | -4.218631** | -1.649828 | -3.456566** | -3.620429** | I(0) |
| SDG1 | -0.852254 | -1.728395 | -4.541123*** | -4.542193*** | I(1) |
| SDG2 | -1.548587 | -1.530286 | -4.581197*** | -4.618819*** | I(1) |
| SDG3 | -0.868467 | -0.868467 | -3.457798** | -3.477999** | I(1) |
| SDG4 | -1.545695 | -1.545695 | -3.678708** | -3.662088** | I(1) |
| SDG8 | -2.126707 | -2.173073 | -4.025320*** | -4.639204*** | I(1) |
| SDG9 | -1.321936 | -0.891083 | -3.009549* | -2.919876* | I(1) |
| SDG10 | -1.607540 | -1.263411 | -4.392060*** | -4.418304*** | I(1) |
| SDG11 | -0.592523 | -0.691949 | -3.452785** | -3.443991** | I(1) |
| SDG16 | -4.992233*** | -2.131041 | -3.623470** | -3.097778** | I(0) |
| SDG17 | -5.040142*** | -1.843126 | -1.695044 | -4.392542*** | I(0) |

Table 2: Bound Test Results for Cointegration

| Model | F-Stat | (Unrestricted intercept and trend) | |
|-------|----------|------------------------------------|------|
| | | I(0) | I(1) |
| | | | |
| GDP | 200.1086 | 1.98 | 2.97 |
| | | 2.21 | 3.25 |
| | | 5.37 | 6.29 |

Table 3: Estimated Long-Run Coefficients using the ARDL Approach, ARDL (3, 0, 0, 0, 0, 0, 0, 0, 0, 0) Selected Based on AIC Criterion, Dependent Variable is Malaysian GDP

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| SDG1 | 2.147788 | 4.959234 | 0.433089 | 0.7072 |
| SDG2 | -2.662293 | 0.395708 | -6.727921 | 0.0214 |
| SDG3 | -14.013950 | 4.005230 | -3.498912 | 0.0729 |

| | | | | |
|--------|-------------|------------|------------|--------|
| SDG4 | -5.441262 | 0.426367 | -12.761907 | 0.0061 |
| SDG8 | -0.258659 | 0.207428 | -1.246983 | 0.3386 |
| SDG9 | -0.660028 | 0.520180 | -1.268846 | 0.3322 |
| SDG10 | 0.142731 | 0.202991 | 0.703140 | 0.5548 |
| SDG11 | 0.571765 | 0.109698 | 5.212195 | 0.0349 |
| SDG16 | -0.042449 | 0.489010 | -0.086806 | 0.9387 |
| SDG17 | 2717.274189 | 979.632024 | -2.773770 | 0.1091 |
| @TREND | 3007.893417 | 956.877785 | 3.143446 | 0.0880 |

On the other hand, SDG11, which involves making cities and human settlements inclusive, safe, resilient and sustainable, was found to have positive impact on economic growth in the long-run. The affordable housing initiative for the bottom 40 per cent (B40) of Malaysians categorised as low-income group, could be one of the reasons for the positive relationship between SDG11 and economic growth. This is because the affordable housing initiative has enabled many low-income Malaysians in the B40 category, who previously could not afford to live in the cities in order to work, to become house owners in the cities. Now they are able to work to contribute to economic growth in country. This is in the right direction towards achieving SDG11 (Make cities and human settlements inclusive, safe, resilient and sustainable).

Estimates of Short-run Relationship and the Error Correction Model

The result of the impacts of Malaysian Islamic banks' financing based on the SDGs on economic growth in the short-run is presented in Table 4. The findings revealed that SDG2, SDG3, SDG4, SDG8, SDG9 and SDG17 all have significant negative impact on economic growth in the short-run, while SDG11 has a significant positive impact on economic growth in the short-run. This significant effect of the regressors on economic growth in the short-run is contrary to the findings in the work of Gani and Bahari (2020) in Malaysia, but reinforced that of Abduh and Omar (2012), Kassim (2016), among others. The error correction term (-2.912) has a negative sign and statistically significant at 1%, indicating the existence of an adjustment toward equilibrium.

Table 4: Short-run Coefficients Estimation using the ARDL Approach, ARDL (3, 0, 0, 0, 0, 0, 0, 0, 0, 0) Selected Based on AIC Criterion, Dependent Variable is Malaysian GDP

| Cointegrating Form | | | | |
|--------------------|-------------|------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(GDP(-1)) | 0.993584 | 0.063195 | 15.722527 | 0.0040 |
| D(GDP(-2)) | 0.591951 | 0.041409 | 14.295193 | 0.0049 |
| D(SDG1) | 4.742463 | 5.029065 | 0.943011 | 0.4452 |
| D(SDG2) | -7.763150 | 0.743950 | -10.435039 | 0.0091 |

| | | | | |
|-------------|--------------|--------------|------------|--------|
| D(SDG3) | -38.863921 | 4.581955 | -8.481952 | 0.0136 |
| D(SDG4) | -15.642786 | 1.021196 | -15.318109 | 0.0042 |
| D(SDG8) | -0.878177 | 0.253828 | -3.459737 | 0.0743 |
| D(SDG9) | -2.037715 | 0.416017 | -4.898150 | 0.0392 |
| D(SDG10) | 0.877551 | 0.379710 | 2.311108 | 0.1470 |
| D(SDG11) | 1.665425 | 0.165035 | 10.091337 | 0.0097 |
| D(SDG16) | -0.086518 | 0.724172 | -0.119472 | 0.9158 |
| D(SDG17) | -8077.566127 | 1184.281473 | -6.820647 | 0.0208 |
| | 844151.80065 | | | |
| C | 2 | 34611.686125 | 24.389213 | 0.0017 |
| CointEq(-1) | -2.911982 | 0.119532 | -24.361558 | 0.0017 |

Results of Diagnostic Tests

The results of the diagnostic tests in Figures 1, 2 and 3 as well as Tables 5 and 6 indicated that the model has passed all diagnostic tests of serial correlation, functional form, normality and heteroscedasticity. The model was also correctly specified indicating that the coefficients estimated were stable, efficient and unbiased. Also, the cumulative sum of recursive residuals (CUSUM) and the cumulative sum squares of recursive residuals (CUSUMSQ) tests were carried out to test for structural stability. The results demonstrated that all the plots of the CUSUM and CUSUMSQ statistics were within the critical bounds of the 5 percent significance level. Therefore, the null hypothesis, stating that all the coefficients in the regressions are stable, cannot be rejected. Thus, the results can be used for policy recommendation purposes.

Figures 1: Normality Tests

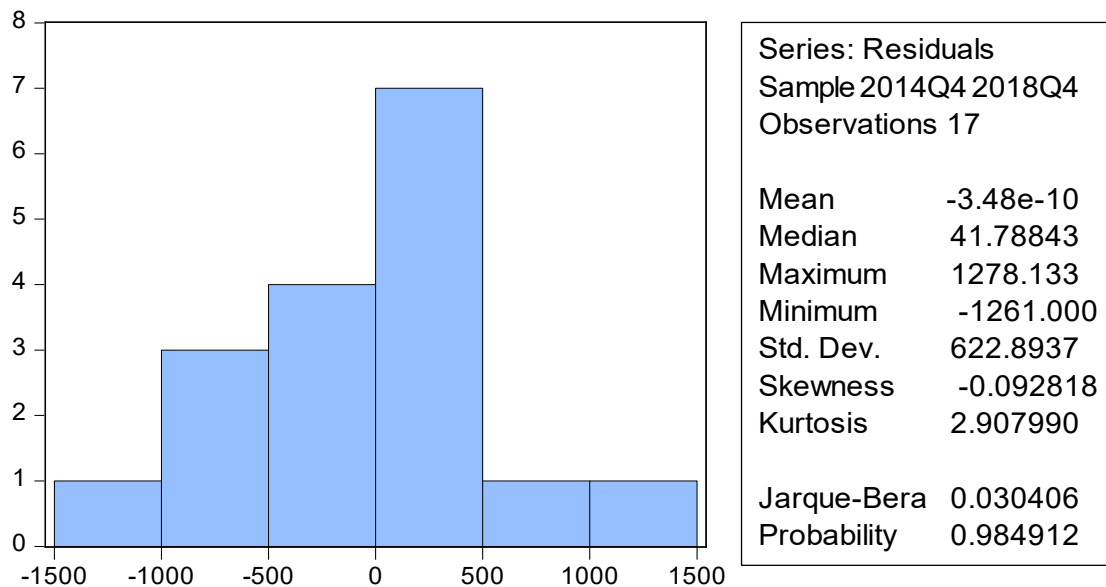
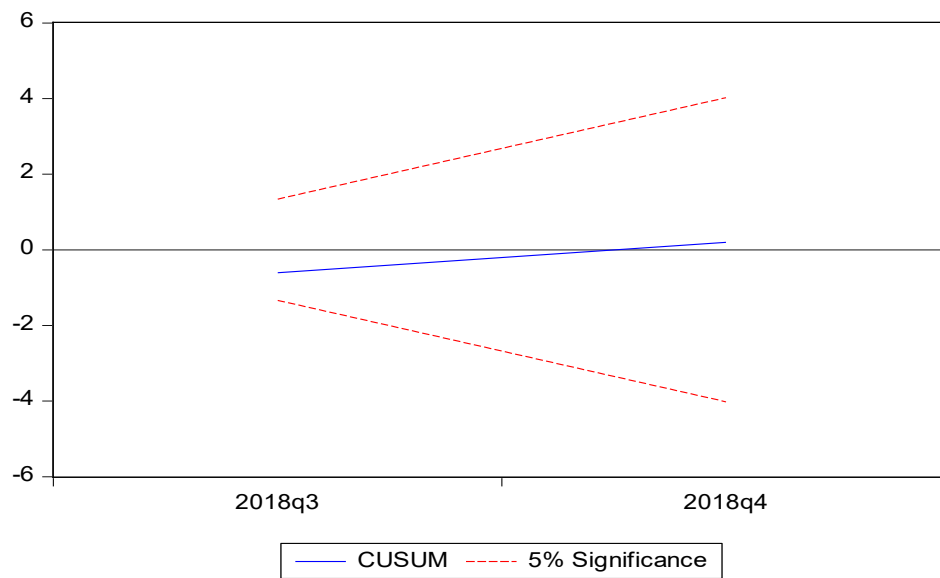


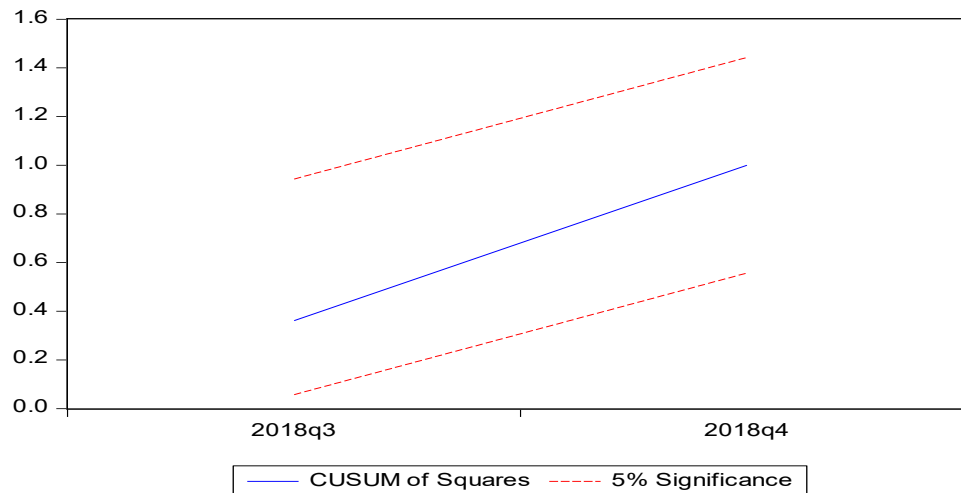
Table 5: Breusch-Godfrey Serial Correlation LM Test

| | | | |
|---------------|----------|---------------------|--------|
| F-statistic | 9.844973 | Prob. F(2,1) | 0.2198 |
| Obs*R-squared | 16.17834 | Prob. Chi-Square(2) | 0.0003 |

Table 6: Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---------------------|----------|----------------------|--------|
| F-statistic | 8.568712 | Prob. F(14,2) | 0.1093 |
| Obs*R-squared | 16.72122 | Prob. Chi-Square(14) | 0.2713 |
| Scaled explained SS | 0.220788 | Prob. Chi-Square(14) | 1.0000 |

Figures 2: Cumulative Sum of Recursive Residuals

Figures 3: Cumulative Sum Squares of Recursive Residuals

Conclusion

Given the pressing need to achieve the SDGs, the growing market share of Islamic banking in Malaysia, the increasing assets as well as significance of the industry in the country, necessitate an evaluation of the role the sector plays in contributing to economic growth through the SDGs. This paper employed the autoregressive distributed lag (ARDL) approach and bounds testing approach to co-integration to empirically investigate the impact of Islamic banks' financing that are aligned with the SDGs, on economic growth in Malaysia. The findings revealed that, overall, seven and four SDG indicators out of the ten analysed in this study were found to have statistically significant impact on economic growth in the short-run and long-run respectively. These indicators were SDG2, SDG3, SDG4, SDG8, SDG9, SDG11 and SDG17 in the short-run and SDG2, SDG3, SDG4 and SDG11 in the long-run. While SDG2, SDG3 and SDG4 remained inversely related to economic growth both in the short-run and long-run, SDG11 was found to have positive association with economic growth both in the short-run or long-run. With a focus on the long-run, continuous financing based on most of the SDGs objectives will eventually lead to decline in economic growth in the long-run. This highlights the compelling need to move focus from GDP growth to supporting the SDGs. While Islamic banks' financing in line with most of the SDGs may lead to decrease in economic growth, financing in line with some of the SDGs such as SDG11 may also lead to increase in economic growth in the long-run. Particularly, policymakers should encourage Islamic banks' participation in the affordable housing schemes for the B40. Hence, thoughtful policies to encourage Islamic banks' financing in line with the SDGs while coping with slow economic growth will be imperative in achieving the SDGs in the long-run. This matters, because with just eight years to go until the SDGs deadline of 2030, policymakers and Islamic banking regulators need to act fast by formulating strategies that will shift emphasis on GDP growth to financing the SDGs. More importantly, an all-inclusive representation of the true scale of financing in line with the SDGs, taking into account the extra costs of reaching the deprived and most vulnerable people as well as the full costs of transitioning to more equitable financing models, is needed to ensure the realisation of the 2030 agenda.

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Financial Development, Governance Systems and Economic Freedom as Determinants of Financial Inclusion

Leo Borders (Saint Louis University, Spain), Azad Abul Kalam (Islamic University of Technology, Bangladesh), Laura Muro (Saint Louis University, Spain), and Paolo Saonda (Saint Louis University, Spain)

Abstract

As a response to the United Nations urgent call for action by all countries -developed and developing- to embrace a global partnership for reaching the Sustainable Development Goals, this paper addresses the question of how financial development, governance systems, and economic freedom determine people's financial inclusion. By using the information from the Financial Access Survey published by the IMF for the period 2004-2020 with a sample of 110 countries. Panel data technique is used in the empirical analysis to deal with the heterogeneity problems. Our results confirm low levels of financial inclusion in the countries' sample and shed light on the benefits of having more developed financial and governance systems, as well as more countries' economic freedom. We provide several policy implications from our findings.

Keywords: sustainable development goals, financial inclusion, financial development, governance systems, economic freedom

Introduction

The Universal Declaration of Human Rights states that everyone has the basic right to an adequate standard of living, emphasizing social and economic rights as a necessity to the healthy growth and development of individuals as well as communities. These socio-economic rights provide a foundation on which people can establish themselves to be not just members of the global community, but as independent, economically self-governing citizens who have an inherent freedom to influence their own livelihoods.¹ One of the numerous contributing factors that differentiate communities with more developed socio-economic rights from those with less is that of financial inclusion (Arner et al., 2020), a factor that accounts for a population's involvement in formal financial systems including banks, credit unions, cooperatives, post offices, or microfinance institutions (Allen et al., 2016).

Along with the Universal Declaration of Human Rights, countless other influential, multinational entities and edicts have credited financial inclusion as being a major constituent in, and thus tool to, advancing living standards around the world. The World Bank, the IMF, the Alliance for

¹<https://www.ohchr.org/en/NewsEvents/Pages/DisplayNews.aspx?NewsID=23970&LangID=E#:~:text=Article%2025%20of%20the%20Universal,widowhood%2C%20unemployment%20and%20old%20age> Date of access: 31 March 2022

Financial Inclusion, and the Consultative Group to Assist the Poor, all agreed to collaborate in expanding the presence of formal accounts with the Universal Financial Access 2020 initiative (Gálvez-Sánchez et al., 2021), marking a turning point on the road to global financial inclusivity at the historic 2009 Pittsburgh Summit. In this same era that is defined by an increase in recognition for the topic, the United Nations (UN) also identified financial inclusion as an enabler for at least seven of their seventeen Sustainable Development Goals (SDGs) for 2030.² The issue's repeated reference from such a broad range of supranational institutions-as well as numerous disciplines from the UN's very own SDGs-highlights the robust and expansive extent to which these entities believe that financial inclusion integration can, in an all-encompassing manner, reduce poverty, provoke prosperity, and drive development.

The World Bank identifies about 1.7 billion adults who do not have an account³ with a financial institution or a mobile money provider, nearly half of which are living in just seven developing economies (Demirgüç-Kunt, 2018): China, India, Indonesia, Pakistan, Nigeria, Bangladesh, and Mexico. Therefore, we find it necessary to explore the determinants of financial inclusion with the aim of providing insights and recommendations to policy makers with the ultimate goal of having a more financially included global population.

Certainly, it is clear that financial inclusion is a growing area of focus. Previous academic studies and researches have concluded that much of the financial exclusion around the world is condensed into particular geographic regions and demographic categories (Demirgüç-Kunt, 2018, Khera et al., 2022), illustrating the high potential for sweeping impacts in underbanked communities when targeted. Overwhelmingly, previous studies establish (Hajilee et al., 2017, Van et al., 2021) a positive correlation between economic growth and financial inclusion with particularly suggestive results coming from developing economies (Khera et al., 2022), paving the way for the optimistic technical approach in our own index development. In supporting this ever-growing consensus, these bodies of literature recognize other relevant factors in their definitions of financial inclusion, such as social inclusion (Aziz and Naima, 2021) and digital assimilation of the community (Khera et al., 2022). These other interpretations exhibit a deeper social consideration and embrace financial inclusion as a proposal that seeks to unlock development opportunities to improve the lives of all, especially those of the poor and marginalized (Allen et al., 2016) by expanding access to catalytic financial tools (Arner et al., 2020) as suggested by the United Nations. Referenced but not utilized, these studies fail to accurately incorporate and quantify the relevance of said dimensions into a functioning, empirical index.

Our goal in this study is to analyze how the development of the financial system, the efficiency of the world governance indicators per country as well as the country's economic freedom impact with the financial inclusion index. However, we attempt to enhance the existing, well-demonstrated technical approach by tackling our index from a tri-dimensional perspective, incorporating the traditional index to combine with previously underrecognized factors. Our

² <https://www.worldbank.org/en/topic/financialinclusion/overview#1> Date of access: 31 March 2022

³ <https://www.worldbank.org/en/topic/financialinclusion/brief/achieving-universal-financial-access-by-2020> Date of access: 31 March 2022

Encompassing Financial Inclusion Index proportionally draws from three components: i) a financial systems development, ii) a quality of country's governance, and iii) economic freedoms. Specifically, in our sub-index that incorporates the relevant economic information pertaining to the development and health of financial systems, we have selectively decided to (within the limits of our data) pursue the proven technique carried out by Sarma and Pais (2011) with their Index of Financial Inclusion (IFI). Defining the three standard dimensions of financial inclusion as accessibility, usage of banking services, and depth of the financial system, they create a comprehensive tool that acts as a cornerstone in our empirical studies.

Our empirical model illuminates the role of financial systems, governance quality, and economic freedoms as determinants in reaching financial inclusion and allows data-based conclusions to be drawn from various, previously uncombined perspectives. Given this uniqueness of precisely chosen variables and research studies, our methodology is contributory and novel as we construct the Encompassing Financial Inclusion index based on three complementary economic arguments to provide empirical, cross-country analyses. Additionally, our methodology incorporates multiple measures of each component to ensure robustness of our findings. Results are later contrasted with changes in the dependent variable by considering the access, use, and depth of the financial system. This applied econometric technique allows for control of the unobservable heterogeneity problem for each sampled country.

Altogether, low levels of financial inclusion in the country sample were unsurprisingly confirmed. Also, we encountered a significant monopoly power of the banking systems worldwide. Big banks have the capacity to provide financial services to financially excluded individuals, but in practice, evidence suggests a negative relationship between bank profitability and financial inclusion. Furthermore, results reveal that when capital markets drive resources to the corporate sectors, households will have less opportunities to be financially included. Additionally, we observe that countries' institutions play a fundamental role in financial inclusion, as demonstrated when analyzing the world governance indicators. Finally, according to previous research identified and utilized in our literature review, the economic freedom of the country positively affects financial inclusion. All these results reveal the importance of implementing national regulations for improving financial and governance systems while simultaneously encouraging the pursuit of economic freedoms.

The ultimate goal for the UN is decent economic growth. Consistently, academic studies have proven that financial exclusivity inhibits economic growth and severely impacts the most marginalized peoples around the world. By focusing on emerging markets where immediate inclusion can create exponential societal advancements, we seek to provide valuable insight and information to contribute to the UN's goal.

The rest of the study continues as follows: Section 2 describes the literature review and develops the research hypotheses. Section 3 discusses the methodological strategy used in the empirical analysis. Section 4 presents our results and discussion. Section 5 explains our conclusions and policy recommendations.

Literature Review

Chibba (2009) highlights four key pillars to establish the nexus between financial inclusion, poverty reduction, and SDGs: private sector development, financial literacy, microfinance, and public sector support. More recently, Kabakova and Plaksenkov (2018) highlight the necessity of not only reinforcing the financial markets, but also the political, economic, social and technological environment. In this assertion, the complex presence of financial inclusion in emerging economies becomes obvious. Consequently, we have grouped determinants of financial inclusion into three main categories, as detailed below, to parallel the development of the tenants in our Encompassing financial inclusion index.

Quality of the Countries' Governance and Financial Inclusion

As our world becomes more global, supranational institutions, such as the Financial Stability Board and the Basel Committee on Banking Supervision, have been working to develop international financial standards. Academic arguments, such as that from Jones and Knaack (2019), suggest the requirement of given standard-setting bodies in international finance to analyze and implement national efforts for financial inclusion and economic development. Moreover, they propose relevant reforms that would eventually integrate into governmental policies and laws. Regardless of whether governments are persuaded by supervisory organizations, it is certain that they have a huge role in influencing financial health within their countries' and the region.

Research is minimal in understanding the exact manner in which government regulations improve financial inclusion (Kodongo, 2018). Governments indeed play a fundamental role in the process of inclusivity, but the direct correlations are not yet fully realized. Only very recent studies, such as Muhammad et al. (2021) provide early analytical data that government quality enhances financial inclusion while taking into account specific governmental indicators.

On the other hand, it is known that unfavorable regulatory systems restrict the frequency of people engaging in financial transactions and can diminish financial inclusion (Muhammad et al., 2021). For the specific example of Sub-Saharan Africa, Anarfo et al. (2020) find that strong conservative regulations could negatively impact financial inclusion goals. Kabakova and Plaksenkov (2018), by conducting an analysis of the ecosystems of 43 countries, highlight the importance of proper regulation and governmental support for the improvement of financial inclusion, along with other influential factors such as well-being and economic opportunities. Similarly, Avom et al. (2021) find that the nonlinear relationship between bank concentration and financial inclusion depends on the levels of protection of property rights, control of corruption, regulatory quality, and other factors.

Okello Candiya Bongomin et al. (2019) suggest fiscal policies such as tax exemptions as a tool for promoting digital financial innovations to improve financial inclusion. Therefore, the literature supports the growing prevalence of digitalization and its interconnectedness with financial inclusion. In this line, Arner et al. (2020) asserts that governments can adopt less expensive cash

transfers, cut back on government expenditure, and allow for marginally higher-valued benefits to be captured with the help of digital financial tools.

Another important component of the quality of a country's governance system is its integrity, which also plays a fundamental role in economic development. Sha'ban et al. (2020) find a positive relationship between government integrity and financial inclusion in the development of their own cross-country financial index. On a similar page, Dzhumashev (2014) and Pulok and Ahmed (2017) develop models that conclude that the incidence of corruption declines with economic development. Finally, Al Mamun et al. (2017), using a sample of 50 exporting oil companies, find that the most important driver of economic growth is the quality of the governance system.

Therefore, the proposed hypothesis is:

H1: Improvements in the Quality of the Country's Governance System will Drive More Financial Inclusion.

Development of the Financial Systems and Financial Inclusion

Financial systems are composed of institutions such as central banks, private banks, microfinance entities, among others and their developmental policies affect the financial inclusion of the citizens in a particular country. As highlighted by Arner et al. (2020) restructuring financial systems to support the United Nations SDGs is a growing movement that enables financial inclusion to play an increasing role in the digital financial transformation. Ensuring this financial inclusion thus manifests a more inclusive society, hence the incorporation of financial systems in our index as it can be distinctly measured and advanced in a society Aziz and Naima (2021).

Banking System

Financial inclusion is a question to be considered by central banks, firstly, because of the impact it has on economic growth and poverty reduction and secondly, for the implications it has for monetary and financial stability. For instance, more inclusion facilitates the efforts of the central bank to keep prices under control and drives stable inflation and output growth for emerging markets (Vo et al. 2021). Notwithstanding, it should be noted that more financial inclusion doesn't implicitly have positive repercussions to an endless degree. As explained by Mehrotra and Yetman (2015), financial inclusion in the specific scenario of fast credit growth in the banking sector could conversely increase the risks in the financial system. Overarchingly however, negative side effects are trifling, and central banks proposedly support financial inclusivity among citizens and private companies.

Both private and public banks play a critical role in the path for financial inclusion. For instance, Inoue (2019) explains how since the late 1960s, the Indian government has implemented different policies to expand banking services in the country. Among those policies, he finds how public sector banks have contributed to poverty reduction with their influence as they hold more than 70% of market share of banking assets. Hence, the impactful role of the public sector banks is

illustrated as they financially serve the poor and those marginalized in society without solely seeking to maximize their profits.

Similarly, Diniz et al. (2012) present a trailblazing case study of financial inclusion in the *Autazes* region, a part of the Amazon not served by banks until 2002. They found financial inclusion as an important driver for socio-economic development, but simultaneously found problems such as low-income populations and over-indebtedness that highlight the necessity for first financial education before assimilation into the private banking sector. In this sense, the combination of both private and public banking resources are relevant in how effectively people are admitted into the overall financial system.

Finally, Dinh Thi Thanh and Nguyen Ha (2019) reflect on specific indicators of a healthy financial system's presence in a community. A larger number of bank branches and ATMs correlates to an increase in formal financial resources, promoting financial literacy, they explain. Allen et al. (2016) also acknowledges that low bank account costs and proximity to financial intermediaries are other indicators that positively affect inclusivity. Hence, according to Huston (2010), analyzing the pertinence of financial inclusion in a community is necessary not only to understand the educational influence but also to pinpoint the barriers that people experience when attempting to make an effective financial decision with a bank. Consequently, we direct our index and this literature review to further understand financial inclusion's relationship with banks in emerging economies.

Capital Markets

According to Lim (2014), financial development and institutional quality are relatively vigorous determinants of investment into capital markets. More specifically, Rojas Cama and Emara (2022) Rojas Cama and Emara (2022) affirm this statement and specify it, saying that financial inclusion itself acts as a determinant factor for an investment. Together, these bodies of literature reflect a macroeconomic stance on financial inclusion's role in capital markets as a catalyst and a worthy variable in deciding the investment capabilities in a country (Md and Jianguo, 2019).

Continuing with the large scale perspective, Lim (2014) examines the institutional and structural factors that contribute to differing investment activities between countries. Indeed, the author states that national policies looking to improve investment financing should improve financial sector development, including but not limited to financial inclusion development. Accordingly, Md and Jianguo (2019) suggest that policymakers in emerging economies implement directed financial policies that strengthen the capital markets and promote financial inclusion to thus attract funds from international investors.

Notably, this identified accumulation of research studies the level of financial inclusion as a reason *to* invest in capital markets. As the already limited research becomes more sectoral, however, it narrows on the intermarket correlation between capital market participation and financial inclusion, as seen in the subsequent literature.

From a regional perspective, Rojas Cama and Emara (2022) similarly connect financial inclusion to capital markets in their study of MENA countries. Upon researching gross capital formation and related fields, they find that financial inclusion has the potential to promote economic growth through, for example, allocating capital more effectively. With efficient capital allocation, the cost of capital can be reduced (Sarma and Pais, 2011), while the availability of capital can be increased (Hajilee et al., 2017, Kusuma, 2020); inevitably this leads to smoother access to the financial system for excluded people as the combination of capital enhancements bidirectionally stimulate the capital market. That being said, a more indirect causal chain leads to this conclusion, illustrating the possibility of a lack of robustness, potential for errors, or decrease in correlation.

From a single country perspective, Agnes Akpene et al. (2022) highlight these conclusion instabilities with their Ghana case study. While devising their standalone regression model -with key variables tested being financial literacy, financial inclusion, and stock market participation- they show that connection between the first two stated variables on stock market participation is not actually statistically significant. Numerous other optimistic conclusions are derived, but those relating to financial inclusion in emerging markets indicate that the use of capital markets as a variable may have marginally positive impacts, if not negative implications.

Seemingly, results regarding this interconnectedness between financial inclusion and capital markets are mixed, particularly when taking the necessary steps to differentiate between interactions within a country and between countries. Altogether, the development of the financial system is crucial to enhancing financial inclusion. Given the data available, literature focus has been directed toward banking systems and capital markets with further analyses investigated in the conclusion section.

Therefore, the proposed hypothesis is:

H2: Improvements in the Development of the Financial System will Drive Financial Inclusion

Economic Freedom and Financial Inclusion

According to the Heritage Foundation,⁴ economic freedom is the fundamental right of every human to control his or her own labor and property. Accordingly, Ram (2014) highlights the importance of this economic freedom as an appropriate indicator of a country's institutional and political environment. Thus, this body of literature explains the interconnectedness of financial inclusion, economic freedom and quality of the institutional system. Indeed, Muhammad et al. (2021) explain that high governance quality combined with economic freedom can increase the financial services available to people and can subsequently increase the country's inclusivity.

Although this explanation contributes to the justification of the two factors in building an encompassing financial inclusion index, it is still essential to distinguish economic freedom as an

⁴ <https://www.heritage.org/index/about> Date of access: 31 March 2022

independent variable to be considered, as it does not perfectly correlate to governance quality. As shown in the Fraser Institute's own categorization of economic freedom,⁵ governance is merely a component, along with size of government, regulation, sound money, and others being identified by Gwartney et al. (2021).⁶

Muhammad et al. (2021) further elaborates on the importance of economic and financial freedom; economically free environments, where restrictions are not overly excessive or prohibitive, allow for natural business competition which in turn stimulates financial inclusion strategies among organizations. As explored in their robust study, free-market economies can financially include their non-banked individuals more effectively with the help of directive government regulations. Finally, their methodological findings eloquently depict economic freedom and government quality as “mutually reinforcing and their ambidextrous performance enhance financial inclusion”.

In a pioneering study, Chortareas et al. (2013) designed a two-stage approach to definitively measure the impact of financial freedom on financial inclusion effectiveness. Effectiveness scores are derived for the 27 European Union member states, which are then regressed against a variety of economic freedom control variables. Results indicate a strong correlation between financial factors of economic freedom and overall bank efficiency and financial stability.

The economic freedom data from the study of Chortareas et al. (2013) come from the Heritage Foundation's Index of Economic Freedom.⁷ Today, this Index⁸ evaluates 12 governmentally affiliated areas that impact national prosperity, such as fiscal health, labor freedom, and government integrity. Both Heritage Foundation⁹ and the Fraser Institute have developed reliable, methodologically backed indices that translate relevant social factors into digestible data. Although the economic freedom rankings are similar, we decided to use data from the Heritage Foundation as it represents mainly policy variables under a government's control.

⁵<https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2021-annual-report> Date of access: 31 March 2022

⁶ <https://www.fraserinstitute.org/sites/default/files/economic-freedom-of-the-world-2021.pdf> Date of access: 31 March 2022

⁷ <http://www.heritage.org/index/> Date of access: 31 March 2022

⁸ https://www.heritage.org/index/pdf/2022/book/2022_IndexofEconomicFreedom_Highlights.pdf Date of access: 31 March 2022

⁹ <https://www.heritage.org/index/about> Date of access: 31 March 2022

Therefore, the proposed hypothesis is:

H3: Improvements in Economic Freedom will Drive Financial Inclusion.

Methodology

Variables Definition and Source of Information

The goal of this study is to analyze how the development of the financial systems, the efficiency of the world governance indicators per country, and the country's economic freedom impact financial inclusion. Hence, the dependent variable will correspond to a metric of the encompassing financial inclusion index. In order to build an efficient metric of financial inclusion, we follow Khera et al. (2022) and Sha'ban et al. (2020) approaches. Khera et al. (2022) considers the access and the usage for digital financial services to build their index, whilst Sha'ban et al. (2020) include the depth of the financial system to build their index. Therefore, by consolidating both similar approaches, this study incorporates the three complementary dimensions of financial inclusion: the use, access, and depth. The information was obtained from the Financial Access Survey published by the IMF and corresponds to a supply-side data set on the access and use of financial services to measure and monitor financial inclusion. Regarding the dimensions, the use of the financial system represents the outreach of available financial services in each country by adults, which is measured by the number of deposit accounts with commercial banks per 1,000 adults and by the number of loan accounts with commercial banks per 1,000 adults. The access to the financial system represents the demographic outreach of banks' physical outlets and is also measured with two indicators, represented by the number of commercial bank branches per 100,000 adults and by the number of ATMs per 100,000 adults. Finally, the depth of the financial system represents the actual usage of financial services. This dimension is measured with two indicators represented by the outstanding deposits with commercial banks as a share of the GDP and the outstanding loans from commercial banks as a share of the GDP.

Following Sha'ban et al. (2020) and Svirydzhenka (2016), the construction of the encompassing financial inclusion index is done in three different steps. In the first one, we normalize the three different dimensions (e.g., use, access, and depth) of financial inclusion to let the metric run from 0 to 1. In order to do so, a non-parametric approach is used that allows one to get an equally-weighted composite index. The estimation is conducted by applying $l_{itc} = (I - Min)/(Max - Min)$, where l_{itc} is the value of financial inclusion indicator i in period t for country c ; Min and Max are the minimum and maximum value, respectively, for indicator i over the sample period for all sample countries. Therefore, the normalized value represents the indicator's deviation from the minimum and maximum limits across the sample, that is, it relates a country's extent of financial inclusion to the global minimum and maximum across all countries and years. Since the metric runs from 0 to 1, the higher the value of the indicator, the higher the degree of financial inclusion.

In the second step, the six normalized indicators (e.g., two indicators for each of the three measures of use, access, and depth) are used to calculate three dimensional indices. The

dimensional index corresponds to the average of the two relevant indicators. Finally, in the third step, the three dimensional indices are aggregated into the encompassing financial inclusion index (*FII*) using the geometric mean as follows:

$$FII = \sqrt[3]{I_{use} \times I_{access} \times I_{depth}} \quad (1)$$

The independent variables are grouped in three categories: i) development of the financial systems, ii) the efficiency of the world governance indicators per country and iii) the country's economic freedom. Since financial systems are complex structures, we decided to subsequently break it down into its development of the banking system and development of capital markets as its two most important components to gain granular understanding of the drivers of financial inclusion. The information was obtained from the Financial Development and Structure Dataset published by the World Bank and developed according to Beck et al. (2000). The degree of development of the banking system will be measured with: i) the claims on domestic real nonfinancial sector by the Central Bank as a share of GDP (*FinDevBank1*), ii) bank credits to bank deposits measured as the private credit by deposit money banks as a share of demand, time, and saving deposits in deposit money banks (*FinDevBank2*), iii) net interest margin computed as the accounting value of banks' net interest revenue as a share of its interest-bearing (total earning) assets (*FinDevBank3*), iv) bank concentration measured as the assets of three largest banks as a share of assets of all commercial banks (*FinDevBank4*), v) banks' ROA computed as the average return on assets $\left(\frac{Net\ Income}{Total\ Assets}\right)$ (*FinDevBank5*), vi) banks' ROE calculated as the average return on equity $\left(\frac{Net\ Income}{Total\ Equity}\right)$ (*FinDevBank6*), and vii) the banks' Z-Score (*FinDevBank7*) which is estimated as $\left(ROA + \frac{Total\ Equity}{Total\ Assets}\right) / \sigma_{ROA}$, where σ_{ROA} is the standard deviation of ROA.

The corresponding measures of the development of the capital markets are: i) stock market capitalization (*FinDevMkt1*) computed as value of listed shares to GDP, ii) the stock market turnover ratio (*FinDevMkt2*) which is the ratio of the value of total shares traded to average real market capitalization, iii) private bond market capitalization to GDP (*FinDevMkt3*) computed as the private domestic debt securities issued by financial institutions and corporations as a share of GDP, iv) the public bond market capitalization to GDP estimated (*FinDevMkt4*) as the public domestic debt securities issued by the government as a share of GDP, v) international debt issues to GDP (*FinDevMkt5*) which is the international debt securities (amortization outstanding) as a share of GDP, and vi) and the net remittance inflows to GDP (*FinDevMkt6*).

The second category of independent variables correspond to measures of the quality of a country's governance systems. These variables are obtained from the World Governance Indicator data set publicly available from the World Bank. These indicators measure six dimensions of governance which go from approximately -2.5 (weak) to 2.5 (strong) (Kaufmann et al. 2011): i) Voice and Accountability (*GovSys1*) which is the process by which governments are selected, monitored, and replaced; ii) Political Stability and Absence of Violence/Terrorism (*GovSys2*) which measures the perceptions of the likelihood that the government will be

destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism; iii) Government Effectiveness (*GovSys3*) which corresponds to the quality of public and civil services, and the degree of their independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies; iv) Regulatory Quality (*GovSys4*) which measures the perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development; v) Rule of Law (*GovSys5*) which reflects the confidence of the agents in the rules of society and whether they abide by them, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence; and finally vi) the Control of Corruption (*GovSys6*) which measures the perceptions of the extent to which public power is exercised for private gain, including both petty and major forms of corruption, as well as "capture" of the state by elites and private interests. Additionally, a seventh measure of the quality of the country's governance system is included (*GovSys7*) that is calculated as the average of the previous six dimensions of governance.

Finally, the last group of variables corresponds to the degree of the country's economic freedom published by The Heritage Foundation. The economic freedom index is a country's indicator of the advancement in economic freedom, prosperity, and opportunity. This construct of economic freedom is recorded in this study with the following 4 indicators: i) financial freedom (*EconFree1*), ii) business freedom (*EconFree2*), iii) trade freedom (*EconFree3*), iv) investment freedom (*EconFree4*). In addition to these 4 indicators, we computed an overall score by averaging them, with equal weights being given to each of them (*EconFree5*). Each of these indicators of economic freedom is graded on a scale of 0 to 1.

The total sample includes 110 countries which allows compound panels for each of them with data that goes from 2004 to 2020.

Baseline Model

Given that we account with cross sectional and time series data, panel data technique arises as a suitable econometric method for the regression outcomes. Hence, our general firm fixed-effect model is:

$$FII_{ct} = \beta_0 + \sum_{j=1}^J \delta_j DevFinSys_{ct} + \sum_{k=1}^K \theta_k GovSys_{ct} + \sum_{l=1}^L \rho_l EconFree_{ct} + \varepsilon_c + \varepsilon_{ct} \quad (2)$$

Where FII_{ct} represents the measure of encompassing financial inclusion index for the c country in the t period. $DevFinSys$ is the vector of J measures of the development of the financial system, and $GovSys$ is the vector of K measures of governance system in each country, and $EconFree$ is the vector of the different L measures of economic freedom. Finally, ε_c and ε_{ct} represents the country fixed-effect and the stochastic error, respectively.

Results and Discussion

Descriptive Statistics

Given that our encompassing financial inclusion index (*FII*) is an unobservable construct compounded by three elements (e.g., access, use and depth of the financial system) that in turn are individually formed out of two more elements, it is necessary to run a reliability test of each indicator. This test is conducted using Cronbach's Alpha which examines whether the components of each indicator (e.g., access, use, depth of the financial system, and the encompassing financial inclusion index) have internal consistency and stability. The value 0.6 or above in the scale reliability coefficient of the Cronbach's Alpha is considered acceptable to pass the test (Ararat et al., 2021). In table 1, the scale reliability coefficients of the three financial inclusion dimensions are presented. Among the three dimensions, the depth index has the highest coefficients ($\alpha=0.989$), indicating that the items are highly internally consistent and generalizable to others. The financial inclusion access index has a coefficient more than the threshold value ($\alpha=0.723$) which also denotes that the test results are consistent over time. However, the use index coefficient is relatively small ($\alpha=0.648$) compared to the access and depth indices, although it passes the test. Overall, the financial inclusion (*FII*) has an acceptable and justified reliability coefficient ($\alpha=0.609$).

Table 1: Reliability Statistics: Cronbach's Alpha

| | Access Index | Use Index | Depth Index | FII |
|--------------------------------|-----------------|--------------|----------------|--------|
| Average interitem covariance: | 0.0101 | 0.0063 | 0.0023 | 0.0030 |
| Number of items in the scale: | 2 | 2 | 2 | 3 |
| Scale reliability coefficient: | 0.7230 | 0.6476 | 0.9895 | 0.6086 |

The summary of the descriptive analysis of the dependent variable corresponding to financial inclusion, and the independent variables (development of the financial systems, world's governance indicators, and country's economic freedom) are shown in Table 2. The result shows that the three dimensions of financial inclusion access, use, and depth index have little variation among them in terms of mean value and their maximum values are close to 1. However, the maximum value of the financial index is 0.262, which indicates a very low level of financial inclusion in the countries' sample. The variables denoting the development of the banking system have significant differences among them. For instance, the mean value of central bank assets to GDP (*FinDevBank1*) and net interest margin (*FinDevBank3*) is 5.1% and 4.7%, respectively. The other measures of banks profitability indicate that the average return on assets (*FinDevBank5*) and the return on equity (*FinDevBank6*) are 1.4% and 11.8%, respectively, but with a high volatility. Indeed, it is observed that the minimum and maximum values of return on equity are about 80% in negative and positive values. The results also exhibit that the three biggest banks in each country hold more than 57% of the banks assets in the financial system. This finding reveals the significant monopoly power observed in the banking systems worldwide.

Regarding the development of the capital market, we observe that the stock market capitalization (*FinDevMkt1*) represents more than 21% of the countries' GDP, with a stock market turnover ratio (*FinDevMkt3*) of almost 15 times. Moving to the aggregated world governance indicator (*GovSys7*), we observe that the mean value is negative (-0.144), denoting that the governance structure of the selected sample is relatively poor. With respect to the economic freedom index (*EconFree5*), the sampled economies have a considerably good average index of 60/100 which indicates that the economic freedom of the economies acts as a reinforcement for enhancing financial inclusion.

Table 2: Deceptive Statistics

| Acronym | Variable's Concept | Obs | Mean | Std. Dev. | Min | Max |
|-------------|--|-------|--------|-----------|--------|--------|
| Access | Access index normalized | 1,318 | 0.127 | 0.118 | 0.001 | 0.969 |
| Use | Use index normalized | 1,318 | 0.108 | 0.099 | 0.000 | 0.998 |
| Depth | Depth index normalized | 1,318 | 0.017 | 0.048 | 0.000 | 0.964 |
| FII | Encompassing financial inclusion index | 1,318 | 0.055 | 0.041 | 0.000 | 0.262 |
| FinDevBank1 | Central bank assets to GDP | 1,188 | 0.051 | 0.094 | -0.971 | 0.737 |
| FinDevBank2 | Bank credit to bank deposits | 1,188 | 0.887 | 0.407 | -0.085 | 3.119 |
| FinDevBank3 | Net interest margin | 1,188 | 0.047 | 0.031 | -0.194 | 0.232 |
| FinDevBank4 | Bank concentration | 1,188 | 0.571 | 0.297 | -0.306 | 1.436 |
| FinDevBank5 | Bank's roa | 1,188 | 0.014 | 0.017 | -0.085 | 0.238 |
| FinDevBank6 | Bank's roe | 1,188 | 0.118 | 0.121 | -0.851 | 0.816 |
| FinDevBank7 | Bank Z-score | 1,188 | 0.131 | 0.097 | -0.077 | 0.595 |
| FinDevMkt1 | Stock market capitalization | 1,188 | 0.211 | 0.392 | -0.864 | 3.284 |
| FinDevMkt2 | Stock market total value traded | 1,188 | 0.088 | 0.255 | -0.807 | 2.154 |
| FinDevMkt3 | Stock market turnover ratio | 1,188 | 0.146 | 0.396 | -1.085 | 4.550 |
| FinDevMkt4 | Private bond market capitalization | 1,188 | 0.045 | 0.142 | -0.361 | 0.802 |
| FinDevMkt5 | Public bond market capitalization | 1,188 | 0.090 | 0.266 | -0.411 | 2.108 |
| FinDevMkt6 | International debt issues to GDP | 1,188 | 0.135 | 0.259 | -0.204 | 1.798 |
| FinDevMkt7 | Remittance inflows to GDP | 1,188 | 0.052 | 0.070 | -0.002 | 0.370 |
| GovSys | World governance index | 1,316 | -0.144 | 0.728 | -1.903 | 1.727 |
| EconFree | Economic freedom index | 1,176 | 60.002 | 8.649 | 21.400 | 79.100 |

Notes: This table represents the summary statistics of the financial inclusion, financial system, world governance indicators, and country's economic freedom. The financial index is calculated for 1318 observations; the development of the banking system and the development of the capital market index are calculated for 1188 observations; the world governance indicator is calculated for 1316 observations, and the economic freedom index is calculated for 1176 observations.

Multivariate Analysis

This section represents the regression result of the fixed-effect model for exploring the impact of the financial system development on financial inclusion. The metrics of financial system development are divided into two broad groups that identify the development of the banking system and the development of capital markets. The first seven variables exhibited in Table 3 correspond to the banking system development while the rest denotes the capital market

development. The central bank asset to GDP (*FinDevBank1*) is found to be statistically significant in the first three models. Regarding the conversion of bank deposits into credits (*FinDevBank2*), this is statistically significant in all the models at 1% confidence level. This is a clear symptom of financial inclusion when the access to credit gets to the final consumer. Moving to the net interest margin (*FinDevBank3*) however, the relationship is found negative, indicating that more profitable banks have lower financial inclusion. When banks make more money from the customer in order to increase the margin for internal profits, the barriers to access to the financial system get higher and with more friction, preventing the final consumer from taking advantage of banking services. This finding is in line with the banks return on equity (*FinDevBank6*), which indicates that there is a transfer of wealth from final customers to banks that gets more difficult the access to the financial system. This finding is also related to the metric of bank risk (*FinDevBank7*) which is positive and statistically significant. However, given the construction of this variable, the interpretation of the estimated coefficient is in the opposite direction. In this case, it means that as bank operating risk increases, the financial inclusion is constrained. This can be interpreted as a hedging strategy followed by financial intermediaries that restrict the access to financial services to people when risk increases. Regarding the bank concentration (*FinDevBank4*) which represents a measure of the monopoly power of the bank, the last model indicates that big banks have the capacity to provide more financial tools to the people for getting access to the financial system.

The second broad group corresponds to the development of the capital markets. The evidence indicates that stock market capitalization to GDP (*FinDevMkt1*) is negatively associated with financial inclusion ($p=0.0021$) at a 1% level confidence level. One plausible explanation of such a diminishing relationship is that the stock market capitalization variable measures the development of corporate sectors more than the financial development of households. Also, when banks and financial institutions start investing in the stock markets rather than focusing on credits and loans to people, the consumers are deprived of getting smoother access to financial tools. Such concentration in the stock markets may technically diminish the development of the financial system. This finding is concomitant with the stock market turnover ratio (*FinDevMkt2*) which is also negatively related to the financial inclusion index (*FII*). This finding indicates that when total shares are continuously traded and they change hands very often, the financial system lubricates such transactions through allocating resources and financial services in the corporate sector, and consequently, giving less opportunities to households to take advantage of financial services.

Two additional metrics of development of capital markets are the private bond market capitalization (*FinDevMkt3*) and the international debt issues (*FinDevMkt5*). The findings indicate that the two of them impact positively on our metri of financial inclusion (*FII*), revealing that the development of alternative investment as well as credit tools which are focused on sophisticated investors permeate the changes of households to take advantage of these instruments. This consequently leads to greater financial inclusiveness.

Therefore, the findings describe a portrait in which the banking can encourage financial inclusions through some variables, but also discourage inclusion when banks take excessive operating risks and when capitalize on abnormal profits in detriment of the inclusiveness opportunities of

households. Similarly, when capital markets drive resources to the corporate sector, there are fewer opportunities for households to be financially included.

Table 3: Financial Inclusion and Development of the Financial System

| VARIABLES | (1) FII | (2) FII | (3) FII | (4) FII | (5) FII | (6) FII |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| FinDevBank1=central bank assets to GDP (%) | -0.0135** (0.0058) | -0.0130** (0.0058) | -0.0133** (0.0058) | | | -0.0085 (0.0058) |
| FinDevBank2=bank credit to bank deposits (%) | 0.0158*** (0.0018) | 0.0154*** (0.0018) | 0.0159*** (0.0018) | | | 0.0156*** (0.0017) |
| FinDevBank3=net interest margin (%) | -0.0473*** (0.0162) | -0.0379** (0.0160) | -0.0565*** (0.0161) | | | -0.0445*** (0.0155) |
| FinDevBank4=bank concentration (%) | 0.0026 (0.0018) | 0.0025 (0.0018) | 0.0019 (0.0018) | | | 0.0030* (0.0017) |
| FinDevBank5=Bank ROA | -0.0114 (0.0273) | | | | | |
| FinDevBank6=Bank ROE | | -0.0100*** (0.0035) | | | | |
| FinDevBank7=Bank Z-Score | | | 0.0176* (0.0104) | | | 0.0165* (0.0099) |
| FinDevMkt1=stock market capitalization to GDP (%) | | | | -0.0036* (0.0021) | -0.0002 (0.0021) | -0.0030 (0.0020) |
| FinDevMkt2=stock market turnover ratio (%) | | | | -0.0041*** (0.0013) | -0.0038*** (0.0013) | -0.0050*** (0.0012) |
| FinDevMkt3=private bond market capitalization to GDP (%) | | | | 0.0246*** (0.0049) | 0.0285*** (0.0048) | 0.0216*** (0.0048) |
| FinDevMkt4=public bond market capitalization to GDP (%) | | | | 0.0049 (0.0037) | 0.0036 (0.0036) | 0.0058 (0.0035) |
| FinDevMkt5=international debt issues to GDP (%) | | | | | 0.0318*** (0.0041) | 0.0285*** (0.0039) |
| FinDevMkt6=remittance inflows to GDP (%) | | | | | 0.0139 (0.0155) | 0.0224 (0.0151) |
| Constant | 0.0432*** (0.0020) | 0.0441*** (0.0020) | 0.0414*** (0.0022) | 0.0554*** (0.0006) | 0.0496*** (0.0011) | 0.0353*** (0.0024) |
| Observations | 1,188 | 1,188 | 1,188 | 1,188 | 1,188 | 1,188 |
| R-squared | 0.0856 | 0.0923 | 0.0879 | 0.0554 | 0.1075 | 0.182 |
| Number of iden | 99 | 99 | 99 | 99 | 99 | 99 |
| Country-Year FE | YES | YES | YES | YES | YES | YES |

Notes: this table represents the fixed-effect analysis between financial inclusion and the development of the financial system for 1188 observations. Here the development of the financial system is divided into the development of the banking system and the development of the capital market. The central bank asset to GDP (%), the deposit money bank assets to GDP(%), bank credit to bank deposit (%), net interest margin (%), bank concentration, and bank Z-score denote the “banking system development” group; the stock market capitalization to GDP (%), the stock market total value traded to GDP (%), stock market turnover ratio (%), private bond capitalization to GDP(%), public bond capitalization to GDP(%), international debt issues to GDP(%) and remittance inflows to GDP(%) represent the “capital market development” group. The sign ***, ** and * denotes the statistical significance level at 1%, 5% and 10% respectively. The p values are shown in the parenthesis.

Table 4 represents the fixed-effect model for the financial inclusion-world governance indicators relationship paradigm, which describes to what extent the quality of the governance system in a country affects financial inclusion. All of the corresponding measures of the world governance indicators are found statistically significant and positive. The finding implies that the more formal and better the institutional system, the higher the financial inclusion in the country. The finding further provides evidence that financial inclusion is a broader concept that includes not only the financial but also the institutional perspectives. Additionally, the very last model includes the

variables financial development as well as the overall score of the World Governance Index (*GovSys7*). In this case, the estimated coefficients are qualitative and quantitative similar to those obtained in the previous table.

Table 4: Financial Inclusion and World Governance Indicators

| VARIABLES | (1) FII | (2) FII | (3) FII | (4) FII | (5) FII | (6) FII | (7) FII | (8) FII |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| FinDevBank1=CENTRAL BANK ASSETS to GDP (%) | | | | | | | | -0.0039 (0.0055) |
| FinDevBank2=BANK CREDIT to BANK DEPOSITS (%) | | | | | | | | 0.0144*** (0.0016) |
| FinDevBank3=NET INTEREST MARGIN (%) | | | | | | | | -0.0276* (0.0146) |
| FinDevBank4=BANK CONCENTRATION (%) | | | | | | | | -0.0001 (0.0016) |
| FinDevBank7=BANK Z-SCORE | | | | | | | | 0.0062 (0.0094) |
| FinDevMkt1=STOCK MARKET CAPITALIZATION to GDP (%) | | | | | | | | -0.0026 (0.0019) |
| FinDevMkt2=STOCK MARKET TURNOVER RATIO (%) | | | | | | | | -0.0046*** (0.0012) |
| FinDevMkt3=PRIVATE BOND MARKET CAPITALIZATION to GDP (%) | | | | | | | | 0.0244*** (0.0045) |
| FinDevMkt4=PUBLIC BOND MARKET CAPITALIZATION to GDP (%) | | | | | | | | 0.0012 (0.0033) |
| FinDevMkt5=INTERNATIONAL DEBT ISSUES to GDP (%) | | | | | | | | 0.0240*** (0.0037) |
| FinDevMkt6=REMITTANCE INFLOWS to GDP (%) | | | | | | | | 0.0120 (0.0142) |
| GovSys1=Voice and accountability | 0.0111*** (0.0018) | | | | | | | |
| GovSys2=Political stability | | 0.0070*** (0.0012) | | | | | | |
| GovSys3=Government effectiveness | | | 0.0191*** (0.0017) | | | | | |
| GovSys4=Regulatory quality | | | | 0.0117*** (0.0015) | | | | |
| GovSys5=Rule of law | | | | | 0.0165*** (0.0018) | | | |
| GovSys6=Control of corruption | | | | | | 0.0159*** (0.0016) | | |
| GovSys7=World Governance Index | | | | | | | 0.0255*** (0.0022) | 0.0265*** (0.0022) |
| Constant | 0.0555*** (0.0003) | 0.0557*** (0.0003) | 0.0568*** (0.0004) | 0.0553*** (0.0003) | 0.0570*** (0.0004) | 0.0569*** (0.0004) | 0.0584*** (0.0004) | 0.0430*** (0.0024) |
| Observations | 1,316 | 1,316 | 1,309 | 1,309 | 1,309 | 1,309 | 1,316 | 1,186 |
| R-squared | 0.0304 | 0.0289 | 0.101 | 0.0462 | 0.0675 | 0.0805 | 0.0993 | 0.276 |
| Number of iden | 109 | 109 | 108 | 108 | 108 | 108 | 109 | 98 |
| Country-Year FE | YES | YES | YES | YES | YES | YES | YES | YES |

Notes: This table shows the fixed-effect analysis between financial inclusion and world governance indicators. Here VA= voice & accountability; PS=political stability; GE= Government effectiveness; RQ= regulatory quality; RL=Rule of law; CC= control of corruption; WGI=the aggregate value of the World governance indicators. The sign ***, ** and * denotes the statistical significance level at 1%, 5% and 10% respectively. The p values are shown in the parenthesis. Table 5 displays the estimations for examining the impact of economic freedom metrics on encompassing financial inclusion index. Here, all the corresponding indicators of economic freedom (financial freedom, business freedom, trade freedom, and investment freedom) are positive and significantly associated with the financial inclusion variable. This signifies that the greater the economic freedom, the higher the financial inclusion for the country. The very last output exhibited in the table describes a comprehensive model where the development of the financial system variables, as well as the development of the country's governance system and the economic freedom metrics are all included. Again, the estimated coefficients are alike those estimated in the previous tables, providing a source of robustness to our general findings.

Table 5: Financial Inclusion and Economic Freedom

| VARIABLES | (1) FII | (2) FII | (3) FII | (4) FII | (5) FII | (6) FII |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| FinDevBank1=CENTRAL BANK ASSETS to GDP (%) | | | | | | -0.0015 (0.0055) |
| FinDevBank2=BANK CREDIT to BANK DEPOSITS (%) | | | | | | 0.0133*** (0.0017) |
| FinDevBank3=NET INTEREST MARGIN (%) | | | | | | -0.0275* (0.0151) |
| FinDevBank4=BANK CONCENTRATION (%) | | | | | | -0.0013 (0.0019) |
| FinDevBank7=BANK Z-SCORE | | | | | | 0.0078 (0.0097) |
| FinDevMkt1=STOCK MARKET CAPITALIZATION to GDP (%) | | | | | | -0.0022 (0.0019) |
| FinDevMkt2=STOCK MARKET TURNOVER RATIO (%) | | | | | | -0.0044*** (0.0011) |
| FinDevMkt3=PRIVATE BOND MARKET CAPITALIZATION to GDP (%) | | | | | | 0.0251*** (0.0045) |
| FinDevMkt4=PUBLIC BOND MARKET CAPITALIZATION to GDP (%) | | | | | | 0.0007 (0.0033) |
| FinDevMkt5=INTERNATIONAL DEBT ISSUES to GDP (%) | | | | | | 0.0240*** (0.0037) |
| FinDevMkt6=REMITTANCE INFLOWS to GDP (%) | | | | | | -0.0055 (0.0150) |
| GovSys7=World Governance Index | | | | | | 0.0247*** (0.0025) |
| EconFree1=Financial Freedom | 0.0001* (0.0001) | | | | | |
| EconFree2=Business Freedom | | 0.0002*** (0.0001) | | | | |
| EconFree3=Trade Freedom | | | 0.0006*** (0.0000) | | | |
| EconFree4=Investment Freedom | | | | 0.0003*** (0.0000) | | |
| EconFree5=Overall Economic Freedom Score | | | | | 0.0008*** (0.0001) | 0.0002** (0.0001) |
| Constant | 0.0506*** (0.0028) | 0.0411*** (0.0036) | 0.0146*** (0.0036) | 0.0373*** (0.0020) | 0.0088 (0.0060) | 0.0328*** (0.0068) |
| Observations | 1,176 | 1,186 | 1,178 | 1,186 | 1,176 | 1,146 |
| R-squared | 0.00322 | 0.0143 | 0.110 | 0.0742 | 0.0535 | 0.277 |
| Number of iden | 101 | 102 | 102 | 102 | 101 | 97 |
| Country-Year FE | YES | YES | YES | YES | YES | YES |

Notes: this table denotes the regression analysis between financial inclusion and economic freedom for 1176 observations. Here Ff=financial freedom; BF=business freedom; TF= Trade freedom; IF=Investment freedom. The sign ***, ** and * denotes the statistical significance level at 1%, 5% and 10% respectively. The p values are shown in the parenthesis.

Finally, Table 6 represents the overall regressions by combining the aspects of the financial development, the world governance indicators, and the economic freedom indicators and their impact of the three composite elements of our encompassing financial inclusion index: access index, use index, and depth index. The very first six variables correspond to the development of the banking system whose coefficients denote that the greater the development of the banking system, the higher the financial inclusion. The next seven variables represent the development of

the capital market. Here, the coefficients of the capital market development provide a mixed finding- some variables have a negative impact on financial inclusion while some have a positive one, as mentioned before. In addition to that, the quality of the institutional system (world governance indicators), and the economic freedom index are found positive and statistically significant to financial inclusion.

To check the robustness of the obtained findings, this study further incorporates three more measures of the financial inclusion index namely access index, use index and depth index. In general, the results of the study are found to be robust across all the measures. The robustness results explore that the depth index is the only measure that changes over time across the variables. For instance, the central bank assets to GDP (%) is negatively associated with the depth index of the financial inclusion ($p=0.0071$) in the banking system development group. This signifies that the greater the size of the central bank, the higher the regulatory system which will provide less opportunity to the commercial banks for escalating financial inclusion. Furthermore, the bank credit to bank deposits is negative to the depth index ($p=0.0022$). one possible explanation of such a negative relationship is that all the commercial and public banks have less scope to give credits to the customers since they must deposit a bigger portion of their total deposits to the central banks for security as per the law. For the rest of the variables of the banking system development, the direction of the relationship remains the same across all the measures except for the net interest margin (%). Moving to the next group of financial system development, the relationship patterns of the private and public bond market capitalization to GDP (%) differ significantly to the depth ($p=0.0060$) and use ($p=0.0080$) index respectively. Moreover, the international debt issues to GDP (%) and remittance inflows to GDP (%) are significantly negative ($p=0.0047$) and positive ($p=0.0187$) respectively. Regarding the world governance indicators, the coefficients are significant across all the indexes except the depth one. Lastly, the overall score of the economic freedom index is significantly negative only to the depth index. It is thus recommended that both a good institutional system and economic freedom should be in place in order to enhance the actual usage of the financial services (depth index).

Table 6: Overall Model of Financial Inclusion and Subindices

| VARIABLES | (1) Access Index | (2) Use Index | (3) Depth Index |
|--|------------------------|--------------------------------|----------------------------|
| FinDevBank1=CENTRAL BANK ASSETS to GDP (%) | -0.0116 (0.0180) | -0.0081 (0.0137) | - 0.1660*** (0.0078) |
| FinDevBank2=BANK CREDIT to BANK DEPOSITS (%) | 0.0344*** (0.0054) | 0.0276** * (0.0041) | 0.0030 (0.0023) |
| FinDevBank3=NET INTEREST MARGIN (%) | 0.0230 (0.0491) | 0.0848** (0.0373) | -0.0145 (0.0212) |
| FinDevBank4=BANK CONCENTRATION (%) | -0.0029 (0.0061) | -0.0009 (0.0046) | 0.0022 (0.0026) |
| FinDevBank7=BANK Z-SCORE | -0.0115 (0.0315) | 0.0094 (0.0239) | -0.0092 (0.0136) |
| FinDevMkt1=STOCK MARKET CAPITALIZATION to GDP (%) | 0.0017 (0.0062) | - 0.0099** (0.0047) | -0.0014 (0.0027) |
| FinDevMkt2=STOCK MARKET TURNOVER RATIO (%) | -0.0111*** (0.0037) | 0.0106** * (0.0028) | -0.0027* (0.0016) |
| FinDevMkt3=PRIVATE BOND MARKET CAPITALIZATION to GDP (%) | 0.1287*** (0.0146) | 0.0314** * (0.0111) | - 0.0348*** (0.0063) |
| FinDevMkt4=PUBLIC BOND MARKET CAPITALIZATION to GDP (%) | -0.0017 (0.0108) | - 0.0248** * (0.0082) | 0.0235*** (0.0046) |
| FinDevMkt5=INTERNATIONAL DEBT ISSUES to GDP (%) | 0.0621*** (0.0120) | 0.0388** * (0.0091) | 0.0054 (0.0052) |
| FinDevMkt6=REMITTANCE INFLOWS to GDP (%) | -0.0461 (0.0487) | -0.0349 (0.0370) | 0.0708*** (0.0210) |
| GovSys7=World Governance Index | 0.0710*** (0.0081) | 0.0603** * (0.0061) | -0.0003 (0.0035) |
| EconFree5=Overall Economic Freedom Score | 0.0004 (0.0003) | 0.0006** (0.0002) | -0.0003* (0.0001) |

| | | | |
|-----------------|-----------------------|---------------|-----------------------|
| | | 0.0625** | |
| Constant | 0.0762*** (0.0222) | * (0.0169) | 0.0367*** (0.0096) |
| Observations | 1,146 | 1,146 | 1,146 |
| R-squared | 0.264 | 0.2214 | 0.321 |
| Number of iden | 97 | 97 | 97 |
| Country-Year FE | YES | YES | YES |

Notes: this table represents the overall fixed effect estimation for the financial inclusion, and the subindices including financial system development, world governance indicators and the economic freedom for 1146 observations. The central bank asset to GDP (%), the deposit money bank assets to GDP(%), bank credit to bank deposit (%), net interest margin (%), bank concentration and bank Z-score denote the banking system development group; the stock market capitalization to GDP (%), the stock market total value traded to GDP (%), stock market turnover ratio (%), private bond capitalization to GDP(%), public bond capitalization to GDP(%), international debt issues to GDP(%) and remittance inflows to GDP(%) represent the capital market development group; the WGI is the world governance indicators and the overall score represents the economic freedom index. The robustness of the findings is checked using three more measures including access index, use index and depth index. The sign ***, ** and * denotes the statistical significance level at 1%, 5% and 10% respectively. The p values are shown in the parenthesis.

Conclusions

This study examines the impact of financial development, the quality of governance and institutional systems, and economic freedom on financial inclusion. For this purpose, a tri-dimensional, encompassing financial inclusion index is developed incorporating the dimensions of access, use, and depth of financial systems. The empirical analysis reveals that the banking system plays a critical role in promoting the financial inclusivity of households when converting deposits into credits. Nevertheless, the results also reveal that the monopoly power of the banking system restricts access to financial services when banks focus on maximizing private benefits and net interest margin. Comparatively speaking, the development of the capital markets also describes a situation where the financial flows of money as well as financial instruments are mostly focused on the corporate sector; less resources are devoted to the integration and inclusion of households. Nevertheless, there are certain aspects like the private bond market development as well as the international debt market development that entail greater financial inclusion. Consequently, when the financial system develops in certain aspects, it does not necessarily involve lowering the barriers to the financial services for households.

The results exhibit consistent indications that the development of a sound institutional system vis-à-vis the promotion of economic freedom in their multiple facets are strongly correlated to the enhancement of financial inclusion. Therefore, we conclude that the financial inclusion as an instrument to promote economic growth and mechanism to mitigate unemployment and poverty, does not depend solely on frictionless financial systems, but also on a sound institutional system and granted economic freedoms.

The findings of this study have implications for the authority of financial institutions as well as policymakers. For instance, proceeding regulation and policies that relate to financial

development and efficient markets should extend to all engaging parties in the ecosystem, including households and final users of the financial system instead of the usual corporate sector and sophisticated investors. Therefore, financial inclusion must be understood as an integrative component of economic development. Private companies and the corporate sector are key economic players that benefit from financial development, along with households and end users. Hence, the regulatory framework that promotes financial development should take into account both parties too. Such policy implications should be built by reinforcing the quality of the institutional system and the promotion of economic freedom, which together act as intertwined in mutually escalating the actual financial inclusion (Muhammad et al., 2021).

This research is subject to some limitations. In this study we focused only on a broad conceptualization of financial inclusion. We purposely excluded the digital component of financial inclusion; the access to new digital technologies in online bank transactions is expanding the scale and scope of banks operations, particularly in younger end users. Nevertheless, there is evidence observed in developed countries with significant elderly population indicating that they are falling behind in the use of digital services (i.e. mobile banking). The argument in this case is rooted in the asymmetric speed of digital advances and the capacity of the users to absorb such technology. None of these aspects have been considered in this study. This endeavor is left for subsequent development in this field.

Similarly, the financial inclusion may differ across levels of country development. This study looks at the encompassing financial inclusion index for an aggregated sample without digging deeper in the economic stage of the countries included in the sample. Future research may benefit from comparing financial inclusion across developed and developing countries.

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Development Cannot Do Us Apart: Why SDG Interconnections Matter in Reducing Youth Unemployment

George Lwanda (Gambia)

Abstract

Youth unemployment is a major hindrance to Africa's achievement of the 2030 Agenda's aim of sustainable development (Africa Capacity Building Foundation 2017; The World Bank 2009; Wallace 2019; Zimmerman et al. 2013). According to the International Labour Organization, Africa has one of the highest proportions of unemployed youth globally. While between 10 and 12 million young people enter the labour force on the continent each year, only 3 million jobs are created (Africa Development Bank Group 2015). As a result, almost 80% of African teenagers entering the labour field experience long-term unemployment.

Prolonged unemployment causes up to half of the continent's unemployed youth to give up looking for work, undermining social cohesiveness (World Bank 2014; Honwana 2014; Mueller, Rosenbach, and Thurlow 2019; Resnick 2019). Youth who have given up looking for work are called discouraged or inactive youth in labour accounting. They are young men and women who, despite their youth, have given up on looking for work after long periods of unemployment (Africa Development Bank Group 2015; Honwana 2014; Resnick 2019; World Bank 2014).

This study identifies the SDGs most closely linked with reducing youth unemployment (SDG8) in the 34 African countries shown in Figure 1. It uses data from the 2018 Afrobarometer Round 7 survey to examine the prevalent socio-economic circumstances of youth who have given up looking for work.

Keywords: Youth unemployment, SDG, discouraged youth, Africa, gender equality

Purpose



Figure 1: Countries covered in the paper

The Sustainable Development Goals (SDGs) are a set of 17 interconnected and indivisible goals that aim to help developing countries achieve long-term progress. While the connections between goals are not obvious, achieving one SDG entails achieving other SDGs as well. As a result, achieving the SDGs will require integrated strategies that take advantage of their interdependence.

This study identifies the SDGs most closely linked with reducing youth unemployment (SDG8) in the 34 African countries shown in Figure 1. It uses data from the 2018 Afrobarometer Round 7 survey to examine the prevalent socio-economic circumstances of youth who have given up looking for work.

Background: Youth Unemployment in Africa

Youth unemployment is a major hindrance to Africa's achievement of the 2030 Agenda's aim of sustainable development (Africa Capacity Building Foundation 2017; The World Bank 2009; Wallace 2019; Zimmerman et al. 2013). According to the International Labour Organization, Africa has one of the highest proportions of unemployed youth globally. While between 10 and 12 million young people enter the labour force on the continent each year, only 3 million jobs are created (Africa Development Bank Group 2015). As a result, almost 80% of African teenagers entering the labour field experience long-term unemployment.

Prolonged unemployment causes up to half of the continent's unemployed youth to give up looking for work, undermining social cohesiveness (World Bank 2014; Honwana 2014; Mueller, Rosenbach, and Thurlow 2019; Resnick 2019). Youth who have given up looking for work are called discouraged or inactive youth in labour accounting. They are young men and women who, despite their youth, have given up on looking for work after long periods of unemployment (Africa Development Bank Group 2015; Honwana 2014; Resnick 2019; World Bank 2014).

Defining the Concept of Youth

While there is no universally accepted definition of youth (Gyimah-Brempong and Kimenyi 2013; Mengistu 2017; Tekinda 2017)¹⁰, many individuals and institutions consider youth as a period of transition between childhood and adulthood. Youth, for example, is defined by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) as the time during which a person develops the talents and social skills necessary to be prepared for financial gain and the responsibilities associated with adulthood.

The notion of youth according to age differs significantly amongst institutions. For example, although the United Nations statistical division defines youth as 15 to 24 years, the African Union defines youth as 15 to 35 years. The paper defines youth as people between 18 and 35 years old. This is because the Afrobarometer survey only interviews 18 years or older people. The upper limit of 35 years is based on the AU Youth Charter.

Why Tackling Youth Unemployment is Vital to Attaining the SDGs

The Sustainable Development Goals (SDG) outcomes document identifies young people as a group that has been "left behind". As a result, the SDGs' overarching goal of "leaving no one behind" necessitates a focus on youth, among other demographics.

Not only are young people who are engaged in their society, economies, and politics more productive, but they also contribute to the stability and progress of their communities and countries. Combating youth unemployment is one strategy for keeping youth active in society. The fact that significantly reducing unemployed youth by 2020 is one of the SDG indicators under SDG 8 ('promote sustained inclusive and sustainable growth, full and productive employment, and decent work for all') demonstrates the critical nature of addressing youth unemployment for sustainable development.

High rates of youth that have given up looking for a job can lead to political disenfranchisement that causes instability, hindering several SDGs. SDG 8 requires, for example, economic growth and full employment, both of which are impossible to achieve if 80 per cent of young people entering the labour market are unemployed (Langdon, Ritter, and Samy 2018). Furthermore, events such as the Arab Spring, which undermined the achievement of SDG 16, highlight the harmful political and social consequences of a large number of discouraged youths.

¹⁰ https://www.brookings.edu/wp-content/uploads/2016/06/04_youth_policy_african_development_kimenyi.pdf, accessed 22 June 2020

Who are the Youth that have Given up Looking for Jobs?

There are two types of accounting for youth employment: those in the labour market and those not (See Figure 2 below). Youth in the labour market include those who work for pay or profit and youth who are unemployed but looking for a job. On the other hand, youth outside the labour force are unemployed youth who are not looking for work (Africa Development Bank Group 2012; ILO 2015; Langdon, Ritter, and Samy 2018; ILO 2018).



Figure 2: Overview of youth labour market indicators

Source: (ILO 2018)

Discouraged youth or youth that have given up looking for jobs are outside the labour force. They simultaneously exhibit the following three qualities: unemployed, available for work, and not actively seeking employment. Discouraged youth are particularly vulnerable, having given up looking for work after extended periods of unemployment. These youth should be at the top of policymakers' priority lists in society (Langdon, Ritter, and Samy 2018; World Bank 2014; Africa Development Bank Group 2012; UNICEF 2015).

Methodology

| Indicator | SDG |
|---|-------|
| Gender | SDG5 |
| Education attainment | SDG4 |
| Location | SDG11 |
| Electricity in area | SDG7 |
| Piped water services in the area | SDG6 |
| Sewage service in the area | SDG6 |
| How often the respondent goes without cash income | SDG1 |

| | |
|--|------|
| How often the respondent goes without food | SDG2 |
| How often the respondent goes without medical care | SDG3 |

Table 1: SDGs examined in the study
Source: Author's compilation

Rapidminer, a predictive machine learning software, was used to model data from the 2018 Afrobarometer Round 7 survey to identify which SDGs, out of nine, are most closely associated with discouraged youths.

Study Findings

Overall Findings

The modelling results indicate that SDGs 4, 5, 6, 7 and 11 are most strongly associated with discouraged youth. These results show that a person's level of education, gender, whether they live in an urban or rural area, access to electricity, and access to piped water sources are the five most important factors determining whether youth are discouraged.

| Indicator | SDG |
|---------------------------------|-------|
| Education | SDG4 |
| Gender | SDG5 |
| Location | SDG11 |
| Electricity in area | SDG7 |
| Piped water service in the area | SDG6 |

Table 2: Six main characteristics of discouraged youth
Source: Rapidminer modelling results

Ghana, Kenya, South Africa, Botswana, Tanzania, São Tomé & Príncipe, and Eswatini have the lowest rate of discouraged youth among the 34 countries analysed. On the other hand, Guinea, Mali, Malawi, Morocco, Burkina Faso, Ivory Coast, and Togo have the highest rate of discouraged youth.

Quality Education is Key to Productive Youth

Education attainment is key to determining if youth will give up looking for a job. The modelling results show that youth with secondary education and above are less likely than those with a university degree to give up looking for a job. For instance, only 3 per cent of university graduates and 14 per cent of youth with secondary school education surveyed by Afrobarometer reported giving up looking for work. In contrast, nearly one out of every four (24 per cent) with no formal education said they had abandoned their job search.

The results also show that education is a strong predictor of quality of life. For example, youth without formal education or only elementary school education are more likely to live in areas without sewage facilities, have no cash income, and be food insecure. In contrast, their peers who have completed secondary education are most likely to live in areas with sewage facilities, have a cash income, and be food secure.

| Rank | Least vulnerable to being discouraged | Most susceptible to being discouraged | The highest proportion of youth with no formal education | The highest proportion of youth with secondary education | The highest proportion of youth with university education |
|------|---------------------------------------|---------------------------------------|--|--|---|
| 1 | Ghana | Guinea | Niger | South Africa | Sudan |
| 2 | Kenya | Mali | Burkina Faso | Nigeria | Botswana |
| 3 | South Africa | Malawi | Guinea | Namibia | Gabon |
| 4 | Botswana | Burkina Faso | Mali | Zimbabwe | Morocco |
| 5 | Tanzania | Ivory Coast | Malawi | Botswana | Tunisia |
| 6 | São Tomé & Príncipe | Togo | Uganda | Tanzania | Ghana |
| 7 | Eswatini | Uganda | Madagascar | Kenya | Eswatini |

Table 3: Ranking of countries by the proportion of discouraged youth and education attainment
Source: Rapidminer modelling results

Therefore, it is not surprising that the countries with the highest percentages of discouraged youth (Burkina Faso and Guinea, Mali Malawi, Malawi, Uganda, Mali, Mali, Uganda, and Guinea) have the highest percentage of youth without formal education. The countries with the lowest rates of discouraged youth, on the other hand, have the largest portions of youth with secondary and university-level education (South Africa, Botswana, Tanzania, Kenya, Eswatini, Botswana, Botswana, Tanzania and Kenya).

Gender Equality and Human Settlements Ensure Youth are not Discouraged

Based on the results, besides education, gender and where someone lives are the two most crucial factors in influencing someone's likelihood of experiencing long-term unemployment and giving up looking for work. Rural youth, in particular, are twice as likely to give up looking for work as their urban counterparts. Similarly, women are more likely than males to abandon their job search.

The consequences of this are severe and worsen the state of discouraged youth. Rural women are less likely to have cash income than their urban counterparts. Unlike their urban counterparts, rural women youth are also unlikely to have potable water and frequently go without cooking fuel, food, medical care, or cash each month. Accordingly, rural youth identified water supply and famine as the most significant development challenges, while urban women identified unemployment as their most pressing development problem.

Access to Electricity and Piped Water is Key to Youth Engagement

| Rank | Least vulnerable to being discouraged | Most susceptible to being discouraged | The highest proportion of youth with electricity and piped water |
|------|---------------------------------------|---------------------------------------|--|
| 1 | Ghana | Guinea | Ghana |
| 2 | Kenya | Mali | South Africa |
| 3 | South Africa | Malawi | Eswatini |
| 4 | Botswana | Burkina Faso | Botswana |
| 5 | Tanzania | Ivory Coast | Tunisia |
| 6 | São Tomé & Príncipe | Togo | Cabo Verde |
| 7 | Eswatini | Uganda | São Tomé & Príncipe |

Table 4: Ranking of countries by the proportion of discouraged youth and access to electricity and piped water
Source: Rapidminer modelling results

While discouraged youth stand to benefit the most from access to electricity and piped water, they are also the least likely to get access, according to the modelling results. For example, Statistica reports that 47 per cent of Africans (597 million people) do not have access to electricity. This is mainly attributable to two factors. The first is that the overwhelming majority of families cannot afford the exorbitant cost of power. In Africa, the average retail power price per megawatt-hour ranges from \$490 in Liberia to \$24.4 in Ethiopia. This cost is prohibitively expensive for most Africans, as up to a third of the continent lives on less than \$1 per day.

Without access to energy, a young person's life can be ruined. It obstructs their access to a high-quality education. As a result, they cannot obtain good positions, and many young people abandon their job search altogether. Youth who have access to electricity and piped water, on the other hand, are less likely to feel discouraged.

Conclusion

While reducing youth unemployment is an economic imperative, African countries must invest in SDGs 4, 5, 6, 7 and 11 to meet the SDG8.6 target of significantly reducing youth unemployment for three reasons: (a) education is the most important determinant of discouraged youth, (b)

female youth are more likely to be discouraged, and (c) youth with access to electricity and water are less likely to be discouraged.

Among the SDGs, investing in quality education (SDG 4) is the most important to reducing youth unemployment and attaining SDG 8. A high-quality education system increases youth employment, reduces inequities (SDG 10), closes the gender gap (SDG 5), promotes well-being, and contributes to sustainable communities. Young people can enter the labour force and achieve financial independence. According to UNESCO, each additional year of education contributes around 10% to an individual's average lifetime wages in low-income nations.

As a result, investing in quality education can be a significant catalyst for social and economic transformation across Africa. For instance, a 2011 study of global maternal and perinatal health statistics showed a link between a woman's educational attainment and her risk of dying during pregnancy.

Despite being a fundamental human right guaranteed by Article 26 of the Universal Declaration of Human Rights, many African youth lack access to quality education. A lack of quality education has exacerbated youth unemployment in many African countries, endangering progress toward the 2030 Agenda and the Sustainable Development Goals (SDGs). The adverse effects of a lack of knowledge become more evident as a person grows older. Poor education is a key contributor to intergenerational poverty because the children of uneducated adults are less likely to attend school.

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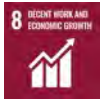
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Higher Education and Human Capital Development

Md. Anisur Rahman (Daulatpur College, Bangladesh)

Abstract

Science refers to a system of acquiring knowledge, following a systematic methodology. This methodology includes observation, measurement and evidence to gain knowledge. Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. Sustainability is broadly used to indicate programs, initiatives and actions aimed at the preservation of a particular resource. It actually refers to four distinct areas: human, social, economic and environmental are the four pillars of sustainability. Higher education also includes teacher-training schools, colleges, universities and institutes of technology after passing secondary school certificate courses. Innovation is the key feature of sustainability. Sustainability can drive innovation by introducing new design constraints that shape how key resources like, energy, carbon, water, materials and waste are used in products and processes. Sustainable innovation is a rational and collaborative way to maintain socio economic values for present and future generations. A key role of higher education institutions is to drive innovation, with the aim of finding solutions to global challenges in areas that matter to socio economic development. The role of higher education for sustainable development involves changing the means and processes of knowledge production and the way in which students are trained, making students more socially responsible, critical and sensitive towards sustainability. This paper discussed the present global economic growth, how the economic growth can be sustainable by digitalization and the 4th industrial revolution, post covid19 economy and highly skilled workforce demand for innovative solutions in the workplace, higher educational institutions can build the students high skilled for present global job market.

This paper is based on observational methodology as a mixed research major in qualitative and minor quantitative. During the research period it was observed the qualitative development in ICT education each year in Bangladesh in SSC level. The observation was done upon (10+2) level students from different institutions after their SSC level.

In the developing countries of the world there is already a digital divide. Both developed and developing countries require more skilled workforce upon digital technologies for a faster recovery of the global economic losses. There needs global cooperation to reduce the obstacles for the ICT skill development at higher educational institutions. The higher educational institutions can build a research cloud for new innovative solutions from the academic institutions for SDGs. A neural network can be established for local and global solutions by making decisions upon data and information using artificial intelligence algorithms. There needs to be rational financing for research and innovation at the institutions for the outcome of global sustainability.

Keywords: Education, Sustainability, 4IR, Innovation & Skill

Background Information

Before covid19 pandemic the world was under a growth slowdown crisis. Covid19 pandemic lost global growth at a higher percentage. Post covid19 economy needs more productivity with less pollution. During covid19 pandemic digital dependency increased at a higher percentage and fueled digital transformation faster, the 4th industrial revolution and digital transformation can increase the value of goods and services by manufacturing goods with less pollution. Adopting digital transformation and 4th industrial revolution there needs a high skill workforce both in developing and developed nations. In many developing countries like Bangladesh there are some obstacles for the faster development of human skill in the higher educational institutions.

Research Questions

The following questions were set to conduct a mixed research major in qualitative and minor quantitative. These questions were asked to the target groups for 3 years to observe the qualitative development in ICT education each year in Bangladesh at SSC level. The base quality at HSC (12+2 level)who will enter at higher education level after passing this level of education.

Questions for the students: (Asked about 1000 students from 10 academy)

1. What level of skill have you gained from your academy at SSC level?
2. What is the main problem to make you skilled in ICT?

Questions for the Teachers: (Asked about 50 ICT and other teachers from 20 academy)

3. What is the main problem to make a student skill user in ICT at your institution?

Questions for the Parents: (Asked about 50 parents of the students)

4. Can you afford the expenses of necessary devices for a student to make him skilled in ICT?

Area of Research

Daulatpur Upa-Zilla, Kushtia, Bangladesh. A rural-urban area with poor and marginalized people.

Research Objectives

Technological innovations are having a significant impact on educational systems at all levels. Online courses, teaching aids, educational software, social networking tools, and other emerging technologies are disrupting the traditional teaching and learning system. Education in the future will need to demonstrate how technology can be used to students' advantage, as well as teach

future generations how to handle problems that arise from it. Technology has the potential to revolutionize the traditional teaching and learning process.

Information and communications technology for development, or ICT4D, is the practice of using technology to assist poor and marginalized people in developing communities. It is a powerful tool for socio economic development. ICT can bridge the digital divide by ensuring equitable access to communication technologies.

The object of this research is to find:

1. The student's basic efficiency in ICT from their SSC level.
2. How their efficiency can be improved in HSC (10+2) level in ICT.
3. How the teacher's ability can be improved to teach them.
4. How the devices can be available to the students for their skill development practices.

Research Questions, Review and Analysis

| Q No. | Starting | Review | Review | Review | Methodology | Result | Result (% Avg.) | Analysis |
|-------|-----------|-----------|-----------|-----------|--|---|-----------------|---|
| 1. | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | Questions and Observation on Development | Not a Good Skill | 80% | Need Development of Skill. |
| 2. | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | Questions and Observation on Development | Lack of Sufficient Infrastructure and Devices at the Institutions | 60% | Need Necessary Infrastructure and Devices |
| 3. | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | Questions and Observation on Development | lack of Teachers Training on Curriculum | 50% | Need More Teachers Training |

| | | | | | | | | |
|----|-----------|-----------|-----------|-----------|--|-------------------------------|-----|--|
| 4. | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | Questions and Observation on Development | Lack of knowledge and Finance | 80% | Need to Aware the Parents about 21 st Century ICT |
|----|-----------|-----------|-----------|-----------|--|-------------------------------|-----|--|

The questions were asked to the target group from the academic year 2018-2019 and at the year 2021-2022. Due to Covid19 pandemic in Bangladesh the educational institutions were closed maximum in 2020-2021.

Introduction

Information and communication technologies (ICTs) can help to accelerate progress towards every single one of the 17 United Nations Sustainable Development Goals (SDGs). ICTs are able to achieve results timely and accurately from the given data and information.

A major digital divide is still in place, with more people offline than online and particularly poor access in developing nations. Technological inclusion in the institution has opened up many new doors in educational development but the low income and developing nations cannot take advantage due to policy measures and finances.

According to UN ESCAP July 2021 during Covid19 pandemic the developed nations were able to achieve educational facilities more than 80% but low income and developing countries were only less than 30%. [Sweta C. Saxena. *Towards post-COVID-19 resilient economies, Economic and Social Survey of Asia and the Pacific 2021*, Slide No.9]

ICT can bridge the digital divide by ensuring equitable access to communication technologies. There needs a global cooperation for the digital revolution and human skill development for global sustainability.

Innovation is the key feature of sustainability. Sustainability can drive innovation by introducing new design constraints that shape how key resources like, energy, carbon, water, materials and waste are used in products and processes. Sustainable innovation is a rational and collaborative way to maintain socio economic values for present and future generation.

A key role of higher education institutions is to drive innovation, with the aim of finding solutions to global challenges in areas that matter to socio economic development. The role of higher education for sustainable development involves changing the means and processes of knowledge production and the way in which students are trained, making students more socially responsible, critical and sensitive towards sustainability.

ICTs have the potential to increase innovation by speeding up the diffusion of information, favoring networking, and enabling closer links between institutions, reducing geographic limitations and increasing efficiency in communication.

Higher Education and the Preparedness for Global Skill and Jobs

Higher education also includes teacher-training schools, colleges, universities and institutes of technology after passing secondary school certificate courses. These institutes are now most responsible areas to make a student prepared for the required global skill and jobs.

The world is transforming very fast. Socio economic structure of the world is changing rapidly. Digital technologies change almost every aspect of our daily life. Business services and manufacturing processes are changing and depending more and more upon the disruptive technologies mainly Artificial Intelligence, Robotics, Internet of Things, Genetic Engineering, 3D printing, Bio technology etc. digital technologies are playing the major role.

Covid19 pandemic increases the use of these technologies at a much higher rate than ever before. It will increase more in the future. Both developing and developed countries will require more skillful workforces upon these technologies in future for their manufacturing and service sectors.

Knowledge and skill upon digital technologies is a must to work in these sectors and the development of these sectors for competitiveness through innovation.

Covid19 Push Forward the Transformation

Corona virus was first to affect china in 2019, china first declared the genome sequence of the corona virus then the world found medicine for temporary medication before vaccine against corona virus by the use of AI technology.

Before any vaccine against coronavirus, the world was in lockdown; communication was mainly dependent upon the internet and digital technologies for the global mobility and continuity in health, education, business, governance everywhere.

Then the virus spread worldwide and was declared as Covid19 pandemic. The virus was detected in the human body by digital technology. Digital technologies were used to disinfect the hospitals, home and roads. The researchers collect data and information about the disease from all over the world through the internet and analyze them in computer by using AI and 3D image processing for the new vaccines. Then they combine AI, Bio technology, genetic Engineering for a 3D unique image for vaccine. These technologies reduce the long term duration for the selection of vaccines. After selection of vaccines the manufacturers manufacture them by automated and robotic machines.

Covid19 proved the potentiality and the revolutionary power of the disruptive technologies in business and manufacturing under an interconnected system.

Digitalization and Global Trade

Digitalization is reducing the production cost of goods and services. Reducing the local and cross border trade cost. The internet of things and E-commerce are playing a big role. This is changing the traditional trading system into a modern business system in the global economy.

Big data and its analysis by human or artificial intelligence are reducing the communication cost. An individual and a country can communicate with others at a very minimum cost and can increase the sales of that product in the domestic and export market. A company can reduce its cost of goods by analyzing the big data and innovation of a competitive good. This innovation can increase the productivity of a country, where technological advancement can take place. This advancement of technology can be a strong tool for global technological cooperation. This cycle from big data analysis, production decision making, innovation of new goods with competitive prices, increasing domestic productivity and the readiness of global technological cooperation can create a sustainable digital transformation over the world.

Big Data and Artificial Intelligence is changing the traditional business pattern. This has the benefit for both the consumers and traders. Big data is different from traditional data base management system. In Big Data management system database includes a huge amount of data in different types like, numerical, text, audio, and video. These data can be analyzed very easily by analyzing tools.

Artificial intelligence can analyze big data and can take decision independently. It is an interaction between computer and artificial intelligence algorithm. Retailers can understand the consumer's behavior by using the big data. The suppliers can understand the retailers demand for their customers. Traders can understand the suppliers demand from this database and they can put their demand to the manufacturer according to the customers' requirements. The manufacturer can manufacture the goods according to customers need. If the consumer choice change upon the product they can research upon the product, can innovate the new product. Here is the central role player is the big data, where automatically database is developing through transactions. The cost of collection of data and communication in different layer of business is reducing. This is the reduction of transaction cost.

Use of crypto and digital currencies, digital assets and intellectual properties are dramatically increasing in business and trade over the world.

Ecological Factors, Economic Models for Economic Growth

United Nations Sustainable Development Goal (SDG) 2030 is targeted to reduce poverty and inequality and a safe environment for all. To reduce poverty and income inequality there need to increase the productivity and income for the growth of individuals and the country. On the other

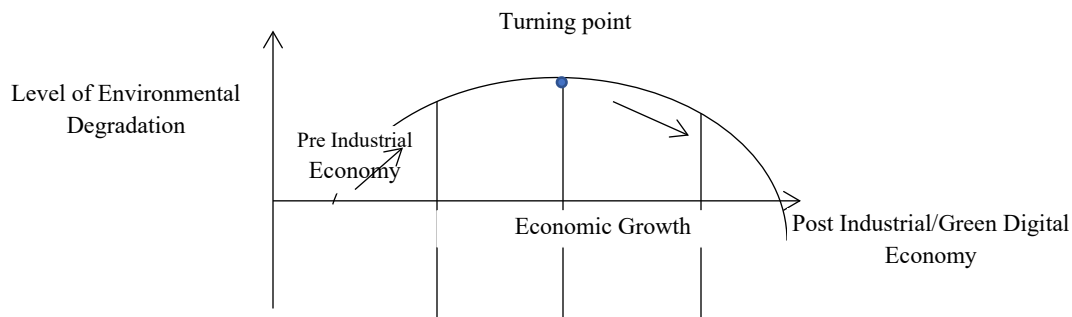
hand there need to reduce the environmental degradation for better health of the population of the world.

But there is a strong relationship between economic growth and the environment. Because there need to install more and heavy machinery for the increase in productivity. More use of oil, coal and gas are needed as fuel to run these machineries and to increase in electricity production.

Economic growth is an increase in real output, affecting consumption of nonrenewable resources which have a direct impact upon the level of pollution, global warming and loss of environmental habitats. But not all forms of economic growth cause damage to the environment.

Rising level of income for both in individual and national level can increase the ability to protect the environment, through development of consciousness and appropriate policy. Increase in productivity through improved automation and digital technology for economic growth can enable higher output with less pollution.

Figure 1: U-Shaped Curve for Economic Growth and the Environment:



Source: Author

The U-shaped curve shows the relationship between economic growth and the environment that up to a certain point of economic growth worsens the environment, but after that the move to a post-industrial economy, it moves towards a better environment. [*Theodore Panayotou, Economic Growth and the Environment, Page-3*]

But, the world is suffering from a growth slowdown for the past several years. Moreover the Covid19 pandemic affect the manufacturing and services over the world, which turned global growth almost at the zero level and for some countries that is negative.

Figure 2: Growth Forecast.

| | Global Economy | | | Advance Economy | | | Developing Economy | | |
|--------|----------------|------|------|-----------------|------|------|--------------------|------|------|
| Year | 2019 | 2020 | 2021 | 2019 | 2020 | 2021 | 2019 | 2020 | 2021 |
| Growth | 2.9 | -4.9 | 5.4 | 1.7 | -8 | 4.8 | 3.7 | -3 | 5.9 |

Source: World Economic Outlook Update June 2020

| | Global Economy | | | Advance Economy | | | Developing Economy | | |
|--------|----------------|------|------|-----------------|------|------|--------------------|------|------|
| Year | 2020 | 2021 | 2022 | 2020 | 2021 | 2022 | 2020 | 2021 | 2022 |
| Growth | -3.2 | 6.0 | 4.9 | -4.6 | 5.6 | 4.4 | -2.1 | 6.3 | 3.2 |

Source: World Economic Outlook Update July 2021

The IMF estimates that the global economy shrunk by 4.4% in 2020. This is the decline as the worst since the Great Depression of the 1930s.

To reach the next normal of the world, there are no alternatives to grow the economy except the faster pace of increased productivity than ever before. Increase in productivity to raise the income of individuals and the country is the first condition to reach at the previous level of growth and to minimize the average level of intended growth for the world to reduce poverty and inequality.

Industrial production and services will have to run together to achieve GDP growth. But there are the risks of the next pandemic for the global need and trend of over productivity that may affect the health and environment.

There are several debates upon growth limit theory. But after the pandemic this debate will rise more and more. For that, already environmental economics treats the natural environment as a separate sector for internationalizing the externalities, while ecological economics takes a more interdisciplinary approach of integrating the ecological factors governing resource regeneration and waste absorption into the economic models. [Ramprasad Sengupta. *Economic Theory and Ecological Limits*, Page- 1]

The concept of the 4th industrial revolution can meet the above mentioned criteria for ecological economy. The 4th industrial revolution is an interconnected manufacturing and service system by using automation and digitalization technologies. This can increase productivity, lower waste and use of alternative environment friendly energy.

Giving importance to the green economy of any economy can be a compound upon the 4th industrial revolution with the integrated, automation and digitalization technology. This could be helpful for the advanced relationship between GNP, GDP and environment.

Covid19 and the Agenda 2030

Covid19 shows great success in business and manufacturing by using disruptive technologies. It may be an example for the world about the use of disruptive technology in mankind like environmental protection, food production. The world can use these disruptive technologies in more other areas for a better world. This will be an adoption of the 4th industrial revolutionary system and technologies where there will lower waste and pollution in industrial manufacturing. Adoption of the 4th industrial revolution will require greater finance in technology and cooperation where the rich countries will have to come first. There will require a fragmentation of the international monetary and financial system through participation of both the low income to high income countries.

Changes in the real income in the low income and developing countries can create a longer version of recession in these categories. Human capital development through education, training and skill development is very essential in these countries to adjust with the 4IR specifications.

Adoption of new technologies always losses some jobs and also creates new job opportunities. There needs the development of national skill in government, public and private sectors. [*Irmgard Nübler, New technologies: A jobless future or golden age of job creation? Page-10*]

The world is transforming towards knowledge based economy, innovation is the key factor in knowledge based economy for capital formation, and the adoption of disruptive technologies with capital can increase value, productivity and income of our country and the world. This can help the post pandemic socio economic recovery and to achieve agenda 2030.

Covid19 and Human Knowledge

The world economy is transforming towards knowledge based economy and society is transforming towards knowledge based society as a whole the global socio economic structure is changing very fast based upon knowledge.

This transformation of the world is not always maintaining the sustainable standard. Education, training and skill development can ensure increased productivity and sustainability.

Education: Knowledge through education promotes protective behaviors by buffering the negative effects of pessimistic illness expectations. Knowledge based economies need new innovations and ethics on innovation for sustainable production and service to increase value and competitiveness. Continuous research in educational institutions is an important issue to direct a nation towards sustainable innovation.

Technological inclusion in the institution has opened up many new doors in educational development but the low income and developing nations cannot take advantage due to policy measures and finances. During Covid19 the developed nations were able to achieve educational facilities more than 80% but low income and developing countries were only less than 30%.

Training: Training for the teachers, trainers and employees is an important issue for the development of related instruction capability. Covid19 changed the traditional mode of training due to the rapid successful adoption of automation, digitalization and robotization in government, health, academic, business and manufacturing sectors.

Skill Development: Skill development is an essential part of a nation for the development in all areas of its activities. Covid19 pandemic has proved the potentiality of the disruptive technologies in the global socio economic activities. The world is adopting these technologies very fast.

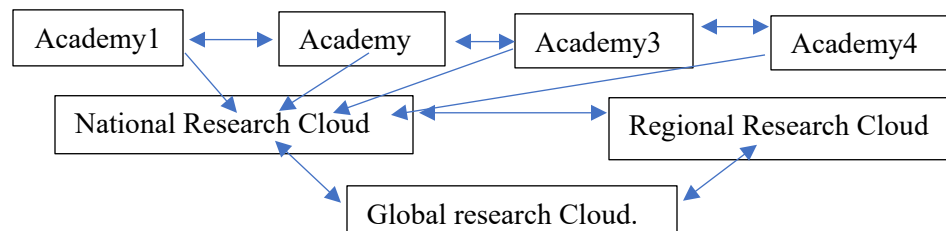
Bangladesh is a middle income country and is already at a good position for its growth. The country is adopting disruptive technologies. As fast as it can develop its national skill to operate and govern this technological adoption in the right direction, it will contribute more to the global economy to reduce the global growth slowdown crisis.

Higher Educational Institutions Can Play a Crucial Role in New Innovation for Sustainability

Higher educational institutions can ensure the ethical innovation for sustainability by acting as entrepreneurs of sustainable development. Technology can play a crucial role in changing the traditional methods of teaching and learning by using digital technologies.

Inter connection with the several departments with their findings upon the recent crisis. A neural network can be established for local and global solutions by making decisions upon data and information using artificial intelligence algorithms.

Figure 3: Research Cloud Network.



Source: Author

The education system must make a student a good user of a computer; teachers have to teach them efficiently at the high school level. After that in (10+2) level before entering in the universities the students must gain knowledge about computer hardware, software, browsing and use of the different software related to data and decision. At the university level they will use this knowledge for new innovation at their own subjectivity.

Colleges and the universities can work upon sustainability through research and innovation both the teachers and the students. These results are to be stored in a research cloud system for the next development at national level and these national results are to be connected with international research cloud for the next development. So, researchers and the policy makers can find fast, their local and regional crisis and their solutions if it is researched in their own country or not. This national and global research cloud can be governed by the United Nations to build up cooperation both in technical and financial terms between the countries of the world for faster achievement of the SDG 2030.

Research Result

In the developing countries of the world there are already a digital divide. During Covid19 pandemic the divide is shown in distance education and internet access in developed countries is more than 80% and the developing countries is less than 30%. But the socio economic transformation upon digital technologies is very fast. Both developed and developing countries require more skill workforce upon digital technologies for a faster recovery of the global economic losses. There needs a global cooperation. The students and the teachers of the rural and urban areas in Bangladesh are facing some obstacles to make them skilled at international level.

1. At the school level students are not trained as good computer users.
2. In many schools there are very minimal facilities for computer laboratories.
3. In (10+2) level the student cannot learn computer browsing and using different software as early as they need to be efficient due to lack of previous experiences.
4. Teachers are not well trained about their academic curriculum.
5. Shortage of computers in proportion with the students.
6. Student's parents are not able to buy a computer at their home for the home work of a student.
7. Insufficient academic infrastructure for a computer laboratory.
8. Higher academic institutions are not making a student innovative for sustainability due to the delayed entrepreneur role of the recent crisis of sustainability.
9. Insufficient fund and financing in research and innovation projects of sustainability at higher education.
10. Very minimum funds for research and innovation in the Non-government College and universities for sustainability, though in Bangladesh about 70% of the total academic contribution is from the Non-government College and universities.

11. Slower cooperation on a national and global level.

Conclusion

The world socio economic structure is transforming very fast and depending upon different disruptive technologies. The global job market is at risk, there need more advanced skilled workforces both in developing and developed countries. Covid19 affects almost all the targets of SDGs. The world needs urgent data and information to take action at the right place at the right time to survive SDGs. Digital technologies can connect all the 17 goals of SDGs through data and information for new initiatives. The skill upon disruptive technologies mainly the digital technologies is an urgent demand in the global job market. Higher educational institutions can make a student skill at a global level.

There are many human activities that are polluting the environment like land grabbing, over agricultural intensification, deforestation, river pollution etc. In business, manufacturing and communication the use of different technologies are increasing where privacy and security is at risk. In these cases sustainable innovation depends upon ethical innovations. Higher educational institutions can make a student ethically developed.

Higher educational institutions and their global interconnection and cooperation both technologically and financially can make the students ethically innovative to adopt socio economic transformation for a sustainable world.

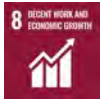
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Decent Work and Wellbeing in Modern World of Work: Empirical Evidence from Delhi NCR Region

Anu Rao (Indian Institute of Technology Jodhpur, India), Balram Rao (Alliance University, India), and Kunal Rao (Indian Institute of Technology Roorkee, India)

Abstract

The Covid-19 pandemic has effectively forced the world into an economic meltdown. Interestingly, in midst of the first corona wave, the Indian Parliament passed three labour codes-the industrial code, the code on social security, and the code on occupational safety, health, and working conditions. In this paper, we examine the impact of the consolidation exercise of these labour codes in the construction industry. We attempt to analyze how these codes could affect the lives and rights of workers in the construction industry.

We focus on analyzing the existing conditions of work, safety regulations, and other welfare measures that could have improved the wellbeing of the workers during a pandemic. Using descriptive analytics, the analysis is derived from the primary data collected at the sampled large construction worksites of both public and private MNCs spread across the Delhi National Capital Region. The findings describe that a more flexiblecum precarious hiring process has weakened the compliance on conditions of work, health, safety, and other welfare measures. Further, de-facto reinforcing the traditional non- standard norms of labour mobilization has not only trapped the workers in neo-bondage kind of labour relations, but the spread of Covid-19 pandemic and inadequate social protection have also affected the safety at work and wellbeing of most of the workers. This is in complete contradiction to both what most of the organizations and governments committed to United Nations Sustainable Development Goals (SDGs) and what neoliberal reforms often claim of 'free the agency of labour'.

Keywords: Covid-19, Work, Wellbeing, Social Protection, SDGs, Construction Industry

Introduction

Covid-19 Pandemic and Construction Industry

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), commonly known as the covid-19 pandemic has effectively forced the world into an economic meltdown. As observed, the coronavirus can be transmitted from person-to-person and causes symptoms that include fever, dry cough, fatigue, absence of taste, dysfunctional olfactory organs and shortness of breath etc. The virus is continuing to spread around the world, as there have been 399,600,607 confirmed cases and 5,757,562 deaths of COVID- 19 reported across almost 200 countries. The US, India and Brazil have seen the highest number of confirmed cases, followed by the UK, France and Russia. In India, there has been 42,410,976 confirmed cases of COVID-19 with

505,279 deaths. More importantly, as of 31 January 2022, a total of 1,672,194,503 vaccine doses have been administered (WHO, Feb.9, 2022). The most critical part of the outbreak has been its rapid spread and long incubation period. In addition to the serious health emergency, the outbreak has resulted in a global economic decline. The construction sector, like many other sectors, has been affected the most in many ways. Since the pandemic began and subsequent lockdown announcement, construction activities were completely halted and, workers were rendered without any work as well as social protection [50].

Construction Industry and Employment Configuration

Construction industry in India is the second largest employer of non-formal contracted workforce after agriculture [19, 20, 28, 45]. Over the decades, Indian Construction Industry has been continuously playing a vital role in development and contribution in the national economic growth [44]. Post 1990s, with pace of neo-liberalism, the building and construction industry has been the primarily reaped the material benefits of global integration via participation of private sector organizations, especially MNCs and subsequent flow of capital, technical services, and technology itself. The consistently contributions of around 8% of GDP and 8-10% of total employment, the industry has emerged as one of the key drivers of the economic growth in India (GOI, 12th five-year plan (2012-17)). The industry is a mix of public sector, joint ventures, and private sector corporate institutional players such as the Confederation of Real Estate Developers Associations of India (CREADI), the Builders Association of India (BAI), and Construction Industry Development Council etc. Interestingly, around 50 construction companies are in top 500 ranking as per their capital cap holdings (Economic Times, 2014:2016). The increasing scale of business beyond national or geographical boundaries, employing a huge army of labour, and growing economic power of corporate sector, construction industry has become very significant player in the development of Indian economy. Today Indian construction industry is valued at over US\$ 157 billion¹¹. Apart from various government flagship program such as 'Housing for All', Smart Cities', 'AMRUT' and 'Make in India', 100% FDI is permitted through the automatic route for townships and development of commercial spaces. The industry accounts for second highest inflow of FDI¹² after the services sector and a priority destination for foreign investors. The increasing multi-level MNCs partnership at different level of work process and services are now resembling like the global production networks in construction industry. Further, due to strong sectoral linkages, the construction activities have multiplier effect across sectors and thus has a critical role in achieving some of the important Sustainable Development Goals [43] including good health and wellbeing (SDG 3), industry innovation and infrastructure (SDG 9) decent work and economic growth (SDG 8), Gender Equality (SDG 5), Clean Water and Sanitation (SDG 6), sustainable cities and communities (SDG 11). Even during the ongoing Covid-19 global pandemic and subsequent lockdowns, when most of the economic activities halted, Construction development as well as infrastructure activities continued to attract more than 10% portion of the FDI equity inflow in FY21 (cumulative) till 2021 (DIPP/GOI, 2021)

¹¹ Infrastructure accounts for 49 percent, housing and real estate 42 percent and industrial projects 9 percent.

¹² 100% FDI through the automatic route is permitted in townships, housing, built-up infrastructure and construction-development projects (including, but not restricted to housing, commercial premises, hotels, resorts, hospitals, educational institutions, recreational facilities, city and regional level infrastructure)

On employment configuration, over the last one and half decades from 2004-05 to 2017-18, construction sector has emerged as the most employment generating subsector of the non-manufacturing sector. From 2004-05 to 2011-12, out of total non-agricultural employment, construction sector itself accounted for half of total increase (see Table 1)

| Table 1. Sectoral Employment as per various NSSO Rounds (Numbers in Million) | | | | | | |
|---|-----------------------------------|-------------|-------------|-----------------------------------|-------------|-------------|
| Type of Industry and Sub-sectors | Total employment (million) | | | Youth employment (million) | | |
| | <i>2004</i> | <i>2011</i> | <i>2017</i> | <i>2004</i> | <i>2011</i> | <i>2017</i> |
| | <i>-</i> | <i>-</i> | <i>-</i> | <i>-</i> | <i>-</i> | <i>-</i> |
| | <i>05</i> | <i>12</i> | <i>18</i> | <i>05</i> | <i>12</i> | <i>18</i> |
| <i>Manufacturing Sector</i> | | | | | | |
| Manufacturing Total | 53.9 | 59.8 | 56.4 | 22.4 | 22.1 | 18.5 |
| <i>Non-Manufacturing Sector</i> | | | | | | |
| Mining and Quarrying | 2.7 | 2.6 | 2.0 | 0.8 | 0.9 | 0.6 |
| Electricity, water and gas | 1.2 | 2.5 | 2.8 | 0.1 | 0.7 | 0.6 |
| Construction | 25.6 | 50.3 | 54.3 | 10.7 | 17.8 | 16.6 |
| Non-manufacturing Total | 29.4 | 55.3 | 58.9 | 11.6 | 19.4 | 17.8 |
| <i>Authors' estimation based on various NSS and PLFS unit level data</i> | | | | | | |

As show in above table, during 2017-18, Construction sector employ about 54.3 million (about 92 percent) out of total 59 million jobs in non-manufacturing. Although the overall employment in construction sector has increased, but the absolute decline of youth employment from 17.8 million to 16.6 million indicate distress kind of employment preference and unattractiveness towards the sector. Further, one of the most labor-intensive work activities, the construction sector has suffered a lot due to lockdowns, shortage of workers, restriction on mobility of workers, disruptions of supply chains, social distancing, and other constraints of standard operating procedures (SOPs).

Further, with precarious cum flexi mobilization process of the migrant workforce without any formal employment and social protection, the construction sector has been significantly affected by the COVID-19 pandemic and has been challenged to improve the work environment, safety, and wellbeing of its workforce.

This necessitates to examine how covid-19 environment have impacted further on the conditions of labour and wellbeing in modern construction industry. The next section describe the conceptual analytical framework followed by objectives, methodology, analysis and conclusion(s).

Literature: The Conceptual and Analytical Framework

Over the last three decades, neoliberalism has dominated economic policymaking around the globe. Both the neoliberal scholars often argue that investment by multinational firms is not just economic expansion, their higher returns to coexist with improved conditions of work and worker's wellbeing along with rise in standard of living of all stakeholders over the long run. However, over the years, many research studies have highlighted that with the pace of globalization and subsequent policy pressure of flexibilisation, the informalization process such as engaging more temporary, casual worker, and contracted or skilled-self-employed have further exacerbated vulnerabilities across the sectors [8, 10, 11, 23, 27, 31, 37, 39, 40, 41, 42]. Such continuous exacerbation of the deficit of decent work along with stagnation and declining regular employment share across sectors have further questioned the efficacy of the state's free market reform process [1, 2, 3, 36].

However, India illustrates the contradictions of both current globalized and other neo-liberal economies, as the country has been traditionally a socially regulated economy and its labour market has remained highly informal as well as localized [12, 13]. The recent Periodic Labor survey and research reports have also highlighted that 91 percent of India's total labor force (495 million) is employed informally across the sectors. With rapid urbanization and industrialization and subsequently rise in flow of FDIs in construction sector has emerged as the largest employer within non-manufacture sector [28, 45, 46].

In September 2015, the onset of global crisis in the development paradigm, most of the United Nations member countries unanimously adopted the Seventeen Sustainable Development Goals [43] built on the principle of 'leaving no one behind'. In contrast to earlier development goals (MDGs), the SDGs aim to involve all stakeholders from North to South including governments, businesses, non-governmental organizations and social or community organizations to ensure sustainable development and inclusive wellbeing. The collective agreed Agenda 2030 with 17 universal goals to address the global development challenges such as end hunger, reduce inequality & poverty, promote decent work, health, safety of the planet and thus sustainable cum inclusive wellbeing for all [43]. Interestingly, the SDGs framework provides the construction industry with a new lens through which universal needs and targets can be translated into better business solutions, wellbeing of all stakeholders and sustainable humanities. The Goal (SDG 8) of economic growth and decent work specifically provide conceptual and analytical framework to address growth with productive employment, social protection, and collective bargaining to improve wellbeing of all stakeholders.

Over the years, the construction industry has been a roller coaster in the building of modern India i.e., building of housing, institutions of governance, industry, development of other infrastructure facilities including education, health, and highway to airways across the regions. Traditionally, the industry has been a beneficiary of rural migrant workforce through the accelerated geographical mobility of labour by precarious ways. In functionality, Construction sector in India is most fragmented in terms of size and scale, with a handful of major companies engaged in all segments of the construction projects while medium size companies are engaged in some niche construction

activities and smallsize organizations are engaged as contractors or subcontractors at field level activities. Despite the tech-ecological transition, the sector remains the most labour intensive by employing millions of workers directly and indirectly [17]. The industry has consistently contributed around more than 8 percent of both GDP and employment generation and its present gross value is about 1,064,068 crores at the current prices [9]. The industry's labourprocess largely depends on the social interaction and regulations where social institutions such as class, caste, religions, and gender shape both the access to work and the conditionsof employment. Further, the nature of social regulations is heterogeneous and varies greatlyfrom one sector to another and from one region to another in relation to both strategies of capital and of labour. The industry has been a significant player in terms of bridging the gap between rural and urban while creating backward-forward linkages across the sectorsuch as cement, iron, and steel etc. As a result, the industry has emerged both.

With improved connectivity (both in terms of transportation and communication) and information about the wage and better job prospects, a large flux of the rural migrantsis strategically migrating towards the big metro cities like Delhi and NCR region, Mumbai,Bangalore, Hyderabad, Chennai and their satellite towns which have emerged as the pillarsof neo-liberal growth in 21st century. These metro cities and their expanded Urban Agglomerations have become the magnetic center for migrant workers due to high demandfor building and construction of housing, urbanization, commercial complexes, industries,SEZs and other infrastructural development activities like roads, flyover, Metro rail,etc. Further, participation by the global organization at various level in the construction industry could be seen as the integration with the global production network (GPN). This transition could have significant transformative effects both in the production relations andlabour standards. Further, because of its strong forward and backward linkages across thesectors, the construction activities have multiplier effect in development of an economy and thus has a critical role in generating more employment, and ensuring rights at work (SDG8) while achieving some of other important sustainable development goals includinggood health and wellbeing (SDG 3), industry innovation and infrastructure (SDG 9) decentwork and economic growth (SDGs 8), Gender Equality (SDG 5), Clean Water and Sanitation (SDG6), Climate action to Life on Land (SDGs 13 & 15), sustainable cities andcommunities (SDG11).

The construction activities around these urban satellite metro cities are booming atlarge to facilitate the massive housing, commercial and industrial space development. Asa result, the construction sector has emerged as the 2nd largest destination of FDI equity inflow after the IT sector (India Stat 2020). However, over the decades, the construction industry has a very poor social responsibility and ethical reputation in terms of labour andwelfare practices [33, 34, 35]. This has necessitated to examine the conditions of work inrespect to decent work (SDG8) and analyzing other work-labour conditions and labour relations to understand the workers' wellbeing. The paper continues from this section, followed by the objectives, overview of study area, data collection and methodology, analysis of the socio-economic profile of the sampled workers, and their conditions of workand labour relations. Finally, it concludes with the key findings and required policy interventions as well as some future research suggestions.

Objectives, Universe of the Study and Methodology

Objective

In this paper, we have focused to answer majorly two key hypothesis and questions. First, how the COVID-19 environment has impacted on the construction industry? How these codes could affect the lives and rights of workers in the construction industry? And to what extent it has impacted on the conditions of work and wellbeing of construction workers with respect to decent work (SDG8)?

Universe of the Study

The fieldwork was carried out in Gurugram and NCT Delhi areas of Delhi NCR region. As per the National Capital Region Planning Board (NCRPB) Act, 1985, the NCR, the national capital region, is also called a mini-India and seen as a unique example of inter-state regional development planning for a region with NCT-Delhi as its core. The post 1990s, the massive urbanization and industrialization of the region, hundreds of small, medium and large construction organizations including both domestic and multinational companies are active in developing and building construction of large housing projects, commercial centers and industrial-SEZs complexes. The sampled workers across worksites belong to medium to large public and private multinational (MNCs) organizations have a presence in Delhi NCR and are also highly active with multiple construction sites across the continents. The NCR covers an area of about 51,144 sq kms falling in the territorial jurisdictions of four provincial Governments namely, National Capital Territory of Delhi, Haryana, UP, and Rajasthan and constitutes about 1.75% of the country's land area [47].

Data and Methodology

For understanding the contemporary conditions of work and wellbeing in the construction sector, we require a holistic mix methodology approach in collection of primary data and interpretation of analysis. For collecting the primary data, we used telephone, mobile conversation, semi structured questionnaire to conduct the interviews with 400 workers and other officials employed at four large construction worksites of both public and private construction MNCs giants across Delhi NCR region. Finally, the descriptive data was interpreted and analyzed quantitatively through the SPSS. The obtained results were further cross verified and validated by focused group discussions and field observations.

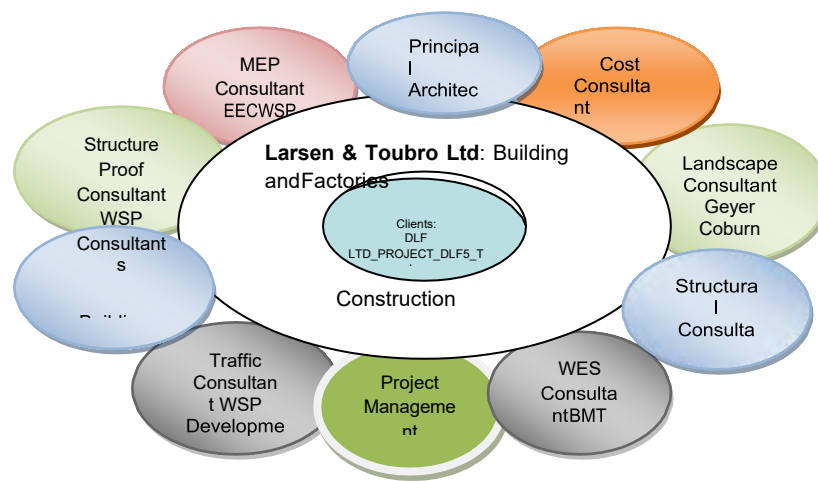
Findings and Analysis

Global Value Multi Stakeholders Transformation

As shown in Fig.1, with increased inflow of foreign direct investment (FDIs), and participation of the global players such as investor, consultants, experts and technological up gradation, the 21st century Indian construction industry has become very much the part of Global Production Network (GPN). The industry encompasses a range of stakeholders including developer/client to chain of

consultants, and general construction contractor to multi-level sub-contractor and casual workers to potential customers at large. The operational scale of the construction projects is today amongst the largest and the presence of some of the construction companies are visible across the continents such as SPCL, DLF, L&T, NBBC etc. Further, expansion of the operation scale of these companies beyond national boundaries and participation of the global players such as investor, consultants, experts, and technological upgradation, the Indian construction industry is also now more prone to global disruption, as it has become very much the part of global production network (GPN) (Figure 1).

Figure 1: The Global Value Chain/Networks of Stakeholders in the 21st Century Construction Industry



Source: Fieldwork* Figure is only shown to give a real account of multi-stakeholders' network (GMSNs) in Global Value Chain (GVC/GVNs).

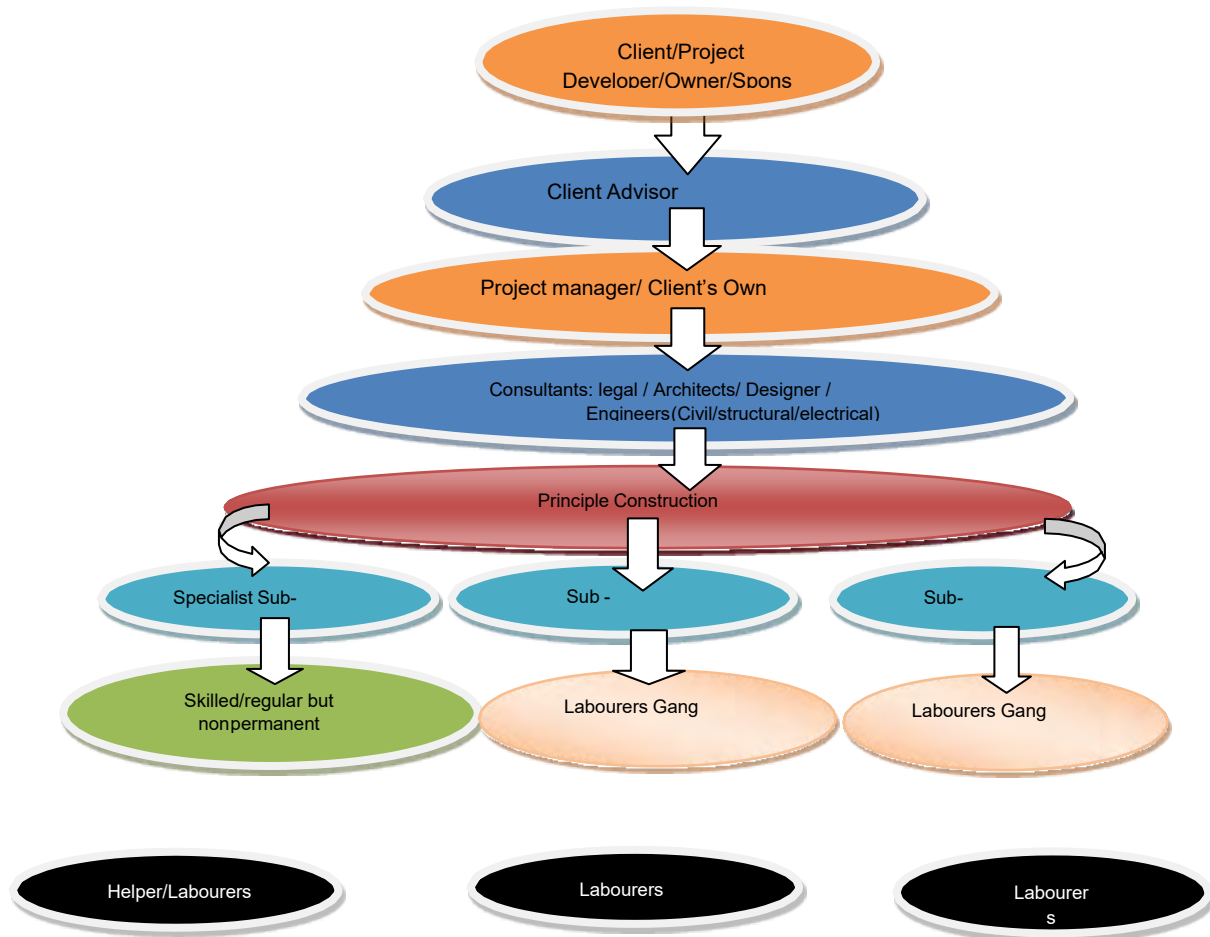
Decency at Work and Conditions of Labour

In post reform periods, the Indian labour market has seen a structural transformation. As a result, construction industry has become one of the largest employers in recent times [9, 28, 29, 30, 45]. Despite of the 2nd largest employers, laborers are at the bottom of the construction industry's process pyramid (Figure 2). The labour process could be seen as the most flexi-cum precarious or 'a race to bottom' in nature, where a large numbers of intermediaries or subcontractors/agents are part of the recruitment and deployment chain. Inspire of technological advancement, the labour process in construction industry still largely depends on tradional way of mobilization such as kinship or local agents who often brings rural migrants from poor region in India.

The industry could be matched at the global parameter in terms of operation, technology, and overall management of the investment as well as product development. But despite of that, the labour practices and standards remain not only highly localized but largely traditional. With growing technological advancement and demand for flexi-specialist workforce, today the sector is

full of sub-contractors. Further, emerging concept of bottom-line contract, the sector has more contractors in form of self-employed workers rather than contractual workers. Though the industry has become more organized, but the labour process is largely remain flexible and facilitated by the multilevel intermediaries through the pyramid of subcontracting (Figure 2).

Figure 2: Employer-Employee Relations and Labour in the Construction Industry



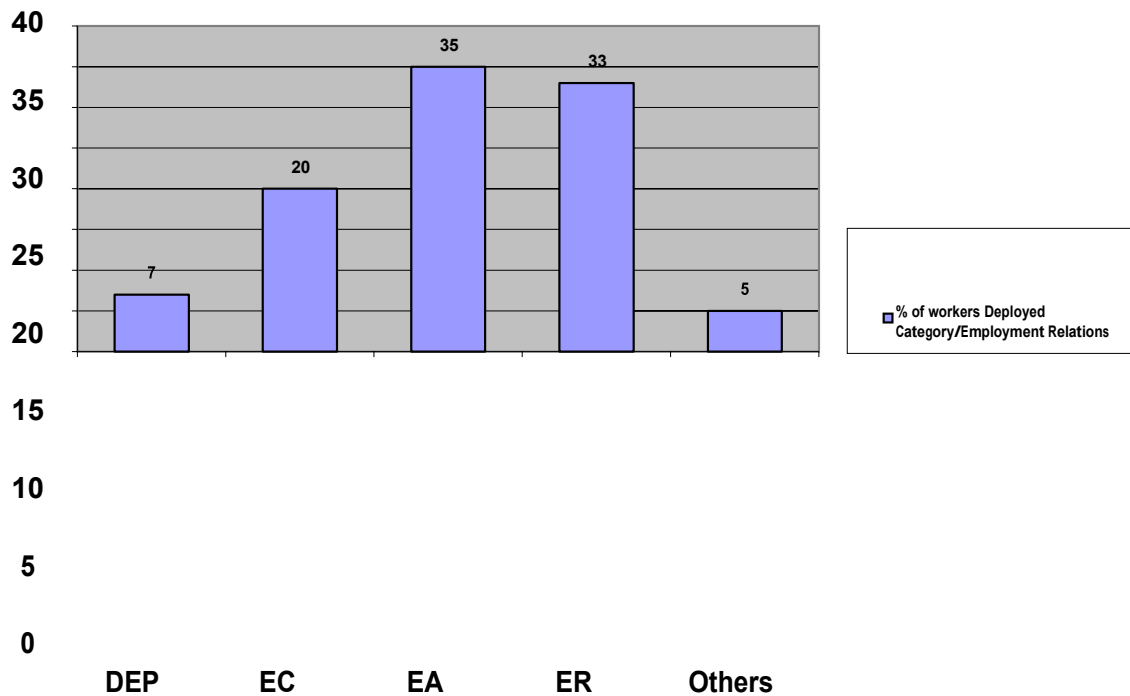
Source: Based on the Author's own observation during fieldwork

The above figure 2, the modern industry has multi-contractual chain of production process and labourers falls at the bottom of the hierarchy. Most of the large construction organizations have almost same typology of labour deployment and management process, where bottom line labourers and their mobility are handled by the low level of supply chain at the margin of the whole process. Because of multi-level sub contractual layer and precarious way of hirings, there is no direct relationship and responsibility of principle employer towards the workers. These field observations clearly show the continuity of precarious labour mobilization practices that result in blurring the employer-employee relations as well as denial of Workmanship rights.

Compliance Conditions of Labour Regulations and Practices

Most of workers are hired through kinship, relatives (33%), and intermediaries (34%) and followed by petty/subcontractors (20%). Only a small (7%) number of workers (specialist/skilled specific) are hired by the main contractor/subcontractor organization directly. However, most of these workers hired directly or through relatives and agency of workers are treated as non-permanent or casual regular and paid on daily person days or measurement rate basis without a formal agreement or contract. Except, who are directly employed by the main contractor/subcontractor, they themselves are responsible for their work, remain most vulnerable in every aspect, as company never takes their responsibility and petty contractor/agent or kinship does not take much responsibility (Figure 3).

Figure 3: Process of Workforce Employment (Percentage-wise)



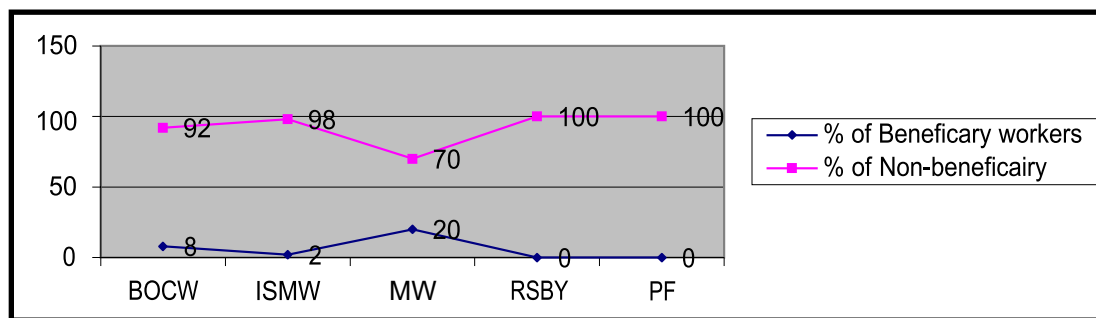
Note: DEP (No of workers employed Directly by the main contractor/principle employer), EC (Employed through petty/subcontractors), EA (Employed through agents), ER (Employed through relatives). Source: Author's Primary survey

There are around more than 44 regulations in general and some more specific regulations such as Minimum Wage Act, Payment of wages Act, Inter-State Migrants Workers (Regulations of Employment and Conditions of Work) Act, Maternity benefits, Equal Wages Act, National Holidays Act, Building and other Construction Workers (Regulations of Employment and Conditions of Work). Most of the workers are hired in unskilled to semi-skilled categories and paid around 100-180 while asked to work around 8-10 hours per day, which shows that they are paid even less the minimum wages. Further, female workers, who even treated at the marginal end of the skilling pyramid usually face more discrimination in wages.

Compliance Conditions of Labour and Welfare Regulations

Despite of number of labour and welfare regulations applicable in the construction industry, the miserable conditions of construction workers tell different story of compliance status. Though, looking at the status of labour and welfare regulations, India, apart from around 44 labour and welfare regulations, as a founder member of International Labour Organization (ILO), has altogether ratified about 333 labour laws and number of related Conventions including Decent work guidelines [18] and Goal 8 [43]. Further, since its independence, India has enacted several legislations that prohibit discrimination due to gender, caste, religion, region etc. (for example Minimum Wage Act, Equal Remuneration, Maternity Benefits Act, Payment of wages Act, Contract Workers Act, Inter-State Migrant Workmen Act, Fair Compensation Act and more construction sector specific Building and Other Construction Workers Act [4] etc. But at the implementation and enforcement level, these acts are usually lack of proper accountability and transparency. Across worksites, organizations are often seen to violate acts like the Discrimination (Employment and Occupation) convention [18] such as different wages, conditions of work and labour conditions, and in case of female labour deployment, more vulnerability as well as injustice has been found to be practiced across sites. Despite as a mandatory code of conduct to put notice board about the minimum wages and day of the payment at ever worksites, the companies lacks in transparency of their process of payment of wages, and more discriminatory wages for women. Except a few, most of them are illiterate and their lack of regulatory awareness is a big concern in construction Labour market, (see Figure 4).

Figure 4: Status of Regulations Awareness of Workers



Note: BOCW (Building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996, ISMW (Inter-State Migrant Workers (Regulation of Employment & Conditions of Service) Act 1979, MW (Minimum Wages Act 1948), RSBY (Rastriya Swasthya Bima Yojna), PF (Provident Fund a/c). Source: Primary Survey.

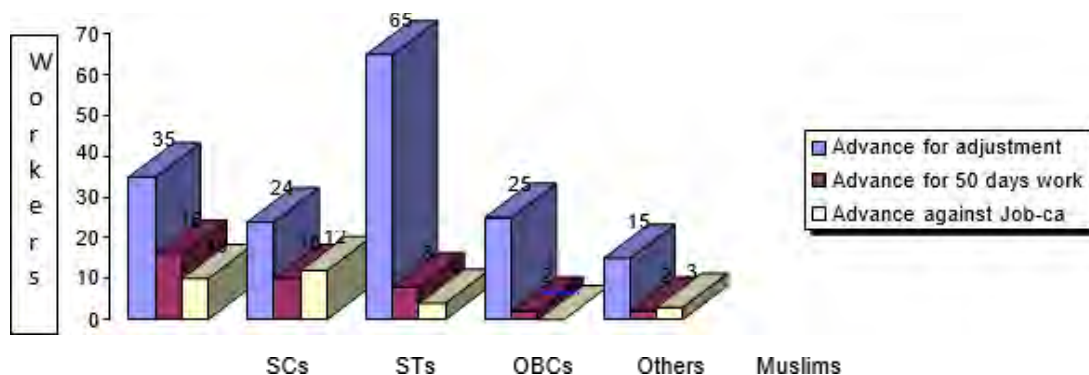
Thus, the lack of awareness of regulations and registration at welfare boards clearly show their adversity at worksites. Most of workers often face vulnerabilities in terms of employment, work conditions, job, further skill, welfare benefits, citizenship identity, living conditions and double excluded such as welfare benefits at the place of origin and social security at the workplace. Except a few know about Minimum-wage, Most of the workers are even not aware or informed about other social protection or benefits such as Labour Card, RSBY, PF, ESI, and recently launch PM Jan Dhan/ Bima Yojna scheme.

More importantly, if the recently passed and notified labour codes such that the Code on Social Security (SS), and the Occupational Safety, Health and Working Conditions (OSH) Code, 2020 are brought into force, it would mean a death knell to the historical struggled won labour gains entitled through Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) (BOCW) Act, 1996 and the companion legislation, Building and Other Construction Workers Cess Act, 1996 (cess act). The BOCW Act is a remarkable piece of legislation that not only carves out the term of employment, workmanship rights and measures for working conditions for the construction workers, but also ensure wellbeing and welfare measures by providing the financial stimulus in the form of a cess to fund the welfare schemes.

Emerging Conditions of Advance Taken and other Bargaining Strategies by the Workers

As traditional trade unions are missing from the construction sector and thus no collective bargaining. However, aftermath of the Right to Act (MGNREGA, 2005), most of the, Contractor, subcontractor and agent told that the labour process hiring has completely changed. Many workers either paid or demanded advance at least equally the wages paid in NREGA to ensure their migration and mobility in the construction industry. In a more interesting findings it shows that across the social structure, many workers i.e. OBCs (65%), SCs (35%), STs (24%), others (25%) and Muslims (15%) have been paid advance/demanded, even a job card of NREGA also empower the workers to demand in advance before migrating with construction agents or contractors (Figure 5)

Figure 5: No of workers, their Conditions of Migration and Joining Construction Industry



Effects of COVID-19 on Gender and other vulnerable groups

Although COVID-19 has impacted the entire construction industry and its workforce. But there is growing evidence that it has had more severe impact on certain groups of workers. Older workers, whose immune systems are compromised by aging, are more vulnerable to the virus. This has further created more vulnerabilities as well as disparities in the workforce (Brown et al., 2020). Further, Men and women have been affected differently by the COVID-19 pandemic. It has had a much more serious impact on female workers than on male workers, which has intensified the gender disparities throughout the workforce. Since the pandemic has caused widespread shutdowns in childcare facilities and schools, women suffered the most with increased family care

responsibility with loss of income. The stress of balancing family and job obligations has caused women to experience more health problems than men (Wenham et al., 2020; Azcona et al., 2020). Further, more deployment of technological equipment, the lower ladder of workers, especially women who often find employment at the lowest ladder, like helper, loader etc. has been largely replaced by the machines such as loaders, cranes and earth movers etc. It has resulted in poor compliance of minimum wages and other regulatory provisions such as Crèche, accommodation, health checkup, drinking water and separate toilet facilities under formal employment agreement of Interstate Migrant Act [22], Maternity Benefits Act, and BOCWA [4]. The private MNC like L & T run a health clinic during the working hours and public sector MNCs like NBCC made an arrangement like with local hospitals, but there was no women labourers deployed on their worksites there. On analyzing covid-19, most of the workers are found to be rendered without any social protection system including facilitating food, return travel to their natives etc. (Table 2).

Table 2: Compliance Conditions of Labour Welfare, Social Protection and Covid-19 Protocols/SOPs

| | Percentage (%) Of Workers |
|---|---------------------------|
| Do you have any Insurance Policy | 0 |
| Social Security (BPL) | 10.6 |
| | |
| Separate toilet facility for women workers | 0 |
| Maternity Benefit claimed by female workers | 0 |
| Social distancing and Mask wearing followed as per SOPs at worksites | 5.5 |
| Mask and hand sanitizers provided at sites | 5.1 |
| Paid for Testing for corona | 0 |
| Loan/advanced provided for managing food and medicines during lockdown | 6.5 |
| Facilitated /paid to go to native | 0 |
| If tested covid-19 positive, any help provided by contractor/employer/agent | 2.4 |

The some organizations, shows the extensive use of capital in terms of technological advancement mechanization such as earth movers, loaders, lifters, concrete mixer etc. They not only reduced the hiring of manual or unskilled workers but also almost denied the entry of women at construction work sites. Thus mobility of neo-liberal capital and subsequent extensive use of technology have a catastrophic kind of effect especially for low skilled labourers and women workers in construction labour market. Many skilled workers feel stressed about their job stability due to pandemic and unskilled felt more vulnerable to lose their job due to automation as well. Further, despite of sector specific regulations like Inter-State-Migrant Act [22] and Building and

Other Construction Workers (Regulation of Employment and Conditions of service) Act. 1996, where registration of the contractor and workers are mandatory with the district welfare boards. The construction contractors or firms lack in endorsement of standards laid down under these regulatory framework. Thus most of the workers even do not have a workmanship identity (Labour Card) and thus not eligible to register with the local welfare board which issues a labour card under the BOCW Act. [4] (See Table 3)

| Table 3. Conditions of Work across Different Worksites | |
|---|-------------------------|
| Conditions at Work across sites | % age of Workers |
| Advance Taken from Contractor | 66.4 |
| Labour /Workmanship Card | 12 |
| Forced to work beyond 8 hrs | 90.4 |
| Wages less than Minimum wages | 95.6 |
| Female workers paid less than male for the same work | 74.4 |
| Long Delay in Payment | 97 |
| Flexi-work hours due to covid-19 | 4.2 |
| Accommodation facility | 28 |
| Crèche facility for children | 0 |
| Contractor used abusive language | 67.4 |
| Work Security (Accidental) | 2.4 |
| Occupational Illness/Health facility | 1.6 |
| Written Employment Contract | 0 |
| Any Union/work association | 0 |
| affiliation Any labour inspector | 0 |
| you meet so far Safety Training provided before induction | 4.5 |

As the above table (3) clearly shows that, irrespective of a public or private organizations, there is a lack of basic amenities, poor compliance at worksites and no proper covid-19 guidelines prepared for flexi-work also. The vulnerability of migrant workers have become even more apparent during the pandemic as multiple issues have made them even more vulnerable to these problems. Except a few, most of the workers and especially who have migrated with their families, are living in Juggi either at construction sites or in nearby slums where their health and safety are the major issues. Further, their conditions of work and payment of wages found to be more precarious. Most of the petty workers often keep working for a long period of time as their work (to be adjusted), in terms of advance, to either pay the journey of labourers or some advance to their agents who brought them. Most of the contractors/ subcontractors neither pay any advance nor loan to workers to manage during the lockdown nor facilitated to return their native. Most of them are unable to isolate or social distance because of nature of work, lack of resource as well as space constraints. The separation from their families, loss of group or family members further caused to develop anxiety, distress, fear and post-traumatic disorders. These socio- environmental

adversities impact both their economic status and wellbeing [49,50].

Most of the workers, OBCs (100), SCs (55), STs (40), Muslims (24) and others (20) have still do not have any account, and still exchange money through either contractor/ agent or relatives / or village landlord account to transfer their money. Some of them told they have opened bank account while working under MGNREGS scheme but there is no bank nearby to their home and village bank agent often have electricity or machine problem.

Free Labour or NEO-Bondage?

As most of the construction laborers are mobilized by multi-level sub contractual networks. As most of the workers across the sites found to be the migrants but unaware about the Inter-State Migrant Act [22]. Further, mobilization with advance payment and keeping them 'ghetto' kind of conditions often put them in neo-bondage labour conditions where they do not have any free voice or capacity of bargaining and social dialogue. Further, non-enforcement of the standard labour and welfare regulations strictly, especially sector specific acts [4, 22, 24], question the efficacy of the state in implementation of their international commitments towards SDG8 (ILO, 2002:2008:2012). The onset of pandemic and subsequent waves has a catastrophic effect as it rendered most of the construction workers without job and wages that ultimately forced them to return their home of origin as well as face survival. Adequate awareness, training and educating workers about the COVID-19 behaviour could be useful tools to convey right informations for preventing mental, physical, and emotional problems.

Conclusion

The paper concludes that the consolidation of labour codes seem to promote ease of doing business and turn the entire country into a giant sweatshop without addressing the concerns of social protection and occupational health and safety. Such labour flexibility promotes the neo-liberal agenda and provides firms a free hand to exploit the workers. The codes have taken away various rights of workers that are presently sanctified in the BOCW Act. It enables the governments to rule by decree and suspend labour laws, as per their own liking. Findings describe the positive impact of equity inflow on development activities through more public private MNC partnership. However, multilayer sub contractual chain of labour mobilization has completely blurred the employer-employee relationship. The poor compliance on conditions of work, welfare, and labour standards have caused distress kind of employment and poor wellbeing in the sector. With more automation, women and other low skilled workers are found missing in sampled large scale projects, thus, there is an urgent need for interventions by both the state, global partners, and other labour market stakeholders to properly enforce the universally agreed guidelines on decent work (SDG8) and sustainable development Agenda of 2030, irrespective of the sector and region. Further, with precarious cum flexi mobilization process of the migrant workforce, the construction sector has been significantly affected by the COVID-19 pandemic. Interestingly, due to its strong forward and backward linkages across sectors, the MNCs in construction industry has a great potential to part with global institutions and play an instrumental role in achieving SDGs while improving the conditions of work and wellbeing including health, drinking water, and skill

development.

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Promoting Sustainable Development Goals Through Project-Based Learning: A Case Study of the Concept Center

Mary Foss (Weber State University, Utah, United States)

Abstract

The field of engineering is well-suited to solve many of the United Nations 17 Sustainable Development Goals (SDGs). It is the responsibility of institutions of higher learning to prepare engineering students to not only understand their role in achieving these goals but to be equipped with the skills, knowledge, and expertise to make incremental changes and advancements in their field that support sustainable development. One such way to do so is through experience in project-based learning (PBL). The Concept Center at Weber State University is modeled after PBL and functions to pair students with sponsored projects. This paper discusses the application of PBL in the Concept Center to achieve a double mission of being an active community member by connecting academia with industry and community members and providing opportunities for students to gain needed skills in problem solving and project engineering and mentorship. A summary of past projects completed at the Concept Center by student interns is presented that demonstrate the ability of the PBL Center to advance goals related to good health and wellbeing (SDG3), quality education (SDG4), gender equality (SDG5), affordable and clean energy (SDG7), and industry, innovation, and infrastructure (SDG9).

Keywords: engineering education, project-based learning, United Nations Sustainable Development Goals, quality education, gender equality, affordable and clean energy, industry, innovation, and infrastructure

Introduction

The purpose of this paper is to provide the evidence, framework, and benefits of utilizing a Project-Based Learning (PBL) center to advance the United Nations SDGs that are relevant and custom to the local community.

PBL is a pedagogical approach where the learning centers around problems (Krajcik and Blumenfeld, 2005). The Concept Center at Weber State University is designed as a living laboratory for students to gain hands-on experience through PBL. The Concept Center strengthens the university's time-tested mission of teaching by expanding that mission to include the conversion of knowledge into solutions to real world problems. The Center employs undergraduate student interns from the College of Engineering, Applied Science and Technology (EAST) in a part-time capacity. The Concept Center is organized into two components which represent the mission of the Center:

Education

The Concept Center is a proving ground for student interns to work on sponsored projects under the direction of faculty mentors. This hands-on experience allows student interns to be better prepared to meet the demands for the modern workforce. By gaining more experience in communication, and broadening their understanding to encompass the economic, social, environmental, and international context of the engineering field, the student intern education is strengthened.

Research and Development

The Concept Center is a place where new knowledge, technology and capability are constantly being expanded. It can meet a variety of different needs that industry will encounter during their research and development activities ranging from development research to product development.

The Concept Center at Weber State University was not created to address the need to meet the 17 goals, however each project that is detailed in this paper explicitly does advance one of the 17 goals in parallel with supporting the goal of quality education. By design, the Concept Center is intended to promote quality education but intentionally selects projects and engages in activities that promote good health and wellbeing, gender equality, affordable and clean energy, and industry, innovation, and infrastructure. The application of meeting these goals is customized and relevant to the local community or individual sponsoring the project. By focusing on the goal of quality education, students gain experiences that would be impossible to achieve in a classroom setting working on sponsored projects that function to promote one or more of the SDGs.

Methodology

This paper describes the organization, framework, and operation of the Concept Center at Weber State University and provides an example of diverse projects that have been completed and their link to at least one of the SDGs. Foss and Liu have described the benefits of the Concept Center as a means of developing creativity (Foss and Liu, 2021) and allowing students to gain skills in technology (Foss and Liu, 2020) as well as identifying key benefits to the institution as well as key lessons learned in student intern management and methods in selecting and identifying appropriate projects (Foss and Liu, 2021). Liu and colleagues have also had success integrating PBL methodologies in the classroom setting to improve the learning outcomes of students (Liu et. al., 2011; 2015; 2017 a & b & c; 2018; 2019 a & b).

The projects that are selected by the Concept Center are invariably tied to at least one of the SDGs. Many past projects target the goal of good health and wellbeing that are addressed here. This paper will also explicitly demonstrate the unique ways the Concept Center advances the goal of quality education through projects, intern mentorship, and outreach to the local community. This paper will also address the ways that the Concept Center takes an active role in promoting the goal of gender equality by engaging in activities that are designed to promote and support

women in engineering. Additionally, this paper will highlight several completed projects that promote the goals of affordable and clean energy and industry, innovation, and infrastructure.

Findings

This paper provides evidence of success by detailing projects completed at the Concept Center that support many of the SDGs including SDG3-5, 7, and 9.

SDG3: Good Health and Wellbeing

The Concept Center has a history of projects that have been completed that promote SDG3.

One example project is the design and prototype of tactile braille display hardware as shown in Figure 1. This prototype was completed with an aim of developing a tablet designed for users with visual impairment so that users can utilize technology that has been inaccessible to the blind and visually impaired community. Work on this sponsored project has been completed and delivered to the customer for further improvements in design and usability.

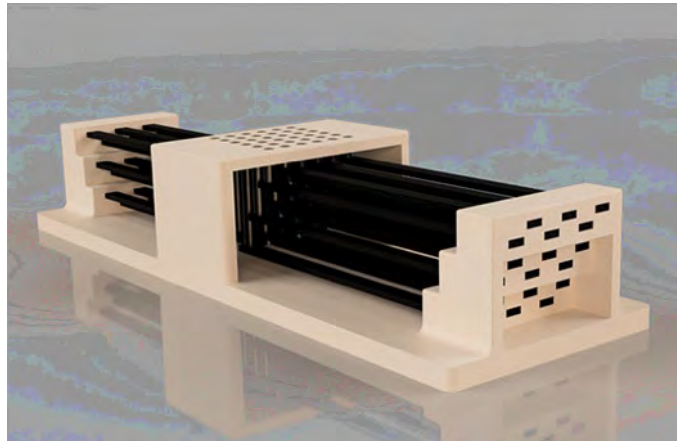


Figure 1. Tactile Display Hardware

In another project, the Concept Center designed and fabricated an athletic tape dispenser product for a student that only had one arm that was completing his studies in the athletic training degree. The product needed to accommodate multiple rolls of athletic tape as well as have the ability to cut the tape at custom lengths with one-handed operation. The Concept Center began by looking for solutions that could meet the customer requirements and created a simple and low-cost prototype that was belt-mounted and used a cutting wheel and slider as well as an easy quick-release mechanism for changing and replacing tape rolls as shown in Figure 2. This is an example of a project that meets the custom needs of an individual in the community and allows the individual to continue to advance in professions that would otherwise be limited.

Figure 3 shows a completed prosthetic guitar pick that was designed and built for a guitar musician that has only one arm. This device was designed with a removable insert so that musician could

utilize existing guitar picks. These projects are examples of projects that the Concept Center engages in that allow for the use of technology to solve real problems related to the health and wellbeing of members of the community.



Figure 2. Athletic Tape Dispenser for one-armed operation



Figure 3. Prosthetic Guitar Pick

Figure 4 shows the completed prototype of another project that had very unique requirements. A group of philanthropic eye doctors wished to come up with a device to administer an eye exam in a field setting. These doctors intended to travel to low income areas and Native American tribal lands to administer eyes tests for residents in those communities. They needed a product that could easily disassemble and fit in carry-on luggage, be light-weight, and low-cost and allow for

customizable settings to complete the exam. The Concept Center, working in conjunction with a team from the University of Utah designed and built a prototype that met the needs of the customers as shown in Figure 4.



Figure 4. Eye Exam Stand

The Concept Center has also worked on a number of projects that are subject to non-disclosure agreements (NDAs) and cannot be discussed in detail such as an innovative intubation tool. This tool is designed to aide a healthcare provider in keeping the airway open so air can get to the lungs in high risk and specialized populations of patients. Many projects completed by the Concept Center are selected due to their ability to promote SDG3.

SDG4: Quality Education

Improving Educational Outcomes

Many successful projects completed through the Concept Center have resulted in significant advancements in teaching within Weber State University and improvements in educational outcomes. In these projects, the clients are faculty or staff members of the University who were looking for solutions for their courses to improve the quality of the education of the course. A few examples of the developed teaching aids are Deming's Red Bead experiment for the course Quality Concepts and Statistics in the Manufacturing Systems Engineering (MSE) Department, I-beam molds for laboratory use in the course Reinforced Plastics/Advanced Composites in the MSE department, 3D printed self-assembling bacteria for Introductory Microbiology in the

Microbiology Department shown in Fig. 5, Leidenfrost effect blocks for several courses in the Physics Department, and a laser pointer assessment tool for the course Human Anatomy in the Zoology Department shown in Fig. 6. Lastly, three senior project teams in the Mechanical Engineering Department engaged in an autonomous robot competition where each team had to design a robot that would follow a course and launch a projectile at a target from different pre-determined locations. The Concept Center designed and fabricated a table-height 9-foot by 10-foot flat seamless surface equipped with side barriers and target locations that could be easily stored compactly when not in-use for use in the robotics course competition.

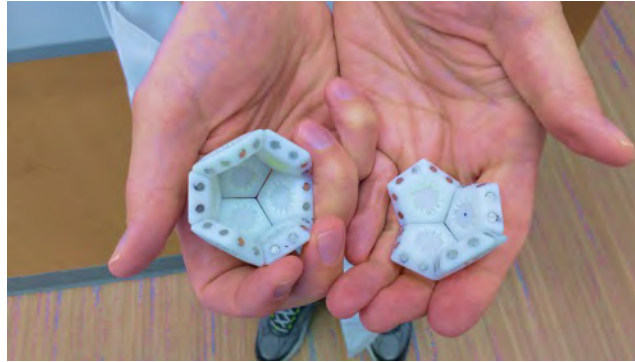


Figure 5. Self-assembling Bacteria



Figure 6. Laser Pointer Assessment Tool

Another example of projects completed that are aimed at improving student learning outcomes is demonstrated by the cadaver storage system. The Zoology Department at Weber State University received two cadavers by donation for use as teaching aids. A faculty member in that department wanted to use these cadavers in undergraduate human anatomy courses but did not have a way to store them. Moreover, the department did not have a budget or funding access to purchase a cadaver storage system. The Zoology faculty member approached the Concept Center for help with a temporary and a long-term storage solution for the cadavers. Based on the

customer's requirements, the team began by dividing this project into two phases. The goal of the first phase was to provide a short-term solution for the summer term and the goal of the second phase was to develop a long-term solution for permanently storing the cadavers in the Zoology Department. The Concept Center delivered to the Zoology department a low-cost and short-term solution and a longer-term solution that involved redesigning an existing gurney and equipping it with a pump and recirculating spray system as shown in Fig. 7. There were several important learning outcomes and unique design features included in this project that Foss and Liu have detailed (Foss and Liu, 2021).



Figure 7. Cadaver Storage Solution

Another project that was completed was the development of a mold for a mannequin shoulder insert. A faculty member from the Department of Zoology wanted a mold that could be used to make gel shoulder inserts for a mannequin for a continuing medical education (CME) accredited class for the Ogden Surgical-Medical Society's 2018 annual meeting. The gel shoulder inserts would be used in a technical training course for attendees led by a faculty member from the University. The mold was designed to allow attendees who are doctors, nurse practitioners, and physician assistants to practice injecting corticosteroids into various joints of the shoulder that are prone to damage. In this technical training course, CME students could visually see the location where the dye was delivered to simulate an injection of medicine on a real shoulder. Using the

mannequin provided by the Zoology faculty, the team made a reusable silicon mold. Fig. 8 shows the mold made in progress for the mannequin shoulder.



Figure 8. Mannequin shoulder mold teaching aid in progress

Mentoring Student Interns

Student interns can benefit the most from the PBL center through the mentoring relationship. The importance of mentoring experiences cannot be overstated and yet it rarely receives the focus or attention in academic culture (Committee on Effective Mentoring in STEMM, 2019). At the Concept Center, each student will have varying and individual needs. One student may need instructions on research methodologies or the use of technology. Fig. 9 shows students gaining skills in the operation of a CNC Plasma Cutting table. Another student may need guidance in interpersonal and communication skills. It is the responsibility of the mentor to assess the needs of each student intern and guide them accordingly. The role that the mentor plays should be tailored for each student intern. Each mentor should meet with student interns individually, document their goals of development, and discuss ways of assessing their progress.



Figure 9. Students gaining skills in technology through mentoring

Active Community Member

The Concept Center plays an active role in advancing quality education by volunteering to host sessions at local elementary schools for science fairs and STEM days. Faculty and interns at the Concept Center design PBL related challenges and provide materials to elementary-age children for STEM day

Concept Center faculty also engage in judging science fairs at local elementary schools and mentoring of winning students as they progress to the next level of the science fair. To do so, one faculty member met individually with 17 6th grade students and provided them tailored feedback and coaching to improve their poster, scientific method and presentation delivery. Many of these students received ribbons and advanced to the regional science fair that is scheduled for late spring, 2022. In this way, The Concept Center can promote SDG4 to not only the institution but also the local community.

SDG5: Gender Equality

The Concept Center plays an active role in promoting SDG5 by supporting women in engineering through outreach activities. The role that women have played in the field of engineering is historically complex but is also changing. In 2007 in the United States, 2.6% of freshmen women had intentions to major in Engineering compared to 13.7% for men. By 2014, the percentage of freshmen women intentions increased to 5.8% while for freshmen men the intentions increased to 19.1% (Science and Engineering Indicators, 2016). These increases in both genders show a marked improvement that could be attributed to many factors, including focus on Science, technology, engineering and math (STEM) in primary and secondary education. However, despite these advances, there remain interesting trends in retention of underrepresented minorities (URM) students in STEM fields. Proportionally, 32% of females left STEM fields by switching to a non-STEM major compared to 26% for males (Chen, 2013). There also exist significant gender imbalances within these fields in both the educational setting as well as industry. For example, the percentage of women working as engineers is 8.7% for mechanical and 11.8% for electrical and electronics (Labor Force Statistics from the Current Population Survey, 2022). The stark gender imbalances within engineering disciplines creates a catch-22 situation. More women would be represented in the educational setting and in industry if a critical mass of women could be achieved, eliminating or reducing challenges related to stereotypes and

stereotype threat and belonging. The Concept Center prioritizes promoting SDG5 within engineering by engaging in a number of outreach events sponsored by the University that are designed around PBL and also intended to create an environment that where belonging is fostered.

Parent Daughter Engineering Night

Many agree that a parent is a child's first teacher. The inspiration for the Parent Daughter Engineering Night Event hosted by Weber State University is based upon this premise using principles of problem-based learning (PBL). This event has been hosted for a period of eleven years with the past 5 years including Foss, the director of the Concept Center, as an event planner and facilitator.

In the setting created by the event, parents see their daughter in a positive atmosphere that not only supports but demonstrates the place of women in engineering. Additionally, the daughter, with a target age group of grades 7 through 12, can find herself in a group of her peers engaging in hands-on engineering activities and hearing the stories of women in engineering as students or in their careers. The result is both parties can share in an experience that uplifts and supports women in engineering and visualize a potential future for the daughter in engineering. Figs. 10 and 11 demonstrate the inclusive nature of the event, the application of PBL in the event design and the culture that is fostered to promote gender equality for women in engineering.



Figure 10. Parent-Daughter Team solving PBL Challenge



Figure 11. Daughters presenting their PBL Hydraulic hand challenge

Girls Welding Camp

Another outreach event that has been supported by the Concept Center is a summer camp that is hosted by Weber State University is the Art and Science of Metalwork through the medium of welding. This hands-on overnight camp targets 7-12th grade girls and exposes students to metal inert gas (MIG) welding, computer aided design (CAD), metal cutting processes such as plasma and waterjet cutting. The Concept Center supports this camp by serving as an instructor, planning the PBL design and build challenges completed by the students, and preparing materials needed for the camp. Figs. 12 and 13 show attendees of the camp participating and learning the welding process in an environment that is inclusive and designed to promote gender equality in a field where there is minimal representation from women.



Figure 12. Attendees of Welding Camp



Figure 13. Student Welding Art Project

Affordable and Clean Energy

The Concept Center prioritizes projects that target SDG7. One example project that was completed was the design and fabrication of two solar powered pavilions. The goal of the Solar Pavilion project was to design and fabricate two solar powered pavilions equipped with lighting and charging sources to power electronic devices. The primary goal of this project was to provide a safe and attractive place for students to convene, study, and work together outside. There were no such areas for students on the campus at that time and the cost of installation to run a new power line to a remote part of the campus was prohibitive and against the campus goals of sustainability.

At the completion of this project, two solar pavilions were installed on campus. Student interns gained hands-on experience in design and fabrication of the corrosion-resistant metal structures and accompanying solar power lighting and charging stations. In carrying out this project, they also developed skills in troubleshooting, teamwork, and problem solving. One completed solar pavilion with a student user is shown in Fig. 14. The pavilions have been in operation since June of 2019. The Concept Center has been monitoring their performance since then and has verified from student feedback that the solar powered pavilions function well in providing lighting and outdoor charging access for students.



Figure 14. Completed solar pavilion

This project led to another partnership with a community partner to design and build a solar powered bus stop shown in Fig. 15. This bus stop was designed to utilize clean energy (solar) to

power a light and an electronic display screen that could display the bus schedule as shown in Fig 16.



Figure 15. Solar Powered Bus Stop



Figure 16. Solar Powered Programmable Display Screen

Industry, Innovation, and Infrastructure

The majority of the industrial partners that have sponsored projects completed at the Concept Center are subject to NDAs so cannot be discussed here. There are, however, some projects that have been completed to support research projects that can be detailed.

Fig. 17 shows the CAD rendering of a test fixture device intended for a start-up corporation working on an innovative vehicle system. This test fixture was designed and fabricated by the Concept Center and allowed the company to better understand weak areas of their design by allowing the component to be tested to failure in an INSTRON machine. Loading conditions that will simulate its use were applied to the device and the customer was able to determine that the component needed to be redesigned to handle the loading that it will experience in use.

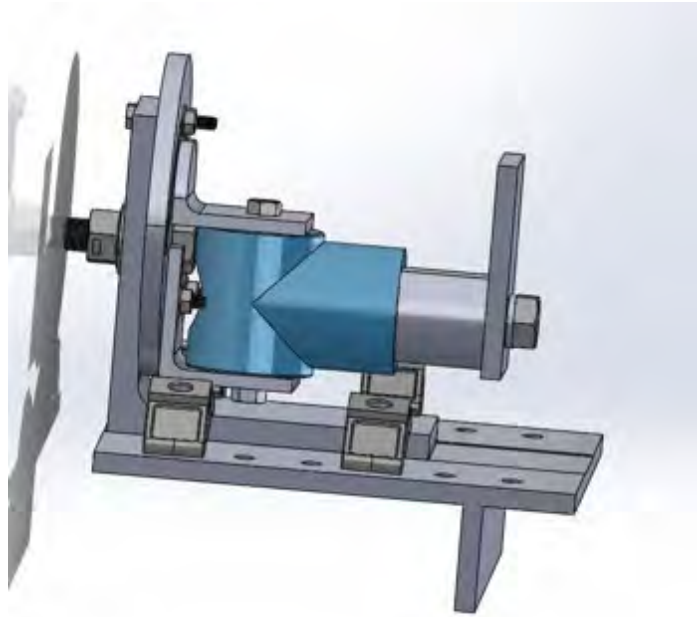


Figure 17. Test Fixture

Fig. 18 shows the completed devices designed and built by the Concept Center to test the water quality at a high elevation lake in a sensitive environment in Utah. Fish Lake is located adjacent to Pando, a clonal quaking aspen believed to be the largest living organism on the planet in Fish Lake National Forest (USDA Forest Service, 2022). A team of researchers were engaged in evaluating the water quality of nearby Fish Lake and needed a device that could be affixed to a dock and monitor the water surface as the level changes.



Figure 18. Water Quality Device



Fig 19. Pando (USDA Forest Service, 2022)

Conclusion

This paper details the relevance of the Concept Center to support the goals of SDG3-5, 7 and 9 through past projects completed.

By understanding the impact of the Concept Center at Weber State University to the local community, other institutions can develop their own PBL centers and further advance the United Nations SDGs in a manner that is custom to their local community. In order for the 17 goals to be achieved, academic institutions must take incremental steps and make progress in areas that are directly related to their communities. A PBL Center similar to the Concept Center is a practical way to do so and this paper demonstrates the explicit ways the goals can be accomplished through completed projects.

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La Necesidad de un Convenio Internacional para Fortalecer Alianzas en la Mitigación de los Desechos Espaciales

Estíbaliz García (Fundación Novia Salcedo, Spain)

Resumen

En un escenario en el que los lanzamientos espaciales son cada vez más frecuentes, los desechos espaciales tienden a acumularse. Se podría afirmar que una problemática similar a la del medioambiente terrestre se ha visto trasladada al ámbito espacial. Tomando en consideración que se halla fuera de discusión la posibilidad de disminuir o restringir la utilización y explotación del espacio ultraterrestre por los Estados, inevitablemente el foco central de interés para hacer frente a la problemática internacional aquí descrita son los propios desechos espaciales, ya que el número de los mismos no dejará de ascender en el tiempo. En los últimos años se ha desarrollado una mayor conciencia de la gravedad del problema, reconociendo los Estados la importancia de mantener un acceso sostenible al espacio ultraterrestre para las futuras generaciones. Desde el punto de vista jurídico dicho reconocimiento se ha venido reflejando en la elaboración de recomendaciones para mitigar la cantidad de desechos espaciales. No obstante, sin restar importancia a este logro en el campo, dichas recomendaciones no son vinculantes para los Estados, por lo que, tampoco se les puede invocar responsabilidad por inobservancia de las mismas. Teniendo en cuenta el incremento continuado año tras año en la cantidad de desechos en órbita, cabe afirmar que el problema persiste y se necesitan medidas adicionales. Por ello, la solución jurídica que se propone en el presente trabajo sería la elaboración de una convención internacional. Dicha medida otorgaría amplios beneficios, siendo el primordial el cumplimiento simultáneo de varios de los Objetivos de Desarrollo Sostenible (ODS) de la Agenda 2030. Ahora más que nunca es necesaria una sólida cooperación internacional centrada en la preservación del medioambiente espacial dada la trascendencia de la basura espacial como problema ambiental inminente y los riesgos que plantea.

Palabras clave: Desechos espaciales, Basura espacial, Espacio ultraterrestre, Derecho Internacional del Espacio, *Corpus Iuris Spatialis*, Protección internacional del medioambiente

Introducción

Transcurridos poco más de cincuenta años desde que se lanzó el primer objeto al espacio ultraterrestre el 4 de octubre de 1957, dando así comienzo la llamada Carrera Espacial, las actividades espaciales se han desarrollado considerablemente y el número de objetos en órbita no ha dejado de crecer. El progreso tecnológico derivado de ello es ciertamente impresionante, pero al mismo tiempo provocan un grave problema ambiental que supone una amenaza al interés común de los Estados en la protección del medioambiente espacial y que se traduce en la continua generación de desechos espaciales orbitando alrededor de la Tierra. Los desechos

espaciales (también conocidos como “basura espacial”) pueden definirse como todos aquellos objetos, fragmentos o piezas artificiales dispersos en el espacio, principalmente a día de hoy en la órbita terrestre, que ya no cumplen la función útil para la que fueron lanzados al espacio y que debido a la extraordinaria diversidad de elementos por la que están compuestos, son consecuencia directa de una multiplicidad de situaciones, entre otras, de destrucciones intencionales de satélites inactivos, desperdicios originados en el desarrollo de misiones espaciales y abandonos de equipos no operativos.

En los primeros viajes al espacio, era inconcebible científicamente que las actividades espaciales llegarían a suponer en un futuro no muy lejano una amenaza cada vez más latente a la protección del medioambiente espacial. Pero lo cierto es que desde los mismos inicios del acceso al espacio estas han ido generando año tras año cuantiosos desechos espaciales que tienden a acumularse descontroladamente en las órbitas de alrededor de la Tierra. Estimaciones actuales de varias agencias espaciales indican que orbitan en el espacio más de 150.000.000 de desechos y que, de continuar con esta tendencia, en un plazo de cincuenta años la órbita terrestre podría llegar a ser intransitable. De ser cierta esta predicción, en la Tierra los seres humanos no podríamos ver la televisión, ni hacer uso del sistema de posicionamiento global, ni obtener datos de meteorología, ni siquiera conectarnos a internet. Tampoco los Estados podrían explorar el espacio, ni llevar a cabo nuevas misiones espaciales, ni realizar actividades en la Luna y otros cuerpos celestes. Muchas de estas facilidades han beneficiado extraordinariamente la vida de las personas en la Tierra, algunas de las cuales incluso se han convertido en necesidades, por lo que resultaría sumamente complejo imaginar una sociedad sin las presentes condiciones de vida.

La situación se ve agravada con la adición de otros factores que derivan de la propia generación de basura espacial, una vez que esta comienza a orbitar alrededor de la Tierra. Uno de los motivos principales que provoca el aumento en el número de desechos espaciales es su largo tiempo en órbita antes de producirse su desintegración al reentrar en la atmósfera. De acuerdo con las investigaciones, los desechos que se encuentran en la órbita más cercana a la Tierra, más conocida como órbita LEO, pueden permanecer allí hasta veinte mil años, y en la órbita geoestacionaria u órbita GEO, que está ubicada a 35.875 km sobre la línea ecuatorial de la Tierra, entre uno y diez millones de años (Moscarella, 2013).

Lo más preocupante, según los expertos, es que durante el tiempo que estos restos permanecen en órbita pueden causar problemas graves. Es más, pueden llegar a resultar peligrosos, ya que, debido a las altas velocidades con que se mueven (concretamente en la órbita LEO, los desechos espaciales viajan a velocidades aproximadas de 27.000 km/h) y a su desplazamiento descontrolado pueden producir daños, e incluso llegar a destruir e inutilizar objetos operativos, así como poner en riesgo a las personas que se encuentran en el espacio ultraterrestre. En este contexto, en numerosas ocasiones los satélites tienen que cambiar su rumbo para evitar una colisión y la Estación Espacial Internacional realiza maniobras para evitar colisiones una o dos veces al año, a pesar de que fue especialmente blindada para protegerla de estos impactos (Pujals, 2013).

Por si estos peligros no fueran suficientes, debemos añadir que estas colisiones también suceden entre los propios desechos que chocan una y otra vez con otros restos, y así sucesivamente, lo que en un futuro no muy lejano generará una reacción en cadena calificada por los expertos en basura espacial como el “Síndrome de Kessler” (Palazzesi, 2019).

Por último, elementos que hasta ese momento fueron escombros orbitales posteriormente se reintroducen en la atmósfera. La mayoría de estas se desintegran por la fricción con la atmósfera, pero en ocasiones algunos fragmentos de chatarra de gran tamaño sobreviven a esas altas temperaturas e impactan en la superficie terrestre, lo que supone un riesgo para las amplias zonas habitadas por seres humanos, animales o plantas (Esquivel, 2012). Bien es cierto que hasta ahora nadie ha resultado herido, pero en ocasiones algunos fragmentos han sido hallados cerca de lugares habitados en diferentes puntos dispersos de la Tierra¹³. Los expertos de la Agencia Espacial Europea (en adelante ESA por sus siglas en inglés) calculan que tienen lugar cuarenta impactos al año en alguna parte del mundo (Martín, 2019), y la NASA destaca que en los últimos 50 años ha caído sobre la Tierra al menos un objeto catalogado por día (Pujals, 2013).

De esta manera, se podría afirmar que una problemática similar a la del medioambiente terrestre se ha visto trasladada al ámbito espacial. Tomando en consideración que se halla fuera de discusión la posibilidad de disminuir o restringir la utilización y explotación del espacio ultraterrestre por los Estados, inevitablemente el foco central de interés para hacer frente a la problemática aquí descrita son los propios desechos espaciales, ya que el número de los mismos no dejará de ascender en el tiempo. Asimismo, dado que la contaminación del espacio ultraterrestre posee un carácter transfronterizo que afecta a la comunidad internacional y a las relaciones entre los Estados¹⁴, resulta razonable que la respuesta a este problema haya que buscarla a escala internacional.

En los últimos años se ha desarrollado una mayor conciencia de la gravedad del problema, reconociendo los Estados la importancia de mantener un acceso sostenible al espacio ultraterrestre para las futuras generaciones. Distintos organismos y organizaciones internacionales (entre los que podemos destacar la UNCOPUOS y el IADC) han tratado de abordar la situación mediante la elaboración de recomendaciones para mitigar la cantidad de desechos espaciales a poner en práctica por la comunidad internacional espacial.

El progreso realizado por los numerosos organismos y organizaciones internacionales representa un avance significativo para afrontar el problema medioambiental. No obstante, y sin restar importancia a este logro en el campo, no puede ignorarse el hecho de que las medidas

¹³ Para conocer los casos más notorios de caídas de basura espacial acudir a ESQUIVEL, M., “Basura espacial: un problema jurídico de la época”, *Aequitas*, 6 (6), 2012.

¹⁴ Esto es así, ya que, a pesar de que el daño directo sea causado por un Estado, sus efectos negativos afectan en el territorio de otro Estado o incluso en el interés que los Estados tienen en este escenario con carácter de *res communis omnium*. Esta expresión describe la condición jurídica del espacio ultraterrestre y significa espacio común o de interés internacional. Implica que los Estados se han abstenido voluntariamente de ejercer soberanía estatal sobre él para crear, a su vez, una región sujeta a una especie de co-soberanía, en la que se prohíbe la reivindicación de soberanía exclusiva estatal y se proclama el principio del libre uso y explotación, partiendo de una base de igualdad de acceso y beneficio común para todos los Estados del planeta.

adoptadas son de naturaleza meramente recomendatoria, lo que implica que no son legalmente vinculantes para los Estados según el Derecho Internacional y, por ende, tampoco se les puede invocar responsabilidad por inobservancia de las mismas. Basta tener en cuenta el incremento continuado año tras año en la cantidad de desechos en órbita para concluir que dichas soluciones no han sido suficientes. Por tanto, no cabe duda de que, a pesar de la relevancia de estos esfuerzos, el problema persiste y se necesitan medidas adicionales.

Desde el punto de vista jurídico, para el tratamiento de los desechos espaciales se hace necesario recurrir al ámbito del Derecho Internacional especializado en regular la conducta de los Estados y las organizaciones internacionales en la exploración y utilización del espacio ultraterrestre: el Derecho Internacional del Espacio (Marchán, 1990). Sin embargo, cabe observar que no existe una regulación específica vigente en materia de desechos espaciales.

Esta actual laguna jurídica resulta comprensible, pues tratándose de una realidad relativamente reciente y desconocida por la comunidad internacional, el Derecho Internacional del Espacio no dispone aún de las herramientas para hacer frente de manera satisfactoria al problema que presenta la contaminación del espacio ultraterrestre. No obstante, a pesar de no contar con una regulación específica en la materia, el riesgo ambiental que ocasionan los desechos en el espacio ultraterrestre está siendo afrontado a través de normas generales de Derecho Ambiental Internacional y de responsabilidad por daños previstas esencialmente en los tratados y convenciones internacionales espaciales o *Corpus Iuris Spatialis*.

Por ello, la presente investigación se enfoca en analizar el Derecho existente aplicable al problema de los desechos espaciales para determinar si el tratamiento que reciben actualmente a la luz del Derecho Internacional es suficiente o, por el contrario, requieren el planteamiento de mejores mecanismos para su gestión en aras de progresar en la protección internacional del medioambiente. Un estudio similar fue realizado por la Comisión de Derecho Espacial de la Asociación de Derecho Internacional en las Conferencias celebradas en Queensland (1990) y El Cairo (1992) y la conclusión a la que llegaron los expertos juristas que en ellas participaron fue la necesidad de adoptar un nuevo instrumento que regulara la problemática. Así, en 1994 esta Asociación aprobó el *Instrumento Internacional sobre la Protección del Ambiente por Daños Causados por Residuos Espaciales*, el cual desde que fue remitido a la UNCOPUOS para su consideración, todavía a día de hoy se encuentra en estudio. En este sentido, con el presente estudio también se determinará si coincidimos en la conveniencia de adoptar un nuevo instrumento específico para los desechos espaciales.

Metodología

Para el desarrollo de la presente investigación, en primer lugar, han sido consultados diversos recursos electrónicos conformados en su mayoría por periódicos digitales y por portales de diversas agencias espaciales como la NASA o la ESA, para conocer detalladamente el estado actual de la problemática, los dilemas que plantean los desechos espaciales y el progresivo incremento de contaminación que generan en el espacio ultraterrestre. La información

proporcionada por dichos recursos ha sido indispensable para tomar conciencia de la gravedad de la situación.

Una vez que tales conocimientos han sido adquiridos, se ha recurrido a las fuentes del Derecho Internacional del Espacio. Hoy en día, el *Corpus Iuris Spatialis*, conformado por cinco tratados o convenciones multilaterales son la fuente que más directamente aborda la cuestión de los desechos espaciales. La UNCOPUOS fue el órgano en el seno del cual se debatieron y codificaron, desempeñando así un papel fundamental en la creación del Derecho Internacional del Espacio (Hermida, 1997). La regulación de estos tratados y convenios ha sido analizada respecto de su aplicación para el problema de los desechos espaciales, con el fin de evaluar el modo en que la problemática está siendo regulada por parte de la comunidad internacional, particularmente desde los ámbitos de la prevención de la contaminación en el espacio y de la responsabilidad por daños.

Tras observar que no existe regulación específica en la materia, se ha acudido a la doctrina tanto nacional como internacional especializada en el ámbito de esta disciplina para así conocer las diferentes soluciones que se han ido proponiendo para intentar dar respuesta a esta laguna jurídica. De esta manera, las fuentes doctrinales han cobrado la máxima importancia. Ello no solo obedece a la actualidad de la cuestión, sino que también no debemos olvidar que el Derecho Internacional del Espacio es una disciplina que apenas ha evolucionado.

A este respecto son ingentes los esfuerzos que realizan las distintas asociaciones y foros de Derecho Espacial. Algunos ejemplos son la Asociación Española de Derecho Aeronáutico y Espacial, el Instituto Iberoamericano de Derecho Aeronáutico, del Espacio y de la Aviación Comercial, y la Asociación de Expertos y Profesionales en Derecho Aeronáutico y Espacial Venezolano, entre muchos otros. Pero especialmente relevantes son las opiniones de los juristas de la Asociación de Derecho Internacional, ya que sobre la base de las mismas hubo consenso en adoptar un nuevo instrumento que regulara la problemática.

Por la misma razón de que el Derecho Internacional del Espacio es una disciplina *in status nascendi*, tampoco existe una jurisprudencia consolidada entorno a los desechos espaciales. Ahora bien, cabe destacar el relevante 'Incidente del COSMOS 954', el cual introdujo un precedente normativo sobre cómo deben actuar los Estados con respecto a la caída de desechos espaciales sobre la Tierra¹⁵.

¹⁵ Se trataba de un satélite soviético de vigilancia oceánica que el 24 de enero de 1978 cayó en el territorio de Canadá, esparciendo todos sus fragmentos radioactivos por la zona y ocasionando daños significativos. La Unión Soviética no informó a Canadá del suceso, ni tampoco advirtió del carácter radioactivo de los fragmentos, pero gracias al Registro Internacional de Objetos Lanzados al Espacio Ultraterrestre se identificó a esta como Estado de lanzamiento y por ende, como Estado responsable. Ante este hecho, el Gobierno de Canadá, solicitó por vía diplomática una indemnización por daños contra la Unión Soviética que compensara los gastos de acuerdo con el artículo XI del Convenio sobre Responsabilidad. En la demanda sostuvo que los residuos radiactivos del Cosmos 954 constituían un daño en los términos del artículo I del Convenio sobre Responsabilidad, por lo que era lícito reclamar tal indemnización económica, cuya cantidad superaba los seis millones de dólares canadienses. El conflicto se logró resolver por vía diplomática, y por la misma se acordó en el Protocolo de 1981 el pago a Canadá de tres millones de dólares canadienses.

Resultados

El Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes¹⁶ (en adelante Tratado del Espacio) constituye el instrumento principal en la materia, por cuanto asienta y desarrolla los principios generales del Derecho espacial proclamados por primera vez en la *Declaración de los Principios Jurídicos de los Estados en la Exploración y Utilización del Espacio Ultraterrestre*¹⁷, y sobre la base del cual se desarrollaron los restantes convenios internacionales (Hermida, 1997). Es por ello que sobre la base de su texto se comenta el análisis realizado de la regulación del *Corpus Iuris Spatialis* potencialmente aplicable a los desechos espaciales.

De entrada, cabe plantear que nos hallamos ante una normativa cuya redacción denota excesiva generalidad, circunstancia que ha dificultado identificar aquellos preceptos que pudieran considerarse aplicables a los desechos espaciales. Por ello, de manera que pudiéramos contemplar disposiciones aplicables a los desechos espaciales, hemos tenido que llevar a cabo una interpretación extensiva de buena parte de los preceptos. Un ejemplo sería el artículo I del Tratado del Espacio¹⁸, que recoge el principio de interés común del espacio ultraterrestre. En la línea de la prevención de la polución espacial, podemos defender que uno de los intereses actuales de todos los países bajo el que podrán realizarse actividades espaciales es mantener en la medida de lo posible un espacio ultraterrestre no contaminado (Reijnen y De Graaf, 1989). De esta manera, concluiríamos que la generación de desechos espaciales sería contraria a este interés y principio.

Otro supuesto de interpretación extensiva podría ser el artículo V del Tratado del Espacio¹⁹, así como la regulación de su posterior desarrollo en el Acuerdo sobre Salvamento y Devolución de

¹⁶ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes: Aprobado por la Asamblea General en su Resolución 2222 (XXI), de 19 de diciembre de 1966. Abierto a la firma el 27 de enero de 1967. Entrada en vigor: 10 de octubre de 1967, de conformidad con el artículo XIV (UNTS Vol. Núm. 610, p. 205).

¹⁷ Ciertamente, el Derecho internacional del espacio cuenta con principios específicos que fueron proclamados por primera vez en la Declaración de los Principios Jurídicos de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, avalada mediante Resolución 1962 (XVIII) de la AGNU, constituyendo así los cimientos del Derecho internacional espacial. Esta, como su propio nombre indica, comprende varios principios fundamentales que fueron elevados posteriormente a rango de tratado en el Tratado del Espacio.

¹⁸ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art I: La exploración y utilización del espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, deberán hacerse en provecho y en interés de todos los países, sea cual fuere su grado de desarrollo económico y científico, e incumben a toda la humanidad [...].

¹⁹ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art V: Los Estados Partes en el Tratado considerarán a todos los astronautas como enviados de la humanidad en el espacio ultraterrestre, y les prestarán toda la ayuda posible en caso de accidente, peligro o aterrizaje forzoso en el territorio de otro Estado Parte o en alta mar. Cuando los astronautas hagan tal aterrizaje serán devueltos con seguridad y sin demora al Estado de registro de su vehículo espacial. Al realizar actividades en el espacio ultraterrestre, así como en los cuerpos celestes, los astronautas de un Estado Parte en el Tratado deberán prestar toda la ayuda posible a los astronautas de los demás Estados Partes en el Tratado. Los Estados Partes en el Tratado tendrán que informar inmediatamente a los demás Estados Partes en el Tratado o al Secretario General de las Naciones Unidas sobre los fenómenos por ellos observados en el espacio

Astronautas y la Restitución de Objetos Lanzados al Espacio Ultraterrestre²⁰. Ambos obligan tanto a los Estados parte del Tratado como a aquellos astronautas que se encuentren en el espacio ultraterrestre a prestar toda la ayuda posible a los astronautas en caso de accidente, peligro o aterrizaje forzoso en el territorio de otro Estado Parte o en alta mar. Asimismo, establecen como obligación de los Estados Partes en el Tratado de informar inmediatamente a los demás Estados Partes o al Secretario General de las Naciones Unidas sobre cualquier fenómeno que descubran en el espacio ultraterrestre que pudiera constituir ‘*un peligro para la vida o la salud de los astronautas*’. Esta redacción inevitablemente nos recuerda las situaciones por las que deben atravesar los astronautas de la Estación Espacial Internacional cuando inesperadamente se les advierte que un desecho espacial va a colisionar con la Estación. Asimismo, en tanto que los desechos espaciales son de infinitos tamaños y los efectos que producen cuando impactan son igualmente desiguales, por “peligro” creemos que al menos podrían ser considerados los desechos de grandes dimensiones, así como aquellos desechos que, debido a la alta velocidad con la que se desplazarán, produjeran con su impacto unas consecuencias destructivas.

El último precepto que vamos a comentar a este respecto es el XI del Tratado del Espacio²¹. Este artículo establece el deber de información de los Estados acerca de la naturaleza, marcha, localización y resultados de las actividades de exploración y utilización del espacio ultraterrestre. Así, para poder vincularlo con la prevención de la polución en el espacio ultraterrestre, consideramos que las informaciones difundidas deberían versar sobre el estado del medioambiente espacial, la cantidad de desechos espaciales en órbita, los pronósticos sobre el futuro, entre otras cuestiones.

Como consecuencia de la ambigüedad de las disposiciones, la segunda cuestión que destacamos del *Corpus Iuris Spatialis* es su deficiente adaptación a la realidad de los desechos espaciales. En efecto, los desechos espaciales constituyen una temática compleja a la que muy difícilmente puede darse respuesta de acuerdo con la normativa vigente. A este respecto, cabe

ultraterrestre, incluso la Luna y otros cuerpos celestes, que podrían constituir un peligro para la vida o la salud de los astronautas.

²⁰ Acuerdo sobre el Salvamento y la Devolución de Astronautas y la Restitución de Objetos Lanzados al Espacio Ultraterrestre: Aprobado por la Asamblea General en su Resolución 2345 (XXII), de 19 de diciembre de 1967. Abierto a la firma el 22 de abril de 1968. Entrada en vigor: 3 de diciembre de 1968, de conformidad con el artículo 7 (UNTS Vol. Núm. 672, p. 119).

²¹ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art XI: A fin de fomentar la cooperación internacional en la exploración y utilización del espacio ultraterrestre con fines pacíficos, los Estados Partes en el Tratado que desarrollan actividades en el espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, convienen en informar, en la mayor medida posible dentro de lo viable y factible, al Secretario General de las Naciones Unidas, así como al público y a la comunidad científica internacional, acerca de la naturaleza, marcha, localización y resultados de dichas actividades. El Secretario General de las Naciones Unidas debe estar en condiciones de difundir eficazmente tal información, inmediatamente después de recibirla.

destacar los artículos VI²² y VII²³ del Tratado del Espacio, los cuales abordan la institución de la responsabilidad internacional de los Estados en el espacio ultraterrestre²⁴. En particular, el artículo VII se desarrolló posteriormente en el Convenio sobre la Responsabilidad Internacional por Daños Causados por Objetos Espaciales²⁵ (en adelante Convenio sobre Responsabilidad). Es precisamente su regulación la que quizás mejor ponga de manifiesto la presente deficiencia que comentábamos.

El Convenio sobre Responsabilidad establece un régimen dual de responsabilidad: una responsabilidad absoluta u objetiva y una responsabilidad por culpa o subjetiva. Mientras que para atribuir responsabilidad absoluta es necesario demostrar una relación de causalidad, siendo el factor determinante identificar al Estado en cuyo registro aparece el objeto causante del daño, para la responsabilidad por culpa, no solo debe probarse el daño causado y el nexo causal, sino que también debe probarse la culpa, lo que implica que, en caso de que no se logre probar esta culpa, no hay obligación de reparar el perjuicio. Este régimen dual de responsabilidad de ser aplicable a los daños producidos por desechos espaciales representa indudablemente varios inconvenientes. En primer lugar, en tanto que los desechos espaciales en muchas ocasiones son de complicada identificación debido a su tamaño o a su cambio físico por la fricción con la atmósfera, ¿cómo van a poder los Estados perjudicados localizar a los Estados responsables del daño? Asimismo, probar la culpa resulta ser una labor prácticamente imposible, pues los desechos se encuentran a la deriva en el espacio ultraterrestre sin que su desplazamiento pueda ser controlado. De esta manera, probar los requisitos necesarios para que surja una responsabilidad objetiva y/o subjetiva en los desechos espaciales es sumamente difícil y mientras no se logre probar los requisitos necesarios para cualquiera de los regímenes de responsabilidad, el Estado perjudicado no podrá ser indemnizado. A pesar de la existencia de estas lagunas, lo cierto es que el Convenio sobre Responsabilidad ya ha sido aplicado a supuestos en los que los daños han sido causados por desechos espaciales, gracias a que en los mismos se logró demostrar los requisitos exigidos para atribuir responsabilidad internacional. La primera aplicación concreta de este Convenio tuvo lugar en 1978 con el relevante caso del Cosmos 954 anteriormente mencionado con ocasión de la escasa jurisprudencia existente en la materia.

²² Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art VI: Los Estados Partes en el Tratado serán responsables internacionalmente de las actividades nacionales que realicen en el espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, los organismos gubernamentales o las entidades no gubernamentales, y deberán asegurar que dichas actividades se efectúen en conformidad con las disposiciones del presente Tratado [...].

²³ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art VII: Todo Estado Parte en el Tratado que lance o promueva el lanzamiento de un objeto al espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, y todo Estado Parte en el Tratado, desde cuyo territorio o cuyas instalaciones se lance un objeto, será responsable internacionalmente de los daños causados a otro Estado Parte en el Tratado o a sus personas naturales o jurídicas por dicho objeto o sus partes componentes en la Tierra, en el espacio aéreo o en el espacio ultraterrestre, incluso la Luna y otros cuerpos celestes.

²⁴ Mientras que el artículo VI regula la responsabilidad internacional del Estado por violación de una obligación internacional (international responsibility), el artículo VII regula la responsabilidad por daños (international liability).

²⁵ Convenio sobre la Responsabilidad Internacional por Daños Causados por Objetos Espaciales: Aprobado por la Asamblea General en su Resolución 2777 (XXVI), de 29 de noviembre de 1971. Abierto a la firma el 29 de marzo de 1972. Entrada en vigor: 11 de septiembre de 1972, de conformidad con el artículo XXIV (UNTS Vol. Núm. 961, p. 187).

Otro supuesto de inadecuada adaptación de la normativa internacional espacial para los desechos espaciales sería, a nuestro juicio, el artículo VIII del Tratado del Espacio²⁶, así como la regulación del Convenio sobre el Registro de Objetos Lanzados al Espacio Ultraterrestre²⁷ (en adelante Convenio sobre Registro), que desarrolla el presente artículo del Tratado del Espacio. En ellos se establece que el Estado en cuyo registro figura el objeto lanzado al espacio ultraterrestre retendrá su jurisdicción y control sobre tal objeto, y que el derecho de propiedad sobre los mismos, así como de sus partes componentes no sufrirá ninguna alteración mientras estén en el espacio ultraterrestre ni en su retorno a la Tierra. En tanto que el derecho de propiedad sobre los objetos es permanente, la jurisdicción y control del Estado de Registro sobre sus objetos y partes componentes no se extinguirá ni cuando estos dejen de ser operativos y controlables (Chatterjee, 2014). Como consecuencia, el Estado de Registro siempre va a estar vinculado al objeto y a sus partes componentes para responder internacionalmente frente a los daños que pudieran ocasionar, cuestión que anteriormente ya se ha criticado. Respecto de la presente, consideramos que es inapropiada para los desechos espaciales por un doble motivo. Por una parte, supone un impedimento para las actividades de remediación de desechos espaciales, esto es, los Estados únicamente van a poder cooperar en la mitigación de desechos espaciales mediante la eliminación de sus propios desechos espaciales. Por otra parte, de nuevo el cambio en las condiciones físicas de los objetos por la erosión o la fricción con la atmósfera dificultan su reconocimiento y, por ende, la identificación del Estado de Registro.

El último ejemplo al que aludiremos respecto de esta incidencia tiene por objeto el artículo IX del Tratado del Espacio²⁸. Este dispone que en el caso de que un Estado tenga motivos para creer que sus propias actividades puedan crear un obstáculo capaz de perjudicar las actividades de otros Estados, deberá celebrar las consultas internacionales oportunas antes de iniciar tal actividad. Paralelamente, si un Estado tiene motivos para creer que las actividades de otro Estado pueden originar un perjuicio para las actividades espaciales del primero, podrá pedir que

²⁶ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art VIII: El Estado Parte en el Tratado, en cuyo registro figura el objeto lanzado al espacio ultraterrestre, retendrá su jurisdicción y control sobre tal objeto, así como sobre todo el personal que vaya en él, mientras se encuentre en el espacio ultraterrestre o en un cuerpo celeste. El derecho de propiedad de los objetos lanzados al espacio ultraterrestre, incluso de los objetos que hayan descendido o se construyan en un cuerpo celeste, y de sus partes componentes, no sufrirá ninguna alteración mientras estén en el espacio ultraterrestre, incluso en un cuerpo celeste, ni en su retorno a la Tierra [...].

²⁷ Convenio sobre el Registro de Objetos Lanzados al Espacio Ultraterrestre: Aprobado por la Asamblea General en su Resolución 3235 (XXIX), de 12 de noviembre de 1974. Abierto a la firma el 14 de enero de 1975. Entrada en vigor: 15 de septiembre de 1976, de conformidad con el artículo VIII (UNTS Vol. Núm. 1023, p. 15).

²⁸ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art IX: [...] Si un Estado Parte en el Tratado tiene motivos para creer que una actividad o un experimento en el espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, proyectado por él o por sus nacionales, crearía un obstáculo capaz de perjudicar las actividades de otros Estados Partes en el Tratado en la exploración y utilización del espacio ultraterrestre con fines pacíficos, incluso en la Luna y otros cuerpos celestes, deberá celebrar las consultas internacionales oportunas antes de iniciar esa actividad o ese experimento. Si un Estado Parte en el Tratado tiene motivos para creer que una actividad o un experimento en el espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, proyectado por otro Estado Parte en el Tratado, crearía un obstáculo capaz de perjudicar las actividades de exploración y utilización del espacio ultraterrestre con fines pacíficos, incluso en la Luna y otros cuerpos celestes, podrá pedir que se celebren consultas sobre dicha actividad o experimento.

se celebren consultas sobre dichas actividades. En este sentido, en tanto que para llevar a cabo las consultas internacionales el Estado debe prever que sus actividades van a ser contaminantes, predecir la generación de desechos espaciales resulta complicado y tampoco puede describirse como una actividad "planificada en el futuro".

Para culminar con el análisis de la regulación del *Corpus Iuris Spatialis*, la última observación que vamos a advertir es la falta de especificación de ciertos conceptos que, a nuestro juicio, sería fundamental conocer para precisar si en ellos se podrían subsumir los desechos espaciales. En este sentido, los conceptos del artículo IX del Tratado del Espacio²⁹ son los más relevantes a examinar, por cuanto este precepto es el que más directamente regula la prevención de la polución del espacio ultraterrestre. Brevemente, de conformidad con este artículo, toda actividad espacial debe efectuarse de forma tal que no se produzca una contaminación nociva ni cambios desfavorables en el medioambiente de la Tierra como consecuencia de la introducción en ella de materias extraterrestres. De su redacción son motivo de debate los conceptos *contaminación* (como concepto aislado), *contaminación nociva* y *cambios desfavorables*. En efecto, se tratan de conceptos indeterminados sobre los que es discutible su afectación a los desechos espaciales. ¿El concepto de *contaminación* comprende la polución y los desechos espaciales? ¿Se puede considerar la generación de desechos espaciales como *contaminación nociva*? Y de ser así, ¿siempre o sólo en algunos casos? ¿Supone acaso su presencia en el espacio ultraterrestre un *cambio desfavorable*? Para solventar estos interrogantes compartimos la postura adoptada por ciertos autores de que solo haciendo uso de una interpretación extensiva de los conceptos anteriores, se podría obligar a los Estados Partes a evitar la creación, reducir e incluso eliminar desechos espaciales para permitir que todos los Estados participen en la exploración y el uso del espacio ultraterrestre con un riesgo mínimo de desechos (Robinson, 2014).

Esta problemática la hemos detectado de forma similar en el artículo 7³⁰ del Acuerdo que debe regir las Actividades de los Estados en la Luna y otros Cuerpos Celestes³¹ (en adelante Acuerdo sobre la Luna), el cual declara que los Estados deben tomar medidas para prevenir la interrupción

²⁹ Tratado sobre los Principios que deben regir las Actividades de los Estados en la Exploración y Utilización del Espacio Ultraterrestre, incluso la Luna y otros Cuerpos Celestes, art IX: En la exploración y utilización del espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, los Estados Partes en el Tratado deberán guiarse por el principio de la cooperación y la asistencia mutua, y en todas sus actividades en el espacio ultraterrestre, incluso en la Luna y otros cuerpos celestes, deberán tener debidamente en cuenta los intereses correspondientes de los demás Estados Partes en el Tratado. Los Estados Partes en el Tratado harán los estudios e investigaciones del espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, y procederán a su exploración de tal forma que no se produzca una contaminación nociva ni cambios desfavorables en el medio ambiente de la Tierra como consecuencia de la introducción en él de materias extraterrestres, y cuando sea necesario adoptarán las medidas pertinentes a tal efecto [...].

³⁰ Acuerdo que debe regir las Actividades de los Estados en la Luna y otros Cuerpos Celestes, art 7: Al explorar y utilizar la Luna, los Estados Partes tomarán medidas para que no se perturbe el actual equilibrio de su medio, ya por la introducción de modificaciones nocivas en ese medio, ya por su contaminación perjudicial con sustancias ajenas al medio, ya de cualquier otro modo. Los Estados Partes tomarán también medidas para no perjudicar el medio de la Tierra por la introducción de sustancias extraterrestres o de cualquier otro modo.

³¹ Acuerdo que debe regir las Actividades de los Estados en la Luna y otros Cuerpos Celestes: Aprobado por la Asamblea General en su Resolución 34/68, de 5 de diciembre de 1979. Abierto a la firma el 18 de diciembre de 1979. Entrada en vigor: 11 de julio de 1984, de conformidad con el artículo 19 (UNTS Vol. Núm. 1363, p. 3).

del equilibrio existente tanto del medioambiente lunar como del terrestre, ya por la introducción de modificaciones nocivas en ese medio, ya por su contaminación con materia extraambiental o de otra manera. Del mismo, volvemos a hacer hincapié en el hecho de que tampoco se definen los términos clave -como *materia extraambiental* o *modificaciones nocivas*- para dilucidar su aplicación válida a los desechos espaciales.

Finalizado el análisis, hasta el momento hemos decidido ignorar un aspecto de la regulación que considerábamos que merecía ser tratado de forma autónoma. Y es que a lo largo de la vigente normativa los artículos no se refieren específicamente a los desechos espaciales, sino que el término empleado es el de *objetos espaciales y sus partes componentes*. La cuestión trascendental que surge entorno a ello es determinar si el concepto de objeto espacial es suficientemente amplio como para incluir los desechos espaciales. La respuesta dada es crucial en tanto que afecta la aplicabilidad de los instrumentos analizados en los desechos espaciales.

La definición de objeto espacial se encuentra tanto en el Convenio de Responsabilidad (art 1.d) como en el Convenio sobre Registro (art 1.b). Ambos establecen que “el término de objeto espacial denotará las partes componentes de un objeto espacial, así como el vehículo propulsor y sus partes”. A partir de esta definición, ¿se puede entonces considerar a los desechos espaciales como objetos espaciales? ¿o tal vez como partes componentes de objetos espaciales? Lo cierto es que existe una clara división doctrinal.

Por un lado, hay juristas que defienden que los desechos espaciales, en tanto que normalmente son fragmentos de antiguos objetos espaciales, deben ser considerados partes componentes de los mismos y, por ende, sí se incluyen en el término de objetos espaciales. De esta manera, fragmentos y partes componentes de un objeto espacial vendrían a ser términos análogos³². Otro razonamiento que han empleado para consolidar su postura es que los desechos espaciales no cambian su status por la circunstancia del desprendimiento o fragmentación, por lo que deben continuar considerándose como objetos espaciales (Chatterjee, 2014). En conclusión, para estos el *Corpus Iuris Spatialis* es correctamente aplicable a los desechos espaciales.

Por otro lado, hay juristas que rechazan su inclusión en el concepto de objetos espaciales ya que resulta discutible que algunos desechos -como los destornilladores, tornillos o guantes de astronautas- puedan ser considerados como tal. En esencia, se refieren a aquellos objetos que aun yendo a bordo de un objeto espacial no forman parte de su estructura ni de sus partes componentes y no resultan absolutamente necesarios para el funcionamiento del mismo (Gutiérrez, 1997). Para estos el concepto “partes componentes” hace referencia únicamente a las piezas utilizadas en la elaboración del objeto espacial, excluyendo de esta manera cualquier interpretación demasiado extensiva del término. De acuerdo con su planteamiento, el concepto “objeto espacial” es ya de muy amplio alcance y, siendo el otro un concepto subordinado a este último, debe ser más restrictivo (Marchán, 1990). Consecuentemente, aplicando estos razonamientos, los desechos espaciales no estarían hoy en día regulados por el Derecho Internacional del Espacio.

³² Algunos de los autores que apoyan este pensamiento son los juristas Iannini, Esquivel, Reijnen y De Graaf, entre otros.

En nuestra opinión, de la misma manera que se ha procedido a la interpretación extensiva de diversos artículos de la regulación actual, se deberá de interpretar el concepto de “objeto espacial”. En tanto en cuanto sea esta la regulación disponible para solucionar los problemas ambientales generados por la proliferación de desechos espaciales lo correcto es defender que el término “objeto espacial” incluye los desechos espaciales.

Concluido nuestro análisis, y siendo nuestro propósito estimar si la normativa espacial vigente es adecuada y suficiente para regular los desechos espaciales, coincidimos ampliamente con la Asociación de Derecho Internacional. Ciertamente el *Corpus Iuris Spatialis* no está pensado para la realidad que plantean los desechos espaciales. Se ha podido observar que este prevé hasta cierto punto normas, procedimientos y mecanismos legales que pueden ser aplicados a los desechos espaciales. Sin embargo, se ha evidenciado que esto es posible siempre y cuando se recurra a la interpretación extensiva de las disposiciones, que, como hemos podido apreciar, se caracterizan por incluir términos excesivamente amplios y no definidos por el legislador. Pese a todo, muchas cuestiones vinculadas a ellos continúan sin una regulación específica.

Conclusiones

Sería necesario, por tanto, que el Derecho Espacial cubriera esta laguna jurídica. La solución más adecuada y por la que se inclinan todos los autores sería la elaboración de un nuevo instrumento jurídico internacional que definiera y regulara el régimen jurídico aplicable propiamente a los desechos espaciales. En efecto, en nuestra opinión, un convenio internacional de desechos espaciales separado del resto de tratados y convenciones internacionales pondría fin a las deficiencias del actual marco jurídico regulatorio. Los beneficios que otorgaría tal medida jurídica serían amplios: 1. Se lograría resolver esta actual laguna jurídica; 2. Se lograría brindar a los desechos espaciales la atención medioambiental que requieren; 3. Otorgaría a la materia valor jurídico; 4. Lograría mayor vinculación y compromiso por parte de los Estados al ser de obligado cumplimiento; 5. Representaría una ALIANZA ENTRE LOS ESTADOS por un interés común: la protección del medioambiente, cumpliendo así satisfactoriamente uno de los ODS de la Agenda 2030. Pero a su vez, su adopción desencadenaría el cumplimiento de otras ODS:

1. Una PRODUCCIÓN Y CONSUMO RESPONSABLES. Los gobiernos nacionales así como las agencias espaciales se verían limitados en su ambición por lanzar incontables objetos al espacio y desarrollarían una mayor conciencia de la gravedad de la problemática y lo que supone para la vida en la Tierra.
2. La VIDA SUBMARINA. La mayoría de los desechos espaciales que caen a la Tierra impactan en el océano, contaminando los ecosistemas marinos. Más aún, si se tratan de desechos con radiación nuclear provocando la muerte de especies marinas. Pero también impactan en la superficie terrestre, lo que supone un riesgo para las amplias zonas habitadas por seres humanos, animales o plantas. Hasta ahora nadie ha resultado herido, pero sí que se han hallado fragmentos cerca de lugares habitados en diferentes puntos dispersos de la Tierra.

3. Finalmente, al tratarse el convenio internacional de un instrumento internacional adoptado en consenso por los Estados, se lograría evitar la aparición de muchos conflictos y competitividad interestatales por dominar el espacio ultraterrestre, fomentando así la PAZ, la JUSTICIA y la existencia de INSTITUCIONES SOLIDARIAS.

No nos son ajenas las dificultades que conllevaría lograr que un nuevo instrumento vinculante de esta índole sea aceptado por la mayoría de la comunidad internacional, en tanto que se trata de un instrumento que indirectamente supondría un límite para las superpotencias en su ambición por conquistar el espacio con sus actividades comerciales. Pero debemos advertir que si una gran mayoría de Estados decidieran no firmar el convenio por motivos político-económicos, finalmente provocarían que el espacio devenga intransitable y ningún Estado podría continuar con sus negocios. Para evitar dicha situación, la solución estaría en concienciar a la comunidad internacional de las consecuencias que generarían su desvinculación al convenio. Tampoco ignoramos el proceso prolongado que conllevaría la entrada en vigor de un convenio internacional, aspecto que supondría que este se materializara pasados varios años. Sin embargo, consideramos que dicho lapso de tiempo sería mucho menor que el que se se llegaría a producir si los ingenieros científicos tuvieran que remover los desechos espaciales.

De esta manera, y pese a ser conscientes de las dificultades, mantenemos que su redacción es imprescindible para subsanar las deficiencias que se han ido observando.

Antes de proceder a proponer el contenido que el mismo debería tener o las cuestiones que debería de contemplar en su regulación, resulta fundamental enumerar los propósitos que se necesitarían cubrir con la nueva regulación. La importancia de establecerlos reside en el hecho de que constituyen la esencia de lo que se espera lograr con la redacción del convenio. Asimismo, unos objetivos definidos también facilitarían la posterior tarea de elaboración de una regulación conforme con la voluntad perseguida.

Un primer objetivo sería aumentar la visibilidad de los problemas de los desechos espaciales en la comunidad científica, así como en la sociedad civil en tanto que continúa siendo un problema bastante desconocido, al menos, para los ciudadanos. Un Convenio internacional es una vía muy efectiva para lograr el presente objetivo.

Un segundo propósito consistiría en aclarar las obligaciones de los gobiernos con respecto a los desechos espaciales y asegurar que los Estados Partes de la Convención hagan cambios legislativos a nivel nacional para implementar sus obligaciones en virtud de la Convención. Con este objetivo se pretende que la actuación no se vea limitada a la escala internacional, sino que la regulación del Convenio también afecte a nivel nacional. Los sujetos a los que principalmente se enfoca este objetivo es a las agencias espaciales de los Estados, en tanto que a ellas no les influiría directamente lo estipulado en el Convenio.

El tercer y último objetivo se basaría en establecer sistemas de cooperación internacional a través de los cuales los Estados, agencias espaciales, organizaciones internacionales y otros actores puedan compartir conocimientos e ideas y trabajar juntos para reducir la contaminación

espacial y los peligros que ahora plantea la contaminación existente en el espacio. Ello se consigue por medio de diversos medios que serán expuestos a continuación.

La incorporación de un instrumento multilateral sólido y bien elaborado ofrecería a los Estados significativas facilidades. Por esta razón, en las líneas que siguen a continuación vamos a enumerar una serie de lineamientos a modo de sugerencias que a nuestro juicio necesariamente debería incluir la nueva propuesta de convenio internacional que pretendemos impulsar.

En primer lugar, el Convenio -tras el preámbulo correspondiente en el que se recordarían los principios del Tratado del Espacio, entre otros aspectos generales- debería recoger una enumeración exhaustiva de conceptos vinculados con los desechos espaciales, de manera que se evite en la mayor medida de lo posible la existencia de lagunas relacionadas con la interpretación de los términos empleados en las sucesivas disposiciones. Así, *desecho espacial, satélite, órbita, medidas de mitigación, contaminación espacial, ambiente o daño* deberían ser algunos de los conceptos que se incluirían en el artículo 1 del Convenio internacional sobre desechos espaciales.

Otro de los aspectos que el convenio debería abordar sería la incorporación de nuevos hechos técnicos recientes con el objetivo de aclarar y en la medida de lo posible resolver algunos casos sencillos relativos a problemas originados por residuos espaciales. De esta manera, se pretendería lograr que los conflictos surgidos entre los Estados con motivo de daños originados por desechos espaciales no originaran malas relaciones internacionales y que dichos conflictos fueran resueltos en el menor tiempo posible. Para ello, evidentemente la información proveniente de los más altos estratos de la ciencia tendría un valor incalculable. Sus conocimientos son necesarios para que el derecho no se aparte de la realidad y su progreso. Consideramos que solo así podrá ser verdaderamente efectivo el marco jurídico que regule el problema de los residuos espaciales.

Otra sugerencia que consideramos oportuna incluir consiste en incorporar las recomendaciones de mitigación de desechos espaciales ya existentes al Convenio Internacional. De esta manera, dejarían de ser recomendaciones y su observancia se tornaría obligatoria. Por las mismas razones, deberían de incluirse prácticas de remoción. Sin embargo, aún no nos es posible desarrollar esta vertiente ya que, tal y como se ha apuntado, los métodos para lograr una remoción en la cantidad de desechos espaciales están en proceso de invención. Únicamente podemos advertir que, en este sentido, para la redacción del articulado deberían participar la industria espacial y las asociaciones profesionales, en tanto que son estas las que conocen de primera mano tales métodos de remoción. Asimismo, para reforzar la observación de tales prácticas se debería incluir una disposición que estableciera que en caso de que cualquier parte de la convención infringiera las pautas de mitigación y remoción acordadas tendría que pagar una multa.

La siguiente proposición, vinculada al fomento del principio de cooperación internacional, ya ha sido expuesta por algunos autores³³. Consiste en la creación de un órgano internacional especializado en los desechos espaciales, con el fin de proporcionar información actualizada sobre los riesgos ambientales y la tecnología de que se dispone para hacerles frente. Así, los desechos espaciales alcanzarían un mayor protagonismo. Asimismo, todos los Estados recibirían una información equitativa y su desarrollo tecnológico o el nivel de implicación en el medioambiente espacial de sus agencias espaciales ya no sería tan desproporcionado. No obstante, su puesta en marcha parece algo prematura. Además, es bien conocida la posición no favorable de las Naciones Unidas con respecto a la proliferación de nuevos órganos internacionales. La opinión generalizada es que no ha llegado todavía el momento oportuno para tener una entidad internacional de la naturaleza propuesta (Williams, 1998). Pero, analizada la situación actual que representan los desechos espaciales, consideramos que dicho momento sí que ha llegado.

En esta línea de fomento de la cooperación internacional, a nuestro juicio sería oportuno sugerir también la inclusión de otra iniciativa planteada por algunos autores (Marcano, 2020), conectada con la responsabilidad internacional. En caso de que la identificación del Estado responsable sea totalmente inviable, la solución que se propone es atribuir la responsabilidad a toda la comunidad internacional. Esta solución radica en que el Convenio atribuye una serie de obligaciones de mitigación y remoción de los desechos espaciales para todos los Estados en su conjunto, en un ambiente cuyo régimen jurídico es de co-soberanía. Y para ello, se propone la creación de un Fondo de Compensación Internacional. Se impondría a los Estados la aportación anual de una *tarifa espacial* que permitiera cubrir todos aquellos daños producidos tanto en el espacio ultraterrestre a objetos de determinados Estados como aquellos daños sufridos en la superficie terrestre con ocasión de la caída de desechos espaciales. De esta manera, se facilitaría enormemente la labor de tener que identificar a un Estado responsable.

Por último, consideramos que también sería razonable que la Corte Internacional de Justicia creara una sala especial para disputas que versen sobre temas espaciales ambientales (Williams, 1998). Esto es, que de acuerdo con lo señalado unas líneas más arriba, el Convenio internacional debería recoger dos medios para la solución de conflictos. Por un lado, un medio amistoso, reflejado en las disposiciones del Convenio que plantearían casos sencillos de solución ágil, y, por otro lado, una solución judicial, en caso de existir casos muy complejos o sobre los que no hay entendimiento entre los Estados.

En definitiva, en el supuesto de que la comunidad internacional planteara la elaboración de un convenio internacional sobre desechos espaciales, cuyo contenido contemplara las sugerencias expuestas anteriormente, a nuestro juicio, se lograría finalmente, de un lado, solucionar los actuales problemas jurídicos que plantea la vigente normativa espacial y, de otro lado, reducir los niveles de contaminación en el espacio ultraterrestre. Pero para ello insistimos en la

³³ Fueron los doctores Golrounia y Bahrami quienes expusieron la presente propuesta en el trabajo que presentaron en el XXXIX Coloquio Internacional de Beijing bajo el título traducido al castellano “El proyecto de la International Law Association de Convenio sobre Residuos Espaciales (Buenos Aires), ¿podrá hacer frente a las necesidades del siglo XXI?”

necesidad de que la comunidad internacional debería tomar conciencia sin demora de que nos encontramos en el momento idóneo para hacer frente a los desechos espaciales.

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Partnering to Maximize the Impact of Technological Innovation in Postharvest Processes in Rural Areas

Michael Ekonde Sone, Denis Tcheukam Toko, and Nestor Tsamo
(University of Buea, Cameroon)

Abstract

Postharvest losses are high in the rural areas of sub-Saharan Africa due to poor road infrastructure and lack of appropriate technologies. This paper reports the use of appropriate technologies to curb poverty and hunger in the rural areas of sub-Saharan Africa due to poor postharvest processes by farmers and how to explore appropriate partnerships to enhance the impacts of the technological innovation. The technologies developed is a drone for data gathering and a new multi-crop drying machine composed of a drying chamber with one end having a heat collector essentially a black body and the other end suction fans to enable circulation of hot dry air. The use of the machine in postharvest processes prevents rapid degradation of farm produce before delivery to urban markets due to poor road infrastructure. The area of implementation of the technological innovation is the kupe-manegouba division in Cameroon due to its enclaved nature with less than 10 kilometres of tarred road. Statistics from the divisional delegation of agriculture show that postharvest losses for plantains is 35%. This percentage could be higher if not of traders who exploit farmers by buying their produce at giving away prices of 200FCFA per bunch to sell later at 5000FCFA. Such practice will enhance poverty and hunger for the local farmers. With the implementation of the technologies and local partnerships, the postharvest losses were reduced to 28.6% and it is envisaged that, with broad-based partnerships, the postharvest losses could be further reduced to less than 5% by 2030.

Keywords: postharvest; multi-crop machine; drone; innovation; partnership; farmers.

Purpose

Partnerships are essential for the achievement of the Sustainable Development Goals (SDGs) and the United Nations transformational agenda for 2030. Only through close collaboration can there be any possibility of finding global solutions to the world's current and future challenges. This paper presents the technological innovation of the College of Technology of the University of Buea, Cameroon in postharvest process in rural areas and how the College of Technology has sought public, public-private, and civil society partnerships to maximize the impact of the innovation. Postharvest processes present a major challenge in rural areas in sub-Saharan Africa because of rapid degradation of farm produce before delivery to urban markets due to poor road infrastructure.

Traditional attempts through partnerships to improve the incomes of smallholder farmers, hence enhancing productivity in sub-Saharan Africa have focused on increased access to improved

seeds, irrigation technology, fertilizers, pesticides, agronomic training, and financial services. However, these attempts enhance crop production and does not adequately address efficient postharvest handling and delivery to urban areas due to poor road infrastructure. In the absence of adequate infrastructure, sustainable developmental efforts and partnerships driven by technological innovation could unleash dynamic and competitive economic forces that generate employment and income, hence reducing inequalities (Vegah and Sone, 2019).

In this light, valuable partnerships have been established by the College of Technology with the Southwest Development Authority (SOWEDA), community centres and farmers' cooperatives and delegations / sub-delegations of the ministry of agriculture notably in the kupe-manegouba division of the Republic of Cameroon and a financial institution in Bangem, the capital of the kupe-manegouba division.

The technological innovation matters because it improves the lives of everyone most especially the farmers in the rural areas confronted with the challenge of poor postharvest processes. The innovation is based on a sustainable multifunction machine used for tropical agric products processes (Wei et al, 2018), with the aim of minimizing postharvest losses coupled with a drone system which ensures information gathering (Colimina and Molina, 2014; Dji, 2021).

The innovation has a substantial impact on some SDGs notably no poverty and zero hunger since it addressed the main challenge faced by farmers in Cameroon, West Africa, and the sub-Sahara African region, namely, the lack of techniques and appropriate equipment for postharvest activities. A variety of farm produce could be appropriately dried by the novel machine for long periods sufficient to reach the main markets.

Statistics from the divisional delegation of agriculture show that the following agricultural commodities are cultivated in the kupe-manegouba division: cassava, cocoyam, plantains, maize, pepper, irish potatoes, beans, cabbages, tomatoes, palm oil, coffee, cocoa. The total surface area used is 13063 hectares for a total per annum production of 3913982 tons with plantains constituting the bulk of the production with 3900000 tons. Such a production potential for a division with less than one hundred and fifty thousand inhabitants is adequate to ensure zero hunger and no poverty to inhabitants in the division and beyond. However, the prevailing situation is appalling due to poor road infrastructure and poor postharvest handling practices. Due to poor postharvest practices, the postharvest loss for the agricultural commodities is enormous ranging from 15% for cabbages to 40% for irish potatoes. The percentage loss for plantains stands at 35% implying that 1365000 tons of plantains are lost annually. Hence, a fraction of the population of the division and beyond is deprived of the valuable commodity resulting to hunger. The postharvest loss could be higher if not of traders who exploit farmers by buying their produce at giving away prices of say 200FCFA per bunch of plantains to sell later at 5000FCFA. Such practice will enhance poverty for the local farmers with its accompanying effects such as lack of money to ensure balanced diet and to provide adequate medical care. With the implementation of the technological innovation by the College of Technology of the University of Buea which involves modern data gathering techniques using locally made drone and a multi-crop drying machine for postharvest handling, the postharvest losses are reduced considerably. The impact of this technological innovation is

enhanced through valuable partnerships with local stakeholders such as the mayor of Bangem who provided funds for the purchase of the machine while the participating farmers paid a minimal sum of money for the maintenance of the machine. The technology was implemented in one of the villages of the Bangem sub-division for some selected farmers. The agricultural commodities processed were plantains, maize, pepper, irish potatoes, tomatoes, cocoa. The postharvest losses for these commodities reduced drastically, for example we recorded a postharvest loss for plantains of 19% as compared to 35% initially for the group of selected twenty (20) farmers. However, the total postharvest loss for the entire division did not change significantly with that of plantains being 32.84% since most of the farmers and agricultural commodities could not be covered due to lack of funds. The College of Technology envisage to establish broad-based partnerships with national and international stakeholders to increase the level of coverage to reduce postharvest losses to less than 5% by 2030 for all the agricultural commodities in the kupe-manegouba division and beyond. Such actions will ensure the drastic reduction of poverty and hunger in Cameroon and the Central Africa sub-region considering the role Cameroon plays in the sub-region (Vinicuis and Leonardo, 2009).

The complete outline of the paper is as follows. In the next section, a methodology to improve postharvest processes using a multi-crop drying machine and a drone is presented. In the first part, the design of the multi-crop drying machine is presented while the second part presents the design of the drone used for data gathering in remote areas. The section concludes with the step-by-step methodology known as “The Commodity Systems Assessment Methodology (CSAM)” conceived and initiated by Harvey Neese to enhance productivity by associating partners with the innovative technology. Results and performance analysis of the innovative technology in postharvest processes will be presented in section 3. Finally, the conclusion and recommendations are presented in section 4.

Methodology

This section presents the methodology used to improve postharvest processes using the multi-crop drying machine and the drone. In addition, the approach to be adopted based on the statistics from the divisional delegation to seek for partnerships will be explored (Pravalika and Aditya, 2021; Silveira *et al.*, 2018; Tian *et al.*, 2018).

Design of Multi-crop Drying Machine

Design Criteria

The following design criteria is used in the production of the machine (Norton, 1992; Franco *et al.*, 2018; Mobey *et al.*, 2020; Karunaraja, *et al.*, 2015):

- The machine can save fuel and electricity and drying time in solar dryer is reduced in comparison to open drying method.
- Products must be protected against flies, rain, and dust.

- The dryers are waterproof, so produce can be left in the dryer overnight during rain.
- The design is scalable, such that the machines can be connected in parallel.
- It can be dismantled easily for easy maintenance or allow easy transportation from one place to another.
- Drying is also carried out at night using stored heat energy, collected during the daytime and with electric heaters located at the optimal position in the drying chamber.
- Materials required for fabrication of solar dryer are locally available.

Description of the Machine

In this section, the description of the multi-crop drying machine is presented. The specification of the machine is presented followed by the prototype. The section concludes with the improvements on the prototype based on field experience of the initial prototype, clearly indicating the reasons for the improvement and the conditions after the improvement.

Specification

The technological innovation project is based on a sustainable multifunction machine used for tropical agricultural products processes, to minimize postharvest losses (Lokesh et al., 2015; Patchimanpom *et al.*, 2020; Srinivasan, Rabha and Muthukumar, 2021). The system consists of a parabolic collector, Arduino microcontroller, and a drying chamber. The dryer is operated during normal sunny days as a solar dryer and as a hybrid solar dryer during cloudy days. The machine is composed of a drying chamber with one end of the chamber having a heat collector which is essentially a black body and the other end having suction fans to enable circulation of hot dry air in the chamber. The heat collector comprises a parabolic reflector and a cylindrical black body. Sun rays are reflected from the parabolic reflector onto the black body with the highly concentrated heat transmitted to the drying chamber through the black body cylinder. The kernel component is a microcontroller that reads the sensor and controls the outputs such as humidity, fan, and motor of the crop shuffling system (Ntwali et al., 2021; Puello-Mendez et al., 2017; Pravalika and Aditya, 2021).

Initial Prototype

The drying chamber comprises the following features:

- An insulated metal box with a capacity of 15 liters of crop per batch; volume of 275l.
- Weight of chain drive locally of 20kg.

- Volume of feeder Hopper of 50 liters.
- Weight of the stand is 33kg.
- A 20-rpm motor.
- Width of the drying chamber is 1 meter, and the length is 2 meters.
- Heat collector system is 3 meters long.
- The total weight of the machine is 70 kg.

The following reasons guided the choice of the above features:

- The conveyor belts are made up of a filter cloth and are used to enable a clear spread and shuffling of the agricultural commodity.
- The weight of the feeder shaft and conveyor belt rolling system was taken into consideration in the mathematical modelling such that, the torque to be generated by the electric motor could counterbalance the external mechanical actions exerted on the upper feeder shaft free body diagram during the feeding process (Tsamo Toko and Talla., 2020; Qiang Paulo and Hamid, 2017).
- The manufacturability of the workpieces was considered when designing shape, aesthetics and the topography of the new multi-crop drying machine.
- The size and the volume of the system are in such a way that it can be transportable on a standard four-wheel driver pickup to easily reach the operating area (Ngale and Tsamo, 2016).
- Suitable static seals to ensure the static sealing between the upper part and the drying chamber.
- Suitable dynamic seals (Paultra double leaves seals) to ensure the dynamic sealing between the feeder shaft and the frame, and between the conveyor belt shafts and the frame.

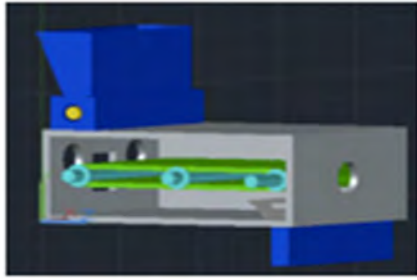


Figure 1: Chamber Design



Figure 2: Chamber prototype

The design structure was built with SOLIDWORKS. Figure 1 shows the chamber design with the layout of the conveyor belts while figure 2 shows the chamber prototype. The initial machine prototype is shown in figure 3.



Figure 3: Initial Machine Prototype

Improved Prototype

After initial trials in the field, certain features of the machine prototype in figure 3 were improved upon. The features are:

- Integrated system, made up of mechanical, electrical, electronic, and computing components, which are interconnected. The mechanical system is made of several components, whose main parts are the feeder system, the drying chamber, the heat collector assembly, the unloading mechanism, and the frame.
- The feeding shaft is guided by four (4) auto lubricated ball bearings SKF NF 3206 to reduce the friction between the feeding shaft and the upper frame.

- The conveyor belt shafts, or the rotating drying chamber are guided in rotation by four (4) auto lubricated ball bearings SKF 3307, to reduce the friction between the conveyor's rollers and the lower frame (Giang et al.,2017).
- Standardized fasteners are used for interchangeability and easy maintenance.
- To ensure strong reliability of the main parts of the machine, the value of the safety factor used in the design of machine elements is equal to 2.5 (Bazergui et al.,1985).
- The Tresca yield criterion on the Hookean material models is used to obtain some optimal design variables such as feeder minimum shaft diameter ($\phi 30$ mm) and conveyor belts rollers minimum diameter ($\phi 32$ mm) (Chields, 2004; Ngale & Tsamo, 2016).
- The suitable choice of the fit between the feeder shaft and the feeder sprocket is $\phi 30H7e8$. The fit between the conveyor belt rollers and the conveyor belt shaft sprockets is $\phi 32H7e8$.

The reasons for the improved prototype are as follows:

- The system was adjusted to be user friendly by introducing an easy-to-operate dashboard. This ensures that, a farmer with very poor skills can operate the machine and be able to carry out basic operations of drying and maintenance. This is essential since the farmers in the rural areas are not generally exposed to such technologies.
- The use of standard elements such as; bearings, static and dynamic seals, nuts with ISO pitch, keys, washers, and commercial fasteners will considerably reduce the production cost of the machine.
- The Tresca yield criterion was used since the stress generated inside the feeder shaft and the conveyor belt rollers is less than the material yield strength used, due to the low working speed of the shafts.
- The fit is such that, the setting of the appropriate geometrical tolerances at the drafting office on the workpiece drawing will lead to a long-life span of the machine.

The conditions after the improvement are such that, there is a shorter drying time, long-life span and improved drying capacity during the rainy season.

AI Model and Drone Implementation

A lot is happening lately about drone applications in agriculture and precision farming (Kulbacki *et al.*, 2018; Hassanalian and Abdelkefi, 2017). From the ability to image, recreate and analyze individual leaves on a corn plant from 120 meters height, to getting information on the water-

holding capacity of soils to variable-rate water applications, agricultural practices are changing due to drones delivering agricultural intelligence for both farmers and agricultural consultants (Veroustraete, 2015; Li *et al*, 2009).

Simply having an aerial imagery tool is not enough to monitor agriculturally based projects for professionals who are in the quest for production yield. A model to watch the growth and alert the owner of exploitation must be attached to the drone (Colwell, 1956; DJI Official, 2021, Gupta, Ghonge, and Jawandhiya, 2013; Guo *et al*, 2013). Our proposal is therefore subdivided in two parts, namely AI model implementation and drone implementation.

AI Model Implementation

Several Machine Learning environments are easily available on the internet that does not need any system specification or framework specifications and use cloud technology to train the model in the best possible time. Some of these open-source machine learning environments such as Google Colaboratory, Kaggle Kernel, are excellent platforms for deep learning and machine learning applications in the cloud (Riturajsaha, 2021). They are google products and require the knowledge of data science in order to develop a model to be fitted in a production environment (Milanova, 2018). The model generated should be able to generate classes to classify crops detected from image analysis (Guo *et al.*, 2016) and detect crop diseases (Tchito *et al.*, 2021). However, the technique used in our implementation is the Google's Teachable Machine which Google introduced as a new open-source platform for training machine learning models that developers could use to code as shown in figure 4.

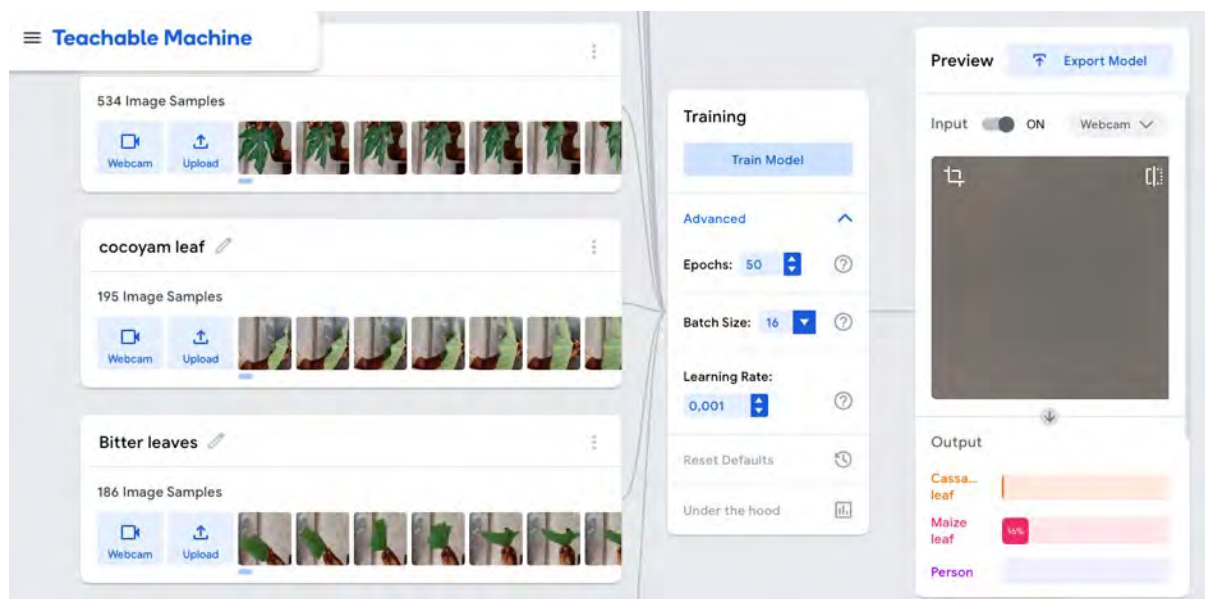


Figure 4: Teachable Machine Environment

The technique used in this machine environment is supervised learning, meaning that the model will be generated from a set of available data. The accuracy of that model will depend on the

learning which will be quantified from error on prediction symbolized by the loss, and yield that emanates from the testing with the unseen data.

The implementation of the model is based on a series of pictures captured to establish the dataset. Teachable machine subdivides the dataset in two bunches. The first bunch, made up of 85% of the dataset, represents the training set and the rest of 15% represents the testing set. Figure 5 shows some samples taken, to recognize some cassava leaves in our model, out of 231 images just for that class.



Figure 5: Collection of leaf samples

Our machine is customized for a learning rate of 0.01, for 16 Batches of 50 epochs, and results depicted in table 1 show an accuracy of 100% for crop leaf considered.

Table 1: Accuracy per Class

| CLASS | ACCURACY | # SAMPLES |
|---------------|----------|-----------|
| Cassava leaf | 1.00 | 35 |
| Maize leaf | 1.00 | 32 |
| Person | 1.00 | 15 |
| plantain Leaf | 1.00 | 77 |
| pawpaw leaf | 1.00 | 81 |
| cocoyam leaf | 1.00 | 30 |
| Bitter leaves | 1.00 | 28 |
| EMPTY | 1.00 | 3 |

The confusion matrix in figure 6 represents how well, the model predict data left out for the testing set. In the Y axis we have the class concerned, and in the x axis we have the corresponding value obtained from the model

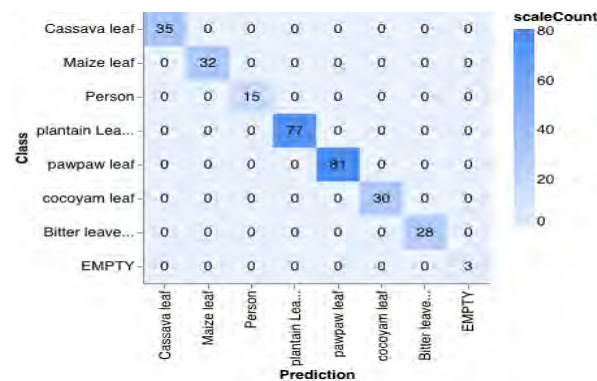


Figure 6: Confusion Matrix

Accuracy is the percentage of classification that the model gets right during the training, as presented in figure 7-b and it's shown that 100% is reached before the first 10 Epochs. Loss is a measure to evaluate how well the model has learned to predict the right classification for a given dataset.

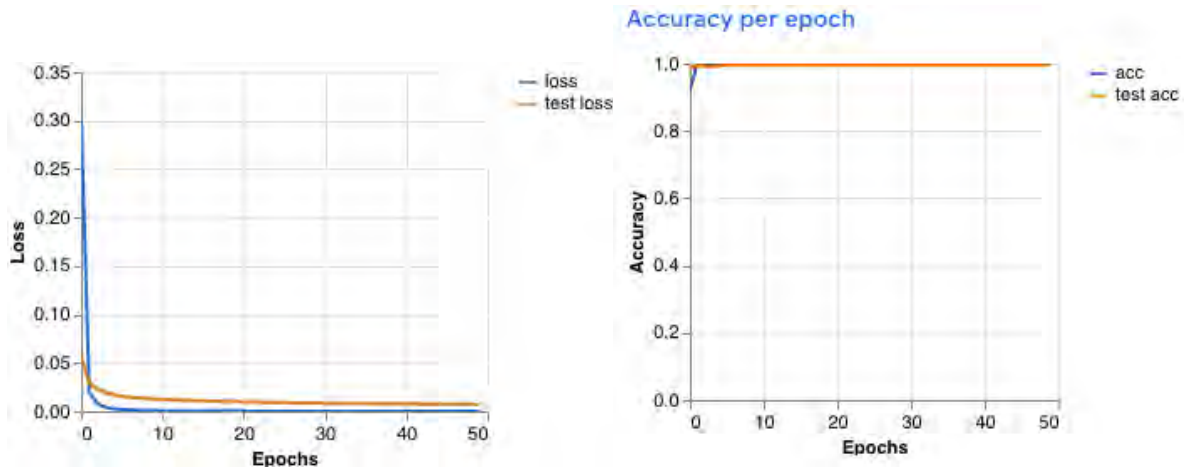


Figure 7: Loss and accuracy of the model. a) Loss per epoch; b) Accuracy per epoch

Drone Implementation

Over time, drones have increased in capabilities and fallen in cost, and their use has greatly expanded especially in complex terrain. High quality remote sensing with spectral imaging using drones makes them interesting for regular use in Precision Agriculture (PA) (Kulbacki *et al.*, 2018; Hassanalian and Abdelkefi, 2017). Drones are often used in agriculture in ways that were highly controversial only a short time ago since there is no unified legislation on drones usage in agriculture.

First remote sensing usage for precise measurements of cropland have been documented in 1930s and practically applied since 1950s. Since then, satellites have been scanning the earth and crops and measuring spectral reflectance properties and temperature crucial for farmers. The temperature indicates whether the crop is healthy. Currently by processing satellites data into evapotranspiration images one can gather information about, how much carbon is taken, how much water is used on individual fields and even predict how much water is being used by a certain field or a certain product (Li *et al.*, 2009). Most of the farmers in the world especially in sub-Saharan Africa cannot effectively use this information (Kulbacki *et al.*, 2018). Figure 8 shows a 3d printed drone's frame and drone prototype.



Figure 8: Drone Implementation, a) 3d Printed Drone's Frame; b) Drone prototype

Drone's Characteristics are:

- Transmission distance: 3Km
- Flying Autonomy: 40 minutes flight time with 500mAH battery capacity

Exploring the Cropland with the Equipped Multispectral Camera

The multispectral camera will be incorporated in our design to consolidate the data extraction process and gain insights into crop health/vegetation management by considering the following camera features (Dji, 2021):

- Imagery: there are six individual lenses. 1 RGB camera and a multispectral camera array with 5 cameras covering Blue, Green, Red, Red Edge, and Near Infrared bands. The five-band multispectral camera can be used to assess Normalized Difference Vegetation Index (NDVI), Normalized Difference Red Edge (NDRE), Modified Soil Adjusted Vegetation Index (MSAVI) and many other formulas for vegetation analysis. NDVI is an indicator of a plant's health based on how it reflects light waves. The one with a lot of chlorophyll and good cell structure actively absorbs red light (RED) and reflects near infrared (NIR). And exactly the opposite happens to a diseased plant. NDRE is a method of measuring the amount of chlorophyll in the plants. The best timing to apply NDRE is mid-to-late growing season when the plants are mature and ready to be harvested. At this point, other indices would be less effective to use MSAVI works where other vegetation indices do not. During seed germination and leaf development stages, MSAVI can be used on Crop Monitoring to monitor seedlings when there is a lot of bare soil in the field. All at 2 Mega Pixels (MP) with global shutter, on a 3-axis stabilized gimbal.
- Sunlight sensor: an integrated spectral sunlight sensor sits on top of the drone to capture solar irradiance. This increases data collection consistency throughout the day & helps obtain the most accurate NDVI results.

- Red Green Blue (RGB) & NDVI: you can easily switch between a preliminary NDVI analysis and the live RGB feed to instantly see where attention is needed so that you can make targeted treatment decisions efficiently.
- Centimetre precision: Drone's Time Synchronization (TimeSync) system means you get real-time, accurate positioning data on images captured by all six cameras, providing centimetre-level accurate measurements. The TimeSync system continually aligns the flight controller, RGB and NB (Near Infrared, Blue) cameras, and Real Time Kinematic (RTK) module. They help in fixing the positioning data to the centre of the Complementary Metal Oxide Semiconductor (CMOS) used to create images in digital cameras) sensor and ensuring each photo uses the most accurate metadata.
- Mobile Application (Android/iOS): one of the standout features of our drone is ability to plan intelligent agriculture missions. Plan flights, execute automated missions and manage flight data using drone's leading flight planning Android/iOS app. The app has an intuitive, easy to use interface. With data collected and analyzed it's easy to take action.
- Switch between a preliminary NDVI analysis and the live RGB feed to immediately visualize where attention is needed, so that targeted treatment decisions can be made quickly, but also accurate decisions concerning the harvesting could be made using the multispectral camera.

Using NDVI, NDRE and MSAVI pictures filters combined with post-flight image processing to create a weed map, farmers and their agronomists can easily differentiate areas of high intensity weed proliferation from healthy crop areas growing right alongside them. Historically, many farmers haven't realized how pronounced their weed problem is until harvesting was performed. Figure 9 shows the farm view through the multispectral camera for both RGB and NDVI feeds.



Figure 9: Farm View through Multispectral Camera, a)RGB; b) NDVI

Another important feature of the multispectral camera is the centimeter-level precision. This entails obtaining real-time, accurate positioning data on images captured by six cameras with DJI's TimeSync system with centimeter-level accurate measurements.

Step-by-step Methodology

The methodology adopted in our work is a step-by-step methodology known as “The Commodity Systems Assessment Methodology (CSAM)” conceived and initiated by Harvey Neese, Director of the Postharvest Institute for Perishables (PIP) (Harvey et al. 2013). Implementing CSAM results in the identification of priority problems in the commodity system and defining possible solutions. In our work, a 4-step solution to solve food problems currently and in the future include data gathering, postharvest handling, marketing of the agricultural commodities and sensitization of the farmers on the use of the innovative technology and government officials through the participation in national events.

In step 1, the drone is used to collect data of farm produce in the rural areas. The drone is launched from the divisional headquarters of Bangem in the Kupe-manegouba division of the Republic of Cameroon. The drone monitors the growth of the crops including cases of pest attacks. The data is collated with our government partners at the divisional delegation of agriculture of Kupe-manegouba division. In the case of normal crop growth, the data collected will indicate the appropriate period to start the postharvest handling using the multi-crop drying machine. However, for abnormal crop growth due to pest as detected by the drone, the farmers are assisted with a soft loan by our financial partner. The microfinance institution based in Bangem offers pesticides to the farmers with equivalent cash worth retrieved after sales of the farm produce. During this step, the Southwest Development Authority (SOWEDA) ensures the sensitization and technical assistance of the farmers and the cooperatives.

In step 2, the multi-crop drying machine is used for postharvest handling. The machine is placed at the village square for use by a group of farmers. Provision is made for a warehouse to store the processed products and the farmers are educated on the functioning of the machine by a facilitator. The mayor of Bangem provided funds for the purchase of the machine while the participating farmers are charged a minimal sum of money for the maintenance of the machine. In step 3 which involves the marketing of the agricultural commodities, a partner financial institution based in Bangem acts as a facilitator. The microfinance institution called “Nninong Bangem Better Life Microfinance (NIBABLIFE)” ensures the sales of the commodities in urban markets on behalf of the farmers. This action greatly reduces the role of middlemen in the entire market chain. With middlemen, the commodities such as plantains were bought at two hundred francs CFA (200FCFA) and sold at five thousand francs CFA (5000FCFA). With the actions of NIBABLIFE, the farmers have full value of their proceeds and are sensitized on the advantages of saving part of their earnings.

In step 4 which involves sensitization of the farmers on the use of the innovative technology and government officials through the participation in national events, the College of Technology of the University of Buea has participated in the annual agropastoral shows organized by the southwest regional delegation of agriculture and rural development in Buea. During this occasion, the College of Technology showcased the innovative technology to visiting farmers and cooperatives. In addition, the College of Technology has participated in major national events organized by the

government of Cameroon on technological innovation. In 2019, the event was organized by the ministry of higher of education in Maroua in the far north region of Cameroon in the sidelines of the university games. The College emerged with the first prize by exhibiting the novel multi-crop drying machine. Figure 10 (a) shows our students during the competition. In 2021, a national event on technological innovation was organized in Douala and the College of Technology emerged with the first prize by exhibiting the novel drone technology. Figure 10 (b) shows the students during the competition.



Figure 10: a) Students in Maroua b) Students in Douala

Findings

Our findings are based on the statistics of losses of agricultural commodities obtained from the divisional delegation of agriculture of kupe-manegouba division. These statistics will be compared to losses of some commodities after the implementation of the technological innovation and existing partnerships on some selected twenty (20) farmers. Finally, the losses will be projected for the case of broad-based partnerships through the year 2030.

Choice of Farmers

The kupe-manegouba division of the Republic of Cameroon has a population of 106.000 inhabitants as per population census of 2014. The division is principally agricultural with approximately 80.000 farmers as per statistics from the divisional delegation of agriculture. Due to lack of funds, the College of Technology could afford one machine under the financial assistance of the mayor of Bangem. The council proceeded with the selection of farmers based on the variety of farm produce and the capability of paying the maintenance fee for the upkeep of the machine. The process resulted to a selection of twenty (20) farmers who represented approximately 0.25% of the entire farming population of the division.

Pre-implementation Statistics

Statistics from the divisional delegation of agriculture show that the following agricultural commodities are cultivated in the kupe-manegouba division: cassava, cocoyam, plantains, maize,

pepper, irish potatoes, beans, cabbages, tomatoes, palm oil, coffee, cocoa. The total surface area used is 13063 hectares for a total per annum production of 3913982 tons with plantains constituting the bulk of the production with 3900000 tons. The detailed statistics displaying the postharvest losses for each agricultural commodity is shown in table 2.

Table 2: Postharvest Losses for Agricultural Commodities in Kupe-manegouba Division

| S/N | Crops | Surface (ha) | Production (T) | Post-Harvest losses (%) |
|-----|----------------|--------------|----------------|-------------------------|
| 1 | CASSAVA | 2651 | 8400 | 20 |
| 2 | COCOYAM | 176 | 521 | 20 |
| 3 | PLANTAINS | 2878.5 | 3.900.000 | 35 |
| 4 | MAIZE | 583.6 | 1548.3 | 25 |
| 5 | PEPPER | 41.1 | 22.3 | 30 |
| 6 | IRISH POTATOES | 13.5 | 53.6 | 40 |
| 7 | BEANS | 52 | 85.5 | 20 |
| 8 | CABBAGES | 11.6 | 42.5 | 15 |
| 9 | TOMATOES | 28 | 90 | 30 |
| 10 | PALM OIL | 46.5 | 15.5 | 20 |
| 11 | COFFEE | 5066.1 | 3110 | 20 |
| 12 | COCOA | 1515.1 | 93.7 | 30 |

The postharvest losses could be higher if not of traders who exploit farmers by buying their produce at giving away prices of say 200FCFA per bunch of plantains to sell later at 5000FCFA. The situation is worst during the raining season with traders finding it difficult to get to farmers in the remote areas due to the deplorable conditions of the road. During this period the farmers are in dire need of revenue since it is not possible to sell the produce even at giving away prices.

Post-implementation Statistics

Twenty (20) farmers in Muebah village in Nninong-Bangem in the Bangem sub-division were selected for the implementation of the technology. The mayor of Bangem provided funds for the purchase of the machine while the participating farmers were charged a minimal sum of money for the maintenance of the machine. The agricultural commodities processed were plantains, maize, pepper, irish potatoes, tomatoes, cocoa. Table 3 shows the statistics for the processed commodities for the entire division while table 4 shows the processed commodities for the twenty (20) selected farmers.

Table 3: Post-implementation Statistics for the Entire Division

| S/ N | CROPS | Surface (ha) | Production (T) | New Production (T) | Original Post- Harvest | Gain (%) | New Post- Harvest losses(%) |
|---------|-------|-----------------|-------------------|--------------------------|------------------------------|-------------|-----------------------------------|
|---------|-------|-----------------|-------------------|--------------------------|------------------------------|-------------|-----------------------------------|

| | | | | | losses(%) | | |
|---|-------------------|--------|---------|---------|-----------|------|-------|
| 1 | PLANTAINS | 2878.5 | 3900000 | 3984240 | 35 | 2.16 | 32.84 |
| 2 | MAIZE | 583.6 | 1548.3 | 1626.5 | 25 | 5.05 | 19.95 |
| 3 | PEPPER | 41.1 | 22.3 | 23.1 | 30 | 3.79 | 26.21 |
| 4 | IRISH POTATOES | 13.5 | 53.6 | 54.3 | 40 | 1.22 | 38.78 |
| 5 | TOMATOES | 28 | 90 | 92.6 | 30 | 2.91 | 27.09 |
| 6 | COCOA | 1515.1 | 93.7 | 96.8 | 30 | 3.34 | 26.66 |

Table 4: Post-implementation Statistics for the 20 Selected Farmers

| S/N | CROPS | Production (T) | New Production (T) | Original Post- Harvest losses(%) | Gain (%) | New Post- Harvest losses(%) |
|-----|-------------------|-------------------|--------------------------|---|-------------|-----------------------------------|
| 1 | PLANTAINS | 975.00 | 1160.49 | 35 | 16.0 | 19.0 |
| 2 | MAIZE | 0.39 | 0.49 | 25 | 20.4 | 4.6 |
| 3 | PEPPER | 0.01 | 0.01 | 30 | 17.5 | 12.5 |
| 4 | IRISH POTATOES | 0.01 | 0.02 | 40 | 14.6 | 25.4 |
| 5 | TOMATOES | 0.02 | 0.03 | 30 | 16.8 | 13.2 |
| 6 | COCOA | 0.02 | 0.03 | 30 | 17.2 | 12.8 |

The postharvest losses for these commodities reduced drastically, for example we recorded a postharvest loss for plantains of 19% as compared to 35% initially for the group of selected twenty (20) farmers. However, the total postharvest loss for the entire division did not change significantly as shown in table 3, with that of plantains being 32,84% since most of the farmers and agricultural commodities could not be covered due to lack of funds. In addition, table 3 shows that, there is an average gain in postharvest losses of 3.08% with maize recording the highest gain of 5.05% implying that, the percentage postharvest loss dropped from 25% to 19.95%. From table 3, the average postharvest losses per annum computed as 28.6%. As indicated in section 2, the drone is launched from the divisional headquarters of Bangem in the kupe-manegouba division of the Republic of Cameroon to detect cases of abnormal crop growth due to pest and appropriate time for harvest. The farmers are assisted with a soft loan by NIBABLIFE to purchase pesticides and the money retrieved after sales of the farm produce. Meanwhile, SOWEDA ensures the

sensitization and technical assistance of the farmers and the cooperatives. These partnerships contributed in the increase of production.

Projected Postharvest Losses with Broad-based Partnerships

The College of Technology of the University of Buea envisage to establish broad-based partnerships with national and international stakeholders to increase the level of coverage to reduce postharvest losses to less than 5% by 2030 for all the agricultural commodities in the kupe-manegouba division and beyond. To achieve this feat, the College of Technology will seek for additional funding from national and international partners based on the following calculations.

- The capacity of the first version of the drying machine which won the first prize during the national competition in Maroua, Cameroon in 2019 is 275L.
- Of recent, this capacity has been upgraded in our second version of the drying machine to 2750L
- The cost of production of the machine stands at two million francs CFA (2000000FCFA) which is equivalent to \$3,636.
- The cost of production of the drone stands at seven hundred thousand francs CFA (700000 FCFA) which is equivalent to \$1273
- Based on the drying time of the machines, each machine can dry 19570 tons of agricultural commodity. With a total per annum production of 3913982 tons for the entire kupe-manegouba division, approximately two hundred (200) drying machines and a single drone for information gathering are required.
- Hence, the total amount required to cover the entire division is
 $200 \text{ machine} \times 2000000\text{FCFA} + 700000\text{FCFA} = 400,700,000 \text{ FCFA} = \$728,545$

Table 5 shows the projected production for 2030 with the broad-based partnerships to attain the 5% postharvest losses.

Table 5: Projected Postharvest Losses by 2030

| S/N | CROPS | Surface (ha) | Production (T) | Post-Harvest losses(%) | New Production | Expected Post-Harvest losses (%) | Gain (%) |
|-----|-----------|--------------|----------------|------------------------|----------------|----------------------------------|----------|
| 1 | CASSAVA | 2651 | 8400 | 20 | 8668.8 | 3.20 | 16.80 |
| 2 | COCOYAM | 176 | 521 | 20 | 536.9947 | 3.07 | 16.93 |
| 3 | PLANTAINS | 2878.5 | 3900000 | 35 | 4154231.3 | 6.52 | 28.48 |

| | | | | | | | |
|----------------|-------------------|---------|-----------|-----------|-----------|------|-------|
| 4 | MAIZE | 583.6 | 1548.3 | 25 | 1620.3927 | 4.66 | 20.34 |
| 5 | PEPPER | 41.1 | 22.3 | 30 | 23.546013 | 5.59 | 24.41 |
| 6 | IRISH POTATOES | 13.5 | 53.6 | 40 | 57.5932 | 7.45 | 32.55 |
| 7 | BEANS | 52 | 85.5 | 20 | 88.92855 | 4.01 | 15.99 |
| 8 | CABBAGES | 11.6 | 42.5 | 15 | 44.5145 | 4.74 | 10.26 |
| 9 | TOMATOES | 28 | 90 | 30 | 95.02875 | 5.59 | 24.41 |
| | PALM OIL | 46.5 | 15.5 | 20 | 16.1231 | 4.02 | 15.98 |
| 10 | COFFEE | 5066.5 | 3110 | 20 | 3258.036 | 4.76 | 15.24 |
| 11 | COCOA | 1515.1 | 93.7 | 30 | 98.935488 | 5.59 | 24.41 |
| SUMMARY | | 13063.4 | 3913982.4 | 25.416667 | 4168740.1 | 4.93 | 20.48 |

Conclusions

In this paper, the use of appropriate technologies to curb poverty and hunger in the rural areas of sub-Saharan Africa due to poor postharvest processes by farmers and how the College of Technology of the University of Buea has sought public, public-private, and civil society partnerships to maximize the impact of the technological innovation is proposed. Postharvest processes present a major challenge in rural areas in sub-Saharan Africa because of rapid degradation of farm produce before delivery to urban markets due to poor road infrastructure. The technologies developed is a drone for data gathering and a new multi-crop drying machine. The area of implementation of the technological innovation is the kupe-manegouba division of the Republic of Cameroon due to its enclaved nature with less than 10 kilometres of tarred road. Statistics from the divisional delegation of agriculture show that the following agricultural commodities are cultivated in the kupe-manegouba division: cassava, cocoyam, plantains, maize, pepper, irish potatoes, beans, cabbages, tomatoes, palm oil, coffee, cocoa. The total per annum production is 3913982 tons with plantains constituting the bulk of the production with 3900000 tons. Such a production potential for a division with less than six hundred inhabitants is adequate to ensure zero hunger and no poverty to inhabitants in the division and beyond. Due to poor postharvest practices, the postharvest loss for the agricultural commodities is enormous ranging from 15% for cabbages to 40% for Irish potatoes. The percentage loss for plantains stands at 35% implying that 1365000 tons of plantains are lost annually. This percentage could be higher if not of traders who exploit farmers by buying their produce at giving away prices of 200FCFA per bunch to sell later at 5000FCFA. Such practice will enhance poverty and hunger for the local farmers. With the implementation of the technologies and local partnerships, the postharvest losses were reduced to an average 20% per annum and it is envisaged that, with broad-based partnerships, the postharvest losses could be further reduced to less than 5% by 2030. We recommend an additional funding of \$728,545 through partnerships for the innovative technology to eliminate poverty and hunger to its residual level in the kupe-manegouba and beyond. Eliminating poverty (SDG1) and hunger (SDG2) will have a positive ripple effect on other SDGs since rural exodus and crime wave will be greatly reduced and health care will be affordable.

Limitations

This research had limitations, which included limited resources, which prompted us to use a limited scope of the survey and other methods of data collection. We had one multi-crop drying machine and one drone which reduced considerably our capability to attend to many farmers and to process all the varieties of farm commodities in study. Hence, the total postharvest loss for the entire division did not change significantly since most of the farmers and agricultural commodities could not be covered due to lack of funds.

Originality

This document is an original concept of the team members of Industry, Innovation, and Infrastructure SDG 9. The originality is on the technological innovation and the method of data collection in postharvest processes.

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Do Education Level and Employment Status Matter for Financial Inclusion? Evidence from Kenya

Cyprian Amutabi (University of Nairobi, Kenya)

Abstract

The United Nations Capital Development Fund (UNCDF) identifies financial inclusion as a major promoter of various Sustainable Development Goals (SDGs) and can be used as an instrument in eradicating poverty and gearing inclusive economic growth. This is also well anchored under Goal Number 10 of the SDGs. Despite this consensus, the level of financial inclusivity in Kenya remains low. Using the 2021 National FinAccess data, this study sought to assess whether the education level and employment status of individuals mattered for financial inclusion in Kenya. Three measurements of financial inclusion were adopted namely, usage, access, and barriers. A multidimensional index of financial inclusion was constructed using the Principal Component Analysis (PCA) approach with the Human Opportunity Index (HOI) being used to measure the inequality of opportunity in financial inclusion. Subsequently, the Shapley decomposition technique was employed to understand the contribution of education and employment to the percentage of inequality of opportunity. The OLS regression results revealed that the two factors were indeed critical and significantly increased financial inclusion in Kenya. Further, the Shapley decomposition technique revealed that the education level vis-a-vis the employment status of an individual explained the highest proportion of financial inclusion across the three models. Moreover, unlike in the usage models where the coverage rate and the HOI were lower, the access models depicted an increased pattern in the access to financial products. To increase financial inclusion in Kenya, this study recommended that financial institutions step up their efforts in bridging the financial information asymmetry gap. This can be realized through financial literacy which helps broaden people's awareness of the access, usage, and barriers to financial products. Additionally, there is a need for both the government and private sector players to create more employment opportunities as this is requisite in providing steady income streams that consequently, incentivize account ownership for transaction purposes.

JEL Classification: D14, G20, G21

Keywords: Financial inclusion, Education, Employment, HOI, Shapley decomposition, Kenya.

Introduction

Generally, there is no conventional description of Financial Inclusion due to its multidimensional nature and varying approaches to its jurisdictions (Anthanasius and Meshack, 2017). Sarma and Pais (2010) define it as the process of providing a variety of financial services through the banking sector outreach, at a reasonable price, at the right location, time, and form without discernment to any member of society. World Bank (2018) describes it as having access to suitable and

reasonably priced formal financial services that solve peoples' or organizations' needs in a distributive, accountable and sustainable manner.

The United Nations Capital Development Fund (UNCDF, 2019) identifies financial inclusion as a major promoter of various Sustainable Development Goals (SDGs) and can be used as an instrument in eradicating poverty and gearing inclusive economic growth. Despite this consensus, the level of financial inclusivity in Kenya remains low. The number of unbanked adults in Kenya stood at 25.38% in 2017 (World Bank, 2017). Many of these individuals rely on informal systems to supplement their low incomes, especially those in rural areas. It is predicted that a large source of this financial inequality stems from the financial illiteracy and unemployment status of individuals or household heads. However, current studies on financial inclusion do not succinctly explore the contribution divergences made by an individual's level of education and or employment status towards realizing financial inclusivity.

More particularly, in the African context, the disparities stemming from education level and employment status have not been extensively investigated. More inclination has been geared towards gender, location, and infrastructural related barriers. Albeit these factors play a massive role in determining the level of financial inclusivity, technological advancement has overridden some of them over the years. Therefore, this study contributes to the existing literature by decomposing financial inclusion from the financial literacy and employment perspectives in the Kenyan context. More importantly, this study employs the unexploited 2021 FinAccess survey data. This survey was conducted during the COVID-19 pandemic period hence providing rich data on the pandemic's impact on the household's interaction with financial services providers & products. More recent topical issues of green finance and technological progress in modeling financial transactions are also incorporated in this survey. To achieve the research objectives, the logistic regression and the Human Opportunity Index (HOI) are used to measure the Inequality of Opportunity (IOP) in financial inclusion in Kenya.

The growth of the financial sector and the enactment of favorable social policies are regarded as fundamental in fostering financial inclusivity. The high level of poverty in developing countries including Kenya has drawn major attention to financial inclusion structures that can be put in place to eradicate poverty. Financial inclusion is measured through formal account ownership, the ability to access formal savings, insurance, and credit facilities. World Bank (2018) observes that the first fundamental step in the direction of financial inclusion is access to a transaction account. This facilitates activities within the scope of using financial services which include payment of services, savings, credit, and insurance. According to the 2017 GlobalFindex survey, an estimated 1.7 billion adults lack access to transaction accounts and are, therefore, left out of the formal and recognized financial system (Demirguc-Kunt et al., 2018). Having an account with a trustworthy bank boosts savings which can be used by the bank on intermediate business loans that could further foster investments hence promoting economic growth (European Bank for Reconstruction and Development) (EBRD, 2016).

The main goal of financial inclusion is to encourage access to formal financial services mainly to the poor, disadvantaged groups, women, and those that depend on informal financial systems.

According to UNCD and the Organization for Economic Cooperation and Development (OECD) (UNCD and OECD, 2019); financial inclusion is a fundamental enabler of Sustainable Development Goals (SDGs). To facilitate this, the World Bank enacted the Universal Financial Access 2020 initiative to reduce the number of the unbanked population globally; with the main focus being on 25 countries that account for 73% of the financially excluded persons. Kenya is one of these countries.

On a positive note, the transformation of financial services in Kenya over the last ten years has been remarkable. Globally, recent data reveals that 75% of adults own a formal account that permits them to save, send or receive money, making Kenya the leader in the sub-Saharan Africa (SSA) region. Indeed, Kenya outpaces both the global average and several middle-income countries such as Brazil, India, Mexico, Russia, and Chile (Heyer and King, 2015). This is largely attributed to the massive innovation strides made in the financial sector through the introduction of M-PESA in 2007, M-Shwari in 2012, Agency banking, and bank staffing through local language networks. This has put Kenya as an exemplary regional lead focus in the SSA region. However, despite Kenya taking a regional lead in the financial sector innovation, it is conceivable that this represents just a tip of the iceberg on what might emerge over the next decade. Even though the digital technology has breached the access frontier, a concern emerges on whether both the providers and consumers of financial services will arrive at a win-win situation where value is equally created for all parties.

Subsequent developments have seen the upward surge in access to mobile money services in the formal sector by many individuals who previously relied on informal institutions. Those groups of people with a previous lower likelihood uptake of formal financial services (poor urban dwellers, rural residents, women, and the less educated persons) have seen a significant increase that has been largely driven by M-PESA and M-Shwari products just over 4 years (2009-2013). More than 10 million adults have opened a formal savings account with M-Shwari, of which about 50,000 can access loans every day. This has seen other competitors such as Equitel, the Kenya Commercial Bank (KCB M-PESA) and other digital mobile lending loan products emerge rapidly in the new mobile banking space. However, despite the financial infrastructural expansion over the last decade, skewness in financial access still exists. While 93% of the richest are formally included, 55% of the poorest are completely excluded from formal and informal financial services. The usage rate remains shallow, thus, rendering the proposition of achieving a welfare-oriented financial system in the Kenyan society questionable (Heyer and King, 2015).

The presence of market imperfections such as high transaction costs and information asymmetry limits the opportunity of financial access to the poor. Moreover, lack of collateral and credit histories among the poor also reduces the chances of financial access. Levine (1997) argues that financial instruments and institutions arise to mitigate information asymmetry and transaction costs. In cross-country regression, the existence of efficient financial systems ensures that capital is channeled to productive use, reduces information asymmetry, provides insurance against shocks, and can alleviate poverty and dissimilarity (Beck et al., 2004).

Following the 2007-2008 global financial crisis, policies focused on achieving equal income distribution among the populace were enacted. This is because inequality in wealth and income results in; underutilization and underinvestment of human capital (Galor and Zeira, 1993), obstruct intergenerational mobility (Corak, 2013), decreased aggregate demand (Carvallo and Rezai, 2015), and consequently social conflict perils.

According to CBK (2019), the percentage of Kenyans who could access mainstream financial services rose from 75.3% in 2015 to 82.9% as of 2018. Despite this, the number of women with access to mainstream or formal financial services remains low at 80% compared to men at 86%. Furthermore, financial access has increased from 42% in 2011 to 82% in 2018 with 86% of the increase being attributed to males with transaction accounts and 78% being attributed to females. Despite the tremendous progress, women still lag in terms of accessing and using financial services. This lag is attributed to low financial literacy at 75%, collateral requirements at 66%, and the socio-cultural environment at 63% as revealed by the Alliance for Financial Inclusion (AFI, 2017).

In Kenya, some of the initiatives embarked on include the implementation of mobile money services, the enactment of microfinance legislation, and the roll-out of the agency banking model. The embracing of mobile money transfers in Kenya has accelerated since the introduction of MPESA in 2007 which has also spread out in other East African countries. This has helped fuel financial inclusion due to its high reliability and accessibility in transferring money hence increasing outreach. However, these initiatives are greatly hampered by financial illiteracy, inaccessibility to some of the remote areas, cultural norms & religious beliefs, gender, high poverty levels among others. This study sought to assess the level of financial inclusion in Kenya specifically from the education level and employment status perspectives since many of those barrier-related factors can be easily overcome through financial literacy.

The rest of the paper is organized as follows: Section 2 presents the theoretical and empirical literature. Section 3 discusses the methodology, data source, descriptive statistics & measurement of variables. Section 4 presents and discusses the econometric estimates on financial inclusion with the final section providing conclusions based on the empirical findings.

Literature Review

Several theoretical studies have demonstrated that one notable modality of poverty eradication is through the development of the financial sector. A robust financial system plays a vital role in the resource allocation process in the economy; something that ensures that financial services and products are available and accessible to all (Diamond and Dybvig, 1983). Further, the banking sector plays an instrumental role in the provision of liquidity which facilitates more investments in productive assets, thus, enhancing the efficiency of capital accumulation and economic growth. Financial inclusion is critical for developing countries where the interaction between individuals (enterprises or households) and the formal financial structures is low. Due to the irregular income streams, many vulnerable groups find it particularly hard to access formal financial services. This does not only lead to a poverty trap but also an upward surge in the inequality gap (Abhijit and

Newman, 1993; Galor and Zeira, 1993; Aghion and Bolton, 1997; Beck et al., 2007). According to Roemer (1998), the principle of equality of opportunity constitutes a situation where the distribution of outcomes of a particular service is identical across social groups and is independent of their circumstances. The theory focuses on reducing inequalities that are deemed unfair and are associated with gender, race, parental background, and ethnicity by advocating for a level playing field of opportunities for everyone in the access to financial services.

These traditional theories can be blended with modern perspectives to draw evidence on the role of financial system players in driving financial inclusion and the resultant beneficiaries. While modern theories are relevant in explaining financial inclusion, they need to be employed with close reference to the traditional theories to provide adequate linkage and synergy between the financial system players and the various forms of inequalities at large. Regarding the provision of financial inclusion services, there are divergent ideologies in theory as to who should take the leading role. According to Aggarwal and Klapper (2013), the government should take the leading role in the delivery of financial inclusion products to its population. Conversely, Gabor and Brooks (2017) advocate for the role of private entities such as banks and fintech businesses in financial inclusion delivery. However, other studies argue that financial inclusion delivery should be a joint endeavor between the public and private sector players (Pearce, 2011; Arun and Kamath, 2015). Whereas, some studies lend credence to the poor segment of the population as the eventual beneficiaries of financial inclusion (Bhandari, 2018); others attribute the entire financial systems as the ultimate beneficiaries (Kim et al., 2018; Ozili, 2018).

It can be noted that increasing financial inclusion in any given economy requires adequate funding. According to Marshall (2004), financial inclusion initiatives ought to be funded by taxpayers. However, Mohiuddin (2015) argues that financial inclusion should be funded by the capitalists in the private sector since they contribute largely to the widening of the income inequality gap between the poor and the rich. Contrariwise, Cobb et al., (2016) posit that financial inclusion ought to be jointly funded by both the public and private sector players.

Globally, some empirical studies have been conducted to assess the extent to which education level and / or employment status reduces financial inequality. According to the 2017 Global Findex survey, Demircuc-Kunt et al., (2018) note divergences in the worldwide account ownership status regarding education level and employment status of individuals. Account ownership was found to be lower among the less educated adults. More precisely, those adults who possessed primary school education or less constituted 56%. This is compared with 76% of those who have completed secondary school and 92% of those with higher education. On the other hand, adults who were active in the labor force-either, employed or seeking work were more likely to have an account than those who were out of the labor force.

As observed by Mutua and Oyugi (2007), the financial market in Kenya remains relatively narrow in the rural areas since most financial institutions are concentrated in the urban, peri-urban areas & cash-crop growing areas. Dupas and Jonathan (2013) also noted that the majority of the self-employed individuals in rural Kenya lacked a formal bank account and rather saved in the form of animals or durable goods, in form of cash at their homes, or through the Rotating Savings and

Credit Associations (ROSCAs) [also commonly referred to as merry-go-rounds]. Johnson et al. (2006) cited poor communications infrastructure, relatively low population density, low levels of literacy, relatively undiversified economies, and less productive economic activities in the rural sector that undermined financial inclusion initiatives.

Most studies analyze the impact of education on income inequality. For instance, a study by Yang and Qiu (2016) found that innate ability and family investment in early education played a fundamental role in explaining income inequality & intergenerational income mobility in China. Similarly, Restuccia and Urrutia (2004) estimated the impact of innate ability, compulsory education & higher education on income gaps and income persistence across generations using US data-adjusted parameters. Their findings revealed that parents' early educational investment explained about 50% of intergenerational mobility and income inequality was mainly driven by higher education. Nabassaga et al., (2020) analyzed how educational inequality influenced income inequality in Africa using multiple waves of living standard measurement surveys from 1987 to 2016 for 37 African countries. From the estimated wealth returns to education and wealth inequality, the study found a significant gap in the access to postgraduate earning opportunities between the bottom 40 percentile and the higher 40 percentile. A reduction in this gap was significantly correlated with a higher pace of wealth inequality reduction. Further, albeit education was found to be one of the key drivers of social mobility, its effect was not uniform across income groups.

Notable empirical evidence recommends the use of financial instruments to increase individual or group savings (Ashraf et al., 2010) and productive investment (Dupas and Robinson, 2013). In an extended view, Peragine (2004) pointed out that the barriers to accessing basic services that are beyond the control of individuals are as a result of low capability and being socially excluded.

Financial inclusion can be measured through access, quality, usage, and its impact (Allen et al., 2016). Both country and individual characteristics influence the extent of financial inclusion. Country characteristics such as high-quality financial institutions & their regulatory frameworks, political instability, cost of opening a bank account, and disclosure issues by financial institutions affect inclusivity. Concerning individual characteristics, the probability of being financially included depends on the level of education, gender, marital status, area of residence, and employment status among other things. Demircuc-Kunt et al., (2014) also found out that Muslims were less likely to own bank accounts or save formally as compared to non-Muslims.

According to Campero and Kaiser (2013), elements of financial inclusion can be classified into demand and supply-side determinants. Whereas demand-side determinants comprise individual income, education, and age among other aspects; the supply-side determinants largely include infrastructural development. Moreover, Camara and Tuesta (2015) link the level of education, gender, income level, and age among other factors to the consumption of formal financial services. Despite great strides being made in increasing the population of financially included persons through advances in technology and mobile banking, the gender gap is found to threaten the possibility of achieving key SDGs that are achievable through financial inclusion (Demircuc-Kunt et al., 2014). Aduda and Kalunda (2012) further established that the contributing factors of

financial inclusion vary depending on the level of a country's economic development and geographical location.

Prieto et al., (2018) measured the inequality of opportunity in the access to superior education in Florida and they aimed at explaining how far a given distribution of individual outcomes arises from equal opportunity. The aspects considered were participation, attainment, and achievement and they found out that, students enrolled in the School District of Hillsborough County lacked equal opportunities. In the enrollment stage, students with high socioeconomic status had a higher chance of attending high-performing schools. The decomposition analysis showed that access was unevenly distributed among children from different locations, races/ethnicity whereby the opportunity for black children was below the overall coverage level of education.

Jemmali and Amara (2014) assessed the inequality of human opportunities using a random sample of households drawn in Tunisia. They found out that the most significant aspects that affect dissimilarity in housing services and education were gender, area of residence, education level, and the expenditure of the household head. Thus, they recommended investment in programs that alleviate illiteracy and curb gender discrimination, especially in rural areas. Bagli and Adhikary (2013) conducted a study on the influence of Self-Help Groups on financial inclusion in the District of Bankura in India. A binary logit model was used to estimate access to financial services. They found that membership to a Self-help group and the duration in which one has been registered significantly accelerated financial inclusion.

Niehus and Peichl (2013) conducted a study on the upper bounds of inequality of opportunity using data from Germany and the United States by the use of harmonized data from national panel surveys. The lower bounds estimates revealed that individual earnings were determined mainly by one's effort and to a less extent by their circumstances. To a large extent, the upper bound estimates showed that individual earnings were pre-determined by exogenous circumstances. According to Hannig and Jansen (2010), empirical evidence on financial stability and inclusion in the 2007-2008 financial crisis showed that financial innovations can have devastating systematic impacts on the economies globally and hence the need for setting up international standards and having national regulators implement the financial regulations and guidelines.

From the reviewed literature, it is apparent that many studies on financial inclusion have been undertaken in the developed economies context. Few studies examine financial inclusion in the African context. Nonetheless, these studies tend to align education and or employment with a decrease in income inequality as opposed to financial inequality reduction. More importantly, this study employs the unexploited 2021 FinAccess survey data. This data was collected during the COVID-19 pandemic period hence providing rich data on the pandemic's impact on the households' interaction with financial services providers and products. More recent topical issues of green finance and technological advancement are also incorporated in this survey.

Methodology

This commences with the construction of the multidimensional index for financial inclusion using the Principal Component Analysis (PCA). PCA aggregates the various financial inclusion indices into one common index. This index is then treated as a regressand upon which the Ordinary Least Squares (OLS) regression analysis is performed (see equation 1).

$$FI_i = \beta_0 + \beta_1 EDUC_i + \beta_2 EMP_i + \sum_{i=1}^n \beta_{i>1} (CTRL)_i + \varepsilon_i \dots \dots \dots (1)$$

Where **FI** denotes Financial Inclusion; **EDUC** is the education level, and **EMP** is the employment status. **CTRL** represents the control variables that have been incorporated into the model to control for the unobserved effects while ε_i is the error term and is assumed to be normally distributed with zero mean and constant variance.

Secondly, the Human Opportunity Index (HOI) is employed to measure the inequality of opportunity in financial inclusion. Finally, the Shapley decomposition technique is used to understand the contribution of each circumstance variable to the percentage of inequality of opportunity (see subsequent derivation).

The Human Opportunity Index

The Human Opportunity Index (HOI) approach is constructed by analyzing basic opportunities to measure how circumstances associated with differentiated socioeconomic factors impact inequality. This approach proceeds in a two-step manner: First, a dissimilarity index is used to gauge if available opportunities are allocated equitably by comparing circumstances subgroups' probabilities of accessing certain basic opportunities. Second, the dissimilarity index is joined with the absolute level of opportunities to form the HOI which helps in identifying the most disadvantaged groups.

Three measurements of financial inclusion will be adopted and specified as usage (owning a transaction bank account); access (mobile money services), and barriers (financial institution proximity). The financial inclusion function used to measure inequality of opportunity can be specified as:

$$F_{ij} = f(C_i, X_i, e, \varepsilon) \dots \dots \dots (2)$$

Where F_{ij} is the subgroup division of financial outcomes for an individual, C_i is the set of circumstances faced by an individual, **X** represents the control variables, **e** is the effort factors and ε denotes the error term. In this case, the barriers to accessing financial services will be the circumstance variables. The Dissimilarity Index (D-index) is used to measure the coverage rate of opportunity in access to financial services.

$$D = \frac{1}{2F} \sum_{i=1}^n \alpha_i |F - F_k| \dots \dots \dots (3)$$

Where n is the number of circumstance groups, F is the coverage rate of the circumstance group and α is the subset of circumstance group i of the total population. D-index ranges from 0 to 1. 1 denote high Inequality of Opportunity (IOP) while zero represents perfect equality.

The HOI is used to measure the coverage rate of opportunity after discounting the distribution of the inequality across groups.

$$HOI = (1 - D)W \dots \dots \dots (4)$$

HOI ranges from 0 to 100. As the coverage rate increases, the HOI increases and vice versa among the circumstance groups.

To measure the opportunity of an individual to access financial services, the logistic regression method is adopted. The probability of having access to finance is assumed to be 1 and 0 if otherwise. A vector of variables that indicate the circumstances is defined as $X_i = X_{1i}, X_{2i}, \dots, X_m$. Individuals with the same circumstances belong to the same group type. Six steps are adopted in determining financial inclusion: A logistic regression model is first estimated using the maximum likelihood approach to ascertain whether the ability of an individual to access financial services is a function of their circumstances.

$$L_n \left(\frac{P(1=1|x_1, x_2, \dots, x_m)}{1 - P(1=1|x_1, x_2, \dots, x_m)} \right) = \sum_{k=1}^m \beta_k X_k \dots \dots \dots (5)$$

The estimation of equation (5) above yields the coefficients estimates (β_k) and the predicted probability (\hat{p}_i) of accessing financial services.

$$\hat{p}_i = \frac{\text{Exp}(\hat{\beta} + \sum_{k=1}^m X_{ki} \hat{\beta}_k)}{1 + \text{Exp}(\hat{\beta}_0 + \sum_{k=1}^m X_{ki} \hat{\beta}_k)} \dots \dots \dots (6)$$

The study then proceeds to calculate the overall coverage rate for financial services represented by F , which provides the fraction of the population that has access to particular opportunities.

$$F = \sum_{i=1}^n \alpha_i \hat{p}_i \dots \dots \dots (7)$$

Where n is the total population and $\alpha_i = \frac{1}{n}$. The dissimilarity index is then calculated as follows:

$$\hat{D} = \frac{1}{2F} \sum_{i=1}^n \alpha_i |\hat{p}_i - F| \dots \dots \dots (8)$$

Following the results obtained in equations (7) and (8) above, the access to services that are unevenly allocated can then be computed as follows:

$$P = F * \hat{D} \dots \dots \dots (9)$$

Finally, the HOI is computed by discounting the inequality of distribution from the overall coverage rate **F** which is given by;

$$HOI = F - P \dots \dots \dots (10)$$

To determine the contribution of each circumstance variable, a potential function is introduced. Therefore, the contribution of one circumstance variable is given by the difference between the potential of the whole set on one hand from which this specific variable has been removed for an inequality index. The Shapley value decomposition rule is used in computing the marginal contribution of each variable and is advantageous because it is responsive to the inequality index chosen. However, its limitation is the inability to respect independence (Shorrocks, 1982).

Data Type and Source

The study used the 2021 FinAccess Household Survey Dataset. This dataset was collected by the Central Bank of Kenya (CBK) in collaboration with the Kenya National Bureau of Statistics (KNBS), and Financial Sector Deepening Trust (FSD Kenya). This survey is unique since it is the first one to be conducted at the county level. The survey was undertaken in the period June-September 2021. As such, it provides firsthand information on the challenges and opportunities across all the 47 counties with regard to financial inclusion. Second and more important, this data was collected in the COVID-19 pandemic era hence providing useful data on how the pandemic impacted the households' interaction with financial services providers and products. Finally, the survey also incorporates the topical issues of green finance and technological progress in modeling financial transactions. Financial inclusion is measured in the dataset based on four key dimensions namely; access, usage, quality, and impact or welfare. A total of 22, 024 households were surveyed across the 47 counties.

Diagnostics

This study conducted the Kaiser-Meyer-Olkin (KMO) test to ascertain the sample adequacy of each of the variables used to construct the Financial Inclusion Index. The statistic is a measure of the proportion of variance among variables that might be common variance. In the cases where KMO values are close to zero, then large partial correlations exist compared to the sum of correlations and this poses a large problem for factor analysis. The KMO test results are shown in Table 1.

Table 1. The KMO Measure of Sample Adequacy

| Variable | KMO |
|--|---------------|
| Bank account (saving/investment) | 0.3794 |
| Transactional account | 0.4506 |
| Bank account (no cheque book) | 0.5067 |
| Current ATM usage | 0.5255 |
| Use Micro Finance Institutions (MFIs) | 0.6868 |
| Use mobile bank saving account | 0.7691 |
| Mobile banking account | 0.7976 |
| Mobile money account | 0.7391 |
| Informal institutions' membership | 0.6372 |
| Cost to the financial advisor | 0.7124 |
| Cost to nearest bank/financial institution | 0.6905 |
| Overall | 0.5542 |

Source: Compiled from Stata

With an overall KMO statistic of 0.5542 (as shown in Table 1); this study sample was considered fairly adequate to be measured using the PCA method.

Additionally, the pairwise correlation matrix was performed to assess the degree of association among the variables. As reiterated by Dziuban and Shirkey (1974), computing the correlation matrix is a very vital pre-requisite to the determination of a matrix that is most suitable for performing the Factor Analysis. The correlation matrix revealed a weak degree of association among the explanatory variables (see Appendix Table A1)

Variable Definition and Measurement

Table 2 shows the definition and measurement of variables.

Table 2. Definition and Measurement of Variables

| Variable | Description and Measurement | Hypothesized Relationship |
|------------------------------|--|----------------------------------|
| Dependent variable(s) | | |
| Usage | Measured by the ability to own a transaction bank account and thus be in a position to deposit or withdraw money. It's a dummy variable taking on the value of 1 if an individual owns and uses the account and 0 otherwise. | |

| | | |
|---|--|----------|
| Barriers | Measured by an individual's proximity to a financial institution. It's a dummy variable taking on the value of 1 if an individual has proximity to a financial institution and 0 otherwise. | |
| Access | The ability of an individual to access mobile money services such as M-PESA, mobile banking, mobile agents, and mobile loan applications. Takes the value of 1 if one has access to mobile money services and 0 otherwise. | |
| The above three indicators are used to compute the Financial Inclusion Index which is used in the regression model as the dependent variable | | |
| Explanatory variable(s) | | |
| Education level | Dummy variable taking the value of 1 if the respondent has acquired secondary school education or higher and 0 otherwise. | Positive |
| Employment status | It is binary and takes the value of 1 if the respondent is employed and 0 otherwise. It acts as a proxy to household earnings. | Positive |
| Respondent's gender | Takes the value of 1 if the respondent is male and 0 otherwise. | Positive |
| Location | Takes the value of 1 if the respondent resides in an urban area and 0 otherwise | Positive |
| Respondent's age | The age of a respondent measured in years. | Positive |
| Religion | Dummy variable taking on the value 1 if the respondent is a Christian and 0 otherwise | Positive |
| Marital status | Takes on the value of 1 if the respondent is married and 0 otherwise | Positive |
| Household size | The number of members/people in a given household | Negative |

| | | |
|-------------|---|---------------|
| Shocks | Whether a particular household or individual experienced a shock that significantly impacted the normal household earnings (1 if yes; 0 otherwise). We use this variable as a proxy to the COVID-19 disease pandemic outbreak which is the major shock reported during the survey period. | Negative |
| Green bonds | Refers to a fixed-income instrument that is designed to specifically support climate-related or environmental projects. It is used as a measure of green finance. The variable is defined as 1 if a household or individual possesses the bond and 0 otherwise. | Indeterminate |

Source: Author's description based on the 2021 FinAccess Survey Data

3.5 Summary Statistics

This is shown in Table 3.

Table 3. Summary Statistics of Key Variables

| Variables | Obs. | Mean | Std. Dev. | Min | Max |
|--------------------------------|--------|-----------|-----------|----------|---------|
| Financial Inclusion (FI) index | 22,008 | -2.56e-09 | 1.00000 | -0.35124 | 2.84695 |
| Education level | 22,024 | 0.29282 | 0.45507 | 0 | 1 |
| Employment status | 22,024 | 0.10193 | 0.30257 | 0 | 1 |
| Respondent's gender | 22,024 | 0.42404 | 0.49421 | 0 | 1 |
| Location | 22,024 | 0.34367 | 0.47494 | 0 | 1 |
| Respondent's age | 22,024 | 38.8967 | 17.21155 | 16 | 116 |
| Respondent's religion | 22,024 | 0.84603 | 0.36093 | 0 | 1 |
| Marital status | 22,024 | 0.54504 | 0.49798 | 0 | 1 |
| Household size | 22,024 | 4.17753 | 2.40753 | 1 | 23 |
| Shocks experienced | 22,024 | 0.70827 | 0.45457 | 0 | 1 |
| Green bonds | 22,009 | 0.00027 | 0.01651 | 0 | 1 |
| Mean monthly expenditure | 21,954 | 9417.579 | 8837.904 | 100 | 197000 |

Source: Compiled from Stata

The Financial Inclusion (FI) Index variable was computed using the PCA method and it aggregated variables from the three indices of financial inclusion namely, usage, barriers, and access. On average, 29.28% of the surveyed population was reported to have schooled beyond the secondary school education level. This leaves a whopping fraction of about 70.72% of the Kenyan population with high school education qualification and below. This has got far-reaching implications on the opportunity of being financially included since education is a vital gauge of an individual's know-how and employment prospects which greatly enhance the opportunity of one being financially included. About 10.19% of the surveyed population was reported to be formally employed. Access and usage of formal financial services such as commercial banks, Micro

Finance Institutions (MFIs), and SACCOs is largely attributed to an individual's employment status. It becomes even more integral to individuals seeking credit facilities by acting as collateral and or guarantee. This explains why formal employment is a significant factor in explaining the probability of financial inclusion and it outweighs self-employment or informal sector employment. Approximately 42.40% of the sample comprised of the male population. Further, on average, 34.37% of the respondents resided in urban areas. The financial market in Kenya remains relatively narrow in the rural areas since most financial institutions i.e. banks, MFIs, and SACCOs are concentrated in the urban and peri-urban areas. Further, poor communications infrastructure, low population density, relatively undiversified economies and less productive economic activities in the rural sector greatly undermine financial inclusion initiatives. The mean age of the surveyed population was about 38 years. The variable had a standard deviation of 17.21 and varied within the intervals of 16 and 116 years around the mean value. On average, 84.60% of the Kenyan population was of the Christian denomination. Further, about 54.50% of the surveyed population was reported to be married. The average number of people in a given household was 4 with the lowest number recorded to be 1 and the highest being 23. More importantly, the survey indicated that about 70.83% of the households experienced a shock over the last fiscal year which adversely affected their streams of income. The notable shocks included the COVID-19 pandemic, drought, and locusts invasion which almost simultaneously hit the country in 2020. More significant was the COVID-19 pandemic which resulted in massive job losses and subsequently depleted earning streams for many Kenyan households. This negatively impacted the savings prospects and consequently the financial inclusion prospects. A paltry 0.027% of the Kenyan individuals or households possessed and used the green bond financing instrument. The mean monthly expenditure averaged 9, 418 Kenya Shillings (KES). The minimum mean monthly expenditure was recorded at 100 with the maximum recorded at 197000.

Empirical Findings

Financial Inclusion (FI) Model

This study sought to establish whether the education and employment status of individuals matter for financial inclusion in Kenya. A financial inclusion index was first generated using the PCA method. This indicator is then regressed against the education level and employment status variables while also controlling for other unobservables. The findings are presented in Table 4.

Table 4. Regression Results

| VARIABLES | Financial Inclusion (FI) Index |
|-------------------|---------------------------------------|
| Education level | 0.407*** (0.0151) |
| Employment status | 0.664*** |

| | |
|----------------------------|------------|
| | (0.0215) |
| Respondent's sex | 0.0827*** |
| | (0.0126) |
| Location | 0.0882*** |
| | (0.0143) |
| Respondent's age | 0.00802*** |
| | (0.000381) |
| Respondent's religion | 0.178*** |
| | (0.0181) |
| Marital status | 0.0470*** |
| | (0.0128) |
| Household size | -0.0189*** |
| | (0.00283) |
| Shock experienced | -0.0284** |
| | (0.0137) |
| Green bonds dummy | -0.353 |
| | (0.372) |
| InMean monthly expenditure | 0.176*** |
| | (0.00847) |
| Constant | -2.200*** |
| | (0.0789) |
| Observations | 21,954 |
| R-squared | 0.171 |
| Adj. R-squared | 0.1703 |
| Prob>F | 0.0000 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The financial inclusion index of an individual who has acquired secondary school education or higher significantly increased by 40.7% *ceteris paribus*. This is compared to those individuals who possessed lower than secondary school education qualifications. The more educated an individual is, the higher the financial inclusivity. Education acts as an empowerment tool by enhancing an individual's knowledge of financial service providers and the roles they play in society. The findings are consistent with those by Demircuc-Kunt et al., (2018) who found divergences in the worldwide account ownership status regarding the education level of individuals with account ownership being found to be lower among the less educated adults. Holding other factors constant, being employed significantly increased the financial inclusion index by 66.4% as compared to being unemployed. Formal employment hugely boosts the transactional account ownership status of individuals as it provides requisite payment channels by employers. Further, individuals can save and borrow easily from the mainstream financial providers since employment status acts as collateral by guaranteeing a steady flow of income. The same applies also to informal credit providers such as shylocks and mobile money lending

platforms. As such, adults who were active in the labor force-either, employed or seeking work were more likely to have an account than those who were out of the labor force (Demirguc-Kunt et al., 2018; Camara and Tuesta, 2015).

Being male significantly increased the financial inclusion index by 8.27% as compared to being female *ceteris paribus*. The male population was found to dominate their female counterparts concerning access and usage of the mainstream financial services. Albeit there has been a reduction in gender inequality with regards to financial inclusivity over the recent past, the women's use of formal financial services is still low; ostensibly owing to the continued prevalence of income and wealth gaps in society. This culminates with cultural norms in some societies that discriminate against women in terms of allocating an equitable share of better job opportunities. Further, wealth inheritance preferences towards the male gender prolong the financial inequality prevalence. Similar findings on gender divergences in financial inclusivity were obtained by Allen et al., (2016) and Demirguc-Kunt et al., (2014). The financial inclusion index of an individual residing in urban areas was found to be higher by 8.82% compared to an individual residing in rural areas. The financial market remains relatively narrow in the rural areas since most financial institutions i.e. banks, MFIs, and SACCOs are concentrated in the urban and peri-urban areas. Further, poor communications infrastructure, low population density, relatively undiversified economies, and less productive economic activities in the rural sector greatly undermine financial inclusion initiatives (Mutua and Oyugi, 2007; Dupas and Jonathan, 2013; Aduda and Kalunda, 2012).

The older an individual is, the increased the opportunity of being financially included by 0.8% *ceteris paribus*. The age variable was found to be significant at a 1% level of significance. Younger individuals (preferably below 18 years) are more likely to be financially excluded since they lack the requisite documentation (National Identification Cards) that would facilitate their access and usage to the mainstream financial service providers. Likewise, they may also not access credit facilities from the digital mobile lending platforms and shylocks if any at all. Apart from the lack of necessary identification documents; the younger population may also lack stable job opportunities (Kampero and Kaiser, 2013; Camara and Tuesta, 2015) and may, thus, be reliant on their parents or caretakers. Holding other factors constant, being a Christian significantly increased the financial inclusion index by 17.8%. This is compared to individuals who belonged to other denominations such as Islamic and Hinduism. While some religions encourage saving and borrowing through formal financial institutions, some do not. For instance, Demirguc-Kunt et al., (2014) found that Muslims were less likely to own bank accounts or save formally as compared to non-Muslims.

Being married significantly increased the financial inclusion index of an individual by 4.70% *ceteris paribus*. Marriage increases an individual's social network and also builds a larger social pool of funds for the parties involved which ultimately increases their opportunity of being financially included. Besides, it develops a sense of communal responsibility and as such, married people are more likely to access and utilize financial services as compared to unmarried people (Allen et al., 2016). Holding other factors constant, an additional household member significantly reduced the financial inclusion index by 1.89% for a given household. This suggested that larger

households were financially constrained as they devoted most of their income towards consumption as opposed to saving. This has the effect of leaving them out of the mainstream financial system.

Further, the financial inclusion index was found to decline significantly by 2.84% for those households or individuals that reported to have experienced shocks over the last fiscal year. The notable shocks experienced in the 2020 year when the survey was conducted included; the COVID-19 pandemic, locusts invasion, and drought. Households and / or individuals reported depleted streams of income due to job losses brought about by the COVID-19 pandemic shock. Further, agricultural yields were affected by locusts invasion and drought that hit the country over the same year. Depleted streams of income due to job losses coupled with decreased agricultural production resulted in a contraction in the financial coverage opportunities. Moreover, the study found that increased mean monthly expenditure was significantly associated with a 17.6% increase in the financial inclusion index for a particular household. Higher household expenditures can be attributed to a broadened access and usage of financial services. More particularly, larger household consumption implies that individuals can be able to borrow and save from both the formal and informal financial streams. This increases their opportunity of being financially included (Beck et al., 2007; Jemmali and Amara, 2014; Nabassaga et al., 2020). The green bonds variable was, however, found to insignificantly determine the financial inclusion index.

The Inequality Measure of Financial Inclusion

To understand the degree of financial inequality in Kenya, the HOI estimation was performed across the three different indices of financial inclusion (usage, access, and barriers). The results are presented in Tables 5, 6, and 7.

Inequality Measure in Financial Inclusion: Usage

Table 5 shows the HOI estimation results for the Usage models. The usage indicator was measured using transactional account ownership, bank account (savings or investments), and ATM usage.

Table 5. HOI Estimation Results for the Usage Models

| Inequality Measure | Transactional account ownership | | Bank account (savings or investments) | | ATM Usage | |
|-------------------------------|---------------------------------|------------|---------------------------------------|------------|-----------|------------|
| | Values | Std. Error | Values | Std. Error | Values | Std. Error |
| Coverage (C) | 2.1545 | 0.1889 | 2.9243 | 0.1112 | 10.9684 | 0.1889 |
| Dissimilarity Index (D) | 38.6381 | 3.2122 | 41.0362 | 6.9684 | 43.6083 | 3.2122 |
| Human Opportunity Index (HOI) | 1.3220 | 0.1408 | 1.7243 | 0.0783 | 6.1853 | 0.1408 |
| Pseudo R^2 | 0.1081 | | 0.1279 | | 0.2234 | |
| Obs Logit | 21,954 | | 21,954 | | 21,954 | |
| Obs | 21,954 | | 21,954 | | 21,954 | |

Table 5 revealed that the coverage rate in the usage of financial services was found to be small at 2.15% and 2.92% for the transactional account ownership and bank account models respectively. Equally, the opportunity of an individual being financially included was lower at only 1.32% and 1.72% for the two models respectively. The higher dissimilarity indexes of 38.64%, 41.04%, and 43.61% across the three usage models implied that fewer individuals in Kenya owned bank accounts and / or ATM cards and conducted transactions using them regularly. Though low, the coverage rate and HOI were found to be higher with regards to ATM usage in Kenya compared to the 2 counterpart models. These findings suggested an increased uptake in the usage of ATM cards in Kenya with individuals now preferring the later mode of the transaction as compared to the bank account transactions approach due to its convenience and timeliness. This becomes even more fundamental in the COVID-19 pandemic era where teller-customer banking transactions were minimized to help combat the pandemic.

Inequality Measure in Financial Inclusion: Access

The access indicator to financial inclusion was measured using; mobile money accounts, mobile banking accounts, and informal institution membership. The results are summarized in Table 6.

Table 6. HOI Estimation Results for the Access Models

| Inequality Measure | Mobile money account | | Mobile banking account | | Informal institution membership | |
|-------------------------------|----------------------|------------|------------------------|------------|---------------------------------|------------|
| | Values | Std. Error | Values | Std. Error | Values | Std. Error |
| Coverage (C) | 30.3270 | 0.2908 | 0.2688 | 0.0349 | 48.7015 | 0.3214 |
| Dissimilarity Index (D) | 21.7722 | 1.6510 | 35.3613 | 24.6628 | 13.0603 | 1.1109 |
| Human Opportunity Index (HOI) | 23.7242 | 0.2795 | 0.1738 | 0.0264 | 42.3409 | 0.3388 |
| Pseudo R^2 | 0.1029 | | 0.0582 | | 0.0701 | |
| Obs Logit | 21,954 | | 21,948 | | 21,948 | |
| Obs | 21,954 | | 21,948 | | 21,948 | |

Table 6 revealed that unlike in the usage models where the coverage rate and HOI were lower, the access models depicted an increased pattern in the access to financial products in the Kenyan market. The coverage rate in the access to financial products was found to be higher at 30.33% and 48.70% for the mobile money account and informal institution membership models respectively. Similarly, the opportunity of an individual being financially included was found to be higher at 23.72% and 42.34% for the mobile money account and informal institution membership models respectively. Compared to the usage models; the dissimilarity indexes in access models were consequently lower. These findings implied that in Kenya, access to mobile money services was higher with a majority of the population having easy access to financial services through their

mobile phones. These services have taken root in every corner of the Kenyan economy and include mobile banking, M-PESA, Airtel Money, mobile loan applications, mobile agents among many others. Also, the majority of Kenyans saved and borrowed money through informal institution group platforms. One such popular platform is the merry-go-rounds or ROSCAs. Nevertheless, mobile banking accounts remained relatively untapped potential in the Kenyan financial market yet it offers a much quicker, safer, and more convenient mode of conducting transactions by linking an individual's mobile account to his or her bank account. Subsequently, one can simply deposit, withdraw, send, and receive funds from their bank accounts through the M-Pesa platform.

Inequality Measure in Financial Inclusion: Barriers

The barriers indicator to financial inclusion was measured using two indicators; cost to the nearest financial institution and the cost to the nearest financial advisor. Table 7 summarized the estimation results.

Table 7. HOI Estimation Results for the Barrier Models

| Inequality Measure | Cost to the nearest financial institution | | Cost to the nearest financial advisor | |
|--------------------------------------|--|-------------------|--|-------------------|
| | Values | Std. Error | Values | Std. Error |
| Coverage (C) | 71.3264 | 0.2628 | 14.0696 | 0.2219 |
| Dissimilarity Index (D) | 14.7169 | 0.9773 | 30.7454 | 2.3130 |
| Human Opportunity Index (HOI) | 60.8293 | 0.3371 | 9.7439 | 0.1817 |
| Pseudo R^2 | 0.2133 | | 0.1277 | |
| Obs Logit | 21,954 | | 21,948 | |
| Obs | 21,954 | | 21,948 | |

Table 7 revealed a higher coverage rate and opportunity of an individual being financially included at 71.33% and 60.83% regarding the cost to the nearest financial institution. Conversely, regarding the cost to the nearest financial advisor, the coverage rate and opportunity of an individual being financially included were found to be lower at 14.07% and 9.74% respectively. The findings suggested that significant progress has been made in Kenya by financial service providers to ensure that financial products are within the reach of a majority of the population. This has been made possible through financial innovation which has seen a rapid increase in the number of bank branches, ATMs, MFIs, mobile bank agents, M-Pesa agents, Airtel Money agents, and so on. Albeit, these innovations have expanded the scope of financial inclusion in the country, there exist notable bottlenecks stemming from unemployment and illiteracy that still pose a challenge to financial inclusion prospects.

Shapley Decomposition by Education Level and Employment Status

To ascertain the extent to which the education level and or employment status of individuals

mattered for financial inclusion in Kenya, the Shapley decomposition technique was performed across the usage, access, and barrier models. The results are presented in Tables 8, 9, and 10 respectively.

Shapley Decomposition: Usage

The results are presented in Table 8.

Table 8. Shapley Decomposition of the D-Index: Usage Models

| Human Opportunity Index | Transactional account ownership | Bank account or (savings investments) | ATM Usage |
|--|---------------------------------|---------------------------------------|-----------|
| HOI | 0.01416 | 0.01833 | 0.06753 |
| D-Index | 0.34213 | 0.37233 | 0.38466 |
| Penalty | 0.00736 | 0.01087 | 0.04221 |
| Coverage | 0.02152 | 0.02920 | 0.10974 |
| Shapley decomposition of the D-Index (Percentage explained by each variable) | | | |
| Education level | 62.19 | 66.14 | 64.88 |
| Employment status | 37.81 | 33.86 | 35.12 |

Shapley Decomposition: Access

The results are presented in Table 9.

Table 9. Shapley Decomposition of the D-Index: Access models

| Human Opportunity Index | Mobile money account | Mobile banking account | Informal institution membership |
|--|----------------------|------------------------|---------------------------------|
| HOI | 0.24959 | 0.00182 | 0.47983 |
| D-Index | 0.17733 | 0.33214 | 0.01466 |
| Penalty | 0.05380 | 0.00090 | 0.00713 |
| Penalty | 0.30339 | 0.00272 | 0.48697 |
| Shapley decomposition of the D-Index (Percentage explained by each variable) | | | |
| Education level | 78.68 | 68.94 | 63.58 |
| Employment status | 21.32 | 31.06 | 36.42 |

Shapley Decomposition: Barriers

The results are presented in Table 10.

Table 10. Shapley Decomposition of the D-Index: Barrier models

| Human Opportunity Index | Cost to the nearest financial institution | Cost to the nearest financial advisor |
|--|---|---------------------------------------|
| HOI | 0.67594 | 0.11875 |
| D-Index | 0.04931 | 0.17154 |
| Penalty | 0.03506 | 0.02459 |
| Penalty | 0.71100 | 0.14334 |
| Shapley decomposition of the D-Index (Percentage explained by each variable) | | |
| Education level | 77.00 | 80.89 |
| Employment status | 23.00 | 19.11 |

Looking at the results in Tables 8, 9, and 10, the level of education of an individual explained the highest proportion of financial inclusion across the 3 models. This implied that education level and more particularly, financial literacy; was considered as the prime factor explaining the financial inclusion prospects in Kenya. The more educated an individual is, the more awareness he or she has with regard to access, usage, and barriers to financial products. Further, education level boosts the employability prospects of an individual; whether formal or informal. Generally, the estimation results reveal that both the education level and employment status of individuals are critical in realizing the SDG goal of reducing global financial inequalities by the year 2030.

Conclusions and Recommendations

This study sought to investigate whether the education level and employment status of an individual matter for financial inclusion in Kenya. The OLS regression results revealed that the two factors were indeed critical and significant drivers of financial inclusion in Kenya. Further, using the Shapley decomposition technique, the level of education, and more particularly, financial literacy; was found to be more astute in explaining the financial inclusion prospects in Kenya. Moreover, unlike in the usage models where the coverage rate and the Human Opportunity Index were lower, the access models depicted an increased pattern in the access to financial products in the Kenyan market. These findings implied that in Kenya, access to mobile money services was higher with a majority of the population having easy access to financial services through their mobile phones. Also, the majority of Kenyans saved and borrowed money through the informal institution group platform commonly referred to as the merry-go-rounds. Nevertheless, mobile banking accounts remained relatively untapped potential in the Kenyan financial market yet it offers a much quicker, safer, and more convenient model of conducting transactions.

To increase financial inclusion in Kenya, this study recommended that financial institutions step

up their efforts in bridging the financial information asymmetry gap. This can be realized through financial literacy which helps broaden people's awareness of the access, usage, and barriers to financial products. Additionally, there is a need for both the government and private sector players to create more employment opportunities as this is requisite in providing a steady income stream. This consequently, incentivizes account ownership for transaction purposes.

While this study was able to decompose financial inclusion along the education level and employment status lens in the COVID-19 pandemic era; future studies should comparatively analyze the financial inclusion levels using panel data under both the Pre-COVID and the COVID-19 pandemic eras. This feat was not achievable in the current research.

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| . | Education level | Employment status | Respondent's gender | Location | Respondent's age | Respondent's religion | Marital status | Household size | Shocks experienced | Green bonds | Monthly expenditure |
|-----------------------|-----------------|-------------------|---------------------|----------|------------------|-----------------------|----------------|----------------|--------------------|-------------|---------------------|
| Education level | 1 | | | | | | | | | | |
| Employment status | 0.2640 | 1 | | | | | | | | | |
| Respondent's gender | 0.0760 | 0.0998 | 1 | | | | | | | | |
| Location | 0.2547 | 0.1597 | 0.0023 | 1 | | | | | | | |
| Respondent's age | -0.1825 | -0.0589 | -0.0208 | -0.1674 | 1 | | | | | | |
| Respondent's religion | 0.1385 | 0.0563 | -0.0344 | -0.0768 | 0.0487 | 1 | | | | | |
| Marital status | -0.0077 | 0.0351 | 0.0618 | -0.0519 | 0.0828 | -0.0453 | 1 | | | | |
| Household size | -0.1408 | -0.1152 | -0.0301 | -0.1797 | -0.1723 | -0.1678 | 0.1923 | 1 | | | |
| Shocks experienced | -0.0058 | 0.0072 | -0.0199 | -0.0443 | 0.0841 | 0.1081 | 0.0817 | 0.0435 | 1 | | |
| Green bonds | 0.0136 | 0.0127 | 0.0137 | 0.0113 | 0.0063 | -0.0084 | -0.0015 | -0.0069 | -0.0077 | 1 | |
| Monthly expenditure | 0.2498 | 0.1848 | 0.0463 | 0.2563 | -0.0918 | -0.1471 | 0.1068 | 0.1013 | -0.0500 | 0.0245 | 1 |

Appendix Table A1: Pairwise Correlation Matrix



Narrativa Transmedia Corporativa: Un Modelo Para Promover el Compromiso por los Objetivos de Desarrollo Sostenible de la Agenda 2030

Tomas Atarama and Maria Delfino (Universidad de Piura, Peru)

Resumen

En el actual ecosistema mediático, las organizaciones tienen el reto de construir nuevas estrategias para conectar con los diferentes públicos de interés. En este contexto, la narrativa transmedia es aplicada en la comunicación corporativa para impulsar una mejora en la sociedad, ya que permite alcanzar a las audiencias, sensibilizarlas y motivarlas a sumarse al proceso de cambio. La presente investigación busca conocer cómo el uso de la narrativa transmedia corporativa propició el aumento del nivel de la vinculación emocional de la audiencia a favor de los Objetivos de Desarrollo Sostenible (ODS) propuestos en la Agenda 2030 para generar el cambio social. Para ello, se ha tomado como objeto de estudio tres campañas de éxito de los últimos años: #YoSoyYVoyA - LifeStreams (2019) de la Fundación Peruana contra el Cáncer, Banco igualitario (2020) de Scotiabank y La regla no es un tema, la violencia sí (2020) de LadySoft. A partir de la metodología de análisis de caso, donde se estudió los mensajes, el ecosistema de difusión de los contenidos y las dinámicas de participación de la audiencia, se demuestra que el éxito de las campañas estudiadas se debe a una correcta articulación de una serie de herramientas para la generación del compromiso por el cambio social basadas en las cuatro claves de la narrativa transmedia: macrohistoria, puntos de contacto, audiencia activa y mundo transmedial.

Palabras Claves: Narrativa transmedia, comunicación corporativa, compromiso, Agenda 2030 y cambio social

Introducción

La llegada de Internet y la proliferación de nuevas tecnologías ha propiciado cambios en “la forma de comunicarse entre las personas, la forma de estar informados, los hábitos en el consumo de medios, la manera de adquirir productos y servicios, etc.” (Gómez, 2016, p. 375). Como apunta Scolari (2019), “estamos viviendo una transición de una ecología de medios, hegemonizada por el *broadcasting*, a otra donde esa centralidad comienza a ser ocupada por el *networking*” (p. 45). “Todo nuestro entorno está en red; estamos inmersos en la era de la convergencia” (Loizate, 2015, p.7). “Hemos pasado de interactuar de uno a uno, o de uno a varios o, como mucho, en pequeños grupos, a relacionarnos todos con todos” (Costa-Sánchez y Túnñez-López, 2018, p. 13).

Antes de la Web 2.0., el consumidor era pasivo. Ha dejado de ser oyente para sumergirse en la conversación (Loizate, 2015). Ahora existe la figura del prosumidor: capaz de consumir y producir

contenido. Se trata de aquellos usuarios que consumen el contenido, lo comparten, conversan y crean contenido (Scolari et al., 2014), principalmente a través de espacios digitales como las redes sociales. “Su opinión cuenta; pues al ser proactivos, expresan lo que piensan con el fin de ayudar a los demás” (Jordán et al., 2017, p. 180). Son adprosumidores, es decir, sirven de referencia a otros al revelar su grado de satisfacción o insatisfacción (Costa-Sánchez y Túñez-López, 2018). Por lo tanto, estos nuevos consumidores tienen el poder de ejercer influencia en la toma de decisiones de determinados públicos.

En el actual ecosistema mediático, las organizaciones han cambiado la forma en que se comunican con sus diferentes públicos de interés. Han dejado de ejercer “el monopolio discursivo sobre sí mismas, sus productos o sus servicios” (Costa-Sánchez y Túñez-López, 2018, p.17). Ya no es posible imponer una historia oficial, pues “son los públicos quienes la aceptan o rechazan, interpretan, matizan e implementan” (Mañas-Viniegra, 2017, p. 1128). Se han convertido en receptores críticos (Rodríguez et al., 2017) y cada vez están más empoderados (Pineda-Martínez y Ruiz-Mora, 2019). “Esta es la esencia del prosumidor: atribuir poder a través de la emancipación de medios. Él es libre de hacer lo que considere con la información que propone” (Jordán et al., 2017, p. 181).

Hoy en día, los profesionales de la comunicación corporativa deben construir estrategias que les permitan alcanzar a un público saturado de información, “encadenado a las nuevas tecnologías e inmerso en el fenómeno multipantalla” (Costa-Sánchez, 2014, p. 146). En este contexto, “el contenido se ha convertido en un elemento distintivo y de valor para conectar con los públicos” (Mut y Miquel, 2019, p. 225). Castelló y Del Pino (2018) apuntan que los mensajes no deben ser invasivos o intrusivos, sino ser valiosos para la audiencia. El uso del *storytelling* juega un rol fundamental por su capacidad apelar a las emociones.

“El nuevo discurso organizacional se compone de historias que permiten a las compañías transmitir su identidad y propiciar la construcción de una imagen favorable que, a largo plazo, se traduzca en una buena reputación” (Delfino, 2022, p. 34). Costa-Sánchez (2014) indica que se deben construir relatos que capten la atención, provoquen emoción y ayuden a retener el mensaje. De ahí que exista el desafío de evolucionar hacia la creación de estrategias narrativas que involucren la participación de los diferentes públicos y puedan ser consumidas desde espacios digitales y no digitales (Pineda-Martínez y Ruiz-Mora, 2019). Este es el caso de la narrativa transmedia o *transmedia storytelling*.

Scolari (2013) define a la narrativa transmedia como “un tipo de relato donde la historia se despliega a través de múltiples medios y plataformas de comunicación, y en la cual una parte de los consumidores asume un rol activo en ese proceso de expansión” (p. 46). No es necesario abordar la experiencia de medios en su totalidad, pues cada punto de contacto contribuye de manera específica a la construcción y comprensión del mundo (Delfino, 2022). Ocurre “un proceso de hibridación de los diferentes modos narrativos así como la confluencia de soportes que, a su vez, son transformados en narración” (Guardia, 2013, p. 260). Por consiguiente, “no se trata de una adaptación o traducción intersemiótica, sino de que en cada medio se ofrece un contenido nuevo narrativamente hablando” (Moya y Moya, 2018, p.37).

Asimismo, este modelo de comunicación, propio de la convergencia mediática, permite generar, principalmente, un alto nivel de vinculación emocional o *engagement* con los diferentes públicos de interés. Según Coombs (2019), uno de sus grandes beneficios es la capacidad de involucrar a las personas en el mundo de las historias. En palabras de Mut y Miquel (2019), fomentar la participación activa y la implicación de las audiencias. Para Dionisio y Nisi (2021), la narrativa transmedia sirve para involucrar, inspirar y reunir a los usuarios en espacios digitales y no digitales. Atarama-Rojas (2019) agrega que la conexión será mucho más fuerte si cada extensión del relato global ofrece un nuevo nivel de desarrollo e información adicional que resulte de interés.

Desde los aportes de Díaz-Duarte y Moreno-Cano (2018), “los universos transmedia transforman el consumo de las historias y brindan la libertad de proponer nuevos giros o formas de disfrutar del relato” (p. 85). Se construyen “mundos narrativos (*storyworlds*) que abarcan diferentes medios/plataformas y experiencias de producción/consumo” (Scolari y Establés, 2017, p. 1017) donde los públicos pueden convertirse en co-creadores de contenido. Tienen “la oportunidad de generar y/o modificar las narraciones creadas aportando nuevas miradas sobre el relato” (Guardia, 2013, p. 260). En este punto es necesario destacar la importancia de las plataformas de contenido por el usuario entendidas como espacios de código abierto permiten enriquecer el entorno narrativo (Scolari, 2009).

Por otro lado, existe una mayor preocupación e interés respecto a las problemáticas que acontecen en la sociedad. Cada vez son más las demandas de un comportamiento socialmente responsable. Para los grupos de interés, las organizaciones deben pronunciarse y actuar con causa (Estanyol, 2020). En efecto, diversos profesionales del campo están optando por implementar a la narrativa transmedia corporativa en la comunicación de acciones con fines sociales. En palabras de Costa-Sánchez y López-García (2021), se trata de proyectos “que pretenden algún tipo de concienciación o de cambio en la sociedad” (p. 238).

La narrativa transmedia permite impactar a diferentes públicos, sensibilizarlos e involucrarlos en el proceso de cambio social. De acuerdo con Pinto y Ríos (2018), “promueve la inclusión de la audiencia a través de una cultura colaborativa en las estrategias de desarrollo y expansión del mensaje” (p. 222). Robledo-Dioses y Atarama-Rojas (2021) agregan que para garantizar el compromiso de la comunidad y su participación en proceso transformador en beneficio de la sociedad es fundamental la generación de vinculación emocional. Desde los aportes de Green et al. (2004), la construcción de historias que conectan emocionalmente potencian el cambio social positivo, educan a los públicos, los involucran en determinadas temáticas y los llevan a la acción. En línea con la naturaleza del proyecto, la participación puede darse en cinco niveles (de menor a mayor): afinidad, sensibilización, concienciación, involucramiento y movilización (Costa-Sánchez y López-García, 2021).

Por su parte, García (2021) apunta que, para lograr construir una sociedad más inclusiva, igualitaria y sostenible es fundamental implementar acciones de comunicación capaces de empoderar a la ciudadanía y movilizar a favor del cumplimiento de los Objetivos de Desarrollo Sostenible (ODS). Por consiguiente, se crean proyectos transmedia corporativos que evidencian

el compromiso de las organizaciones por el cambio social, el cual puede estar alineado al logro de los objetivos propuestos en la Agenda 2030 adoptada por la Organización de las Naciones Unidas (ONU) que consiste en un “plan de acción a favor de las personas, el planeta y la prosperidad, que también tiene la intención de fortalecer la paz universal y el acceso a la justicia” (Naciones Unidas, 2015).

Tras realizar una aproximación teórica, a continuación, se presenta el análisis de tres casos peruanos donde el uso de la narrativa transmedia corporativa propició el aumento del nivel de la vinculación emocional de la audiencia a favor de los objetivos propuestos en la Agenda 2030 para generar el cambio social. De esta manera, se podrán conocer las diferentes herramientas basadas en las cuatro claves de la narrativa transmedia (macrohistoria, puntos de contacto, audiencia activa y mundo transmedial) que han sido implementadas para la generación de compromiso por la mejora de la sociedad.

Metodología

En la presente investigación se aplica la metodología de análisis de caso que contempla el estudio de los mensajes, el ecosistema de difusión de los contenidos y las dinámicas de participación de la audiencia. Para ello, se ha tomado como objeto de estudio tres campañas peruanas de éxito de los últimos años: #YoSoyYVoyA - LifeStreams (2019) de la Fundación Peruana de Cáncer, Banco igualitario (2020) de Scotiabank y La regla no es un tema, la violencia sí (2020) de LadySoft. La elección se debe a los resultados en medios digitales y al reconocimiento obtenido a nivel nacional e internacional. A continuación, se desarrolla cada una de estas:

#YoSoyYVoyA - LifeStreams

La Fundación Peruana de Cáncer es una organización sin fines de lucro, fundada en 1960 por Frieda Heller y el Dr. Eduardo Cáceres con el propósito de salvar vidas y aliviar el sufrimiento causado por el cáncer en el Perú (Fundación Peruana de Cáncer, 2022). Su misión es brindar asistencia integral a las personas con cáncer más necesitadas y contribuir a elevar los estándares de atención y tratamiento de dicha enfermedad (Fundación Peruana de Cáncer, 2022). A través del albergue Frieda Heller, la FPC ofrece a los pacientes de escasos recursos diversos beneficios como hospedaje, alimentación, transporte, asistencia social, apoyo psicológico, espiritual, emocional, entre otros.

Cada 04 de febrero se conmemora el Día Mundial contra el Cáncer, una enfermedad que anualmente llega a la vida de más de 69 mil peruanos (Ministerio de Salud, 2022). En el 2019, la FPC se unió a la campaña internacional #IAmAndIWill promovida por la Union for International Cancer Control (UICC) y, en colaboración con la agencia Wunderman Thompson, lanzó #YoSoyYVoyA - LifeStreams, la cual buscó generar conciencia sobre la enfermedad e involucrar a más personas en la lucha contra el cáncer. Esta iniciativa destacó por el uso de contenido en vivo en Instagram y la participación de líderes de opinión quienes prestaron su voz a los niños del Albergue Frieda Heller a través de la herramienta *Go live with a friend*.

El lanzamiento de Lifestreams fue un éxito. En tan solo 24 horas se logró generar 51 millones de impresiones, incrementar la conversación de marca en un 1228 %, multiplicar el número de donantes en 10 veces y recaudar una cifra mayor a la de los últimos 6 meses con una donación promedio por persona de 14 dólares (Wunderman Thompson Perú, 2019). En consecuencia, obtuvo el galardón de plata en el Premio Ideas, en la categoría Social Media & Content – Mejor uso de influencer o celebrities y el premio de bronce en dos festivales internacionales: El Sol y Ojo de Iberoamérica en las disciplinas Digital y Móvil, y Ojo Digital & Social, respectivamente (El Ojo de Iberoamérica, 2022). Asimismo, en Cannes Lions quedó finalista en PR (Mercado Negro, 2019b).

Banco Igualitario

Scotiabank es el banco líder en Canadá y un destacado proveedor de servicios financieros en las Américas, con una trayectoria de 188 años a nivel mundial. Scotiabank Perú inició sus operaciones en 2006 y actualmente, junto con CrediScotia Financiera, Profuturo AFP, Scotia Bolsa, Scotia Fondos, Scotia Titulizadora, Scotia Contacto y Caja Cencosud, conforman uno de los grupos financieros más importantes del país (Scotiabank, 2022). En el 2014, la Asociación Perú 2021 otorgó a la entidad bancaria el Distintivo Empresa Socialmente Responsable (ESR) por tercer año consecutivo. En su página web, se presenta como un banco consciente y humano que trabaja por el bienestar de las familias, sus clientes y el país (Scotiabank, 2022).

En marzo de 2020, en marco del Día Internacional de la Mujer, Scotiabank y Wunderman Thompson lanzaron la campaña *Banco igualitario* con el objetivo de sensibilizar a la población en relación con la brecha salarial de género en el Perú, la cual es de casi el 30% (Gestión, 2022). Para ello, cada una de las mujeres que abrieron una cuenta el 09 de marzo recibió un 29,6% adicional en Scotia Point, puntos que se podían usar como dinero real. Para determinar este salario adicional, el banco desarrolló un algoritmo que compara los salarios de las clientas con los de los hombres, considerando variables como la edad, la ocupación, la educación y la ubicación geográfica (Wunderman Thompson, 2020).

La iniciativa fue reconocida con tres galardones en el Ojo de Iberoamérica, Oro en la categoría Direct, Plata en Sostenible y Mejor Idea Perú. Al año siguiente, en los Cannes Lions, obtuvo el león de bronce en la disciplina Relaciones Públicas, Imagen Corporativa, Comunicación y Gestión de la Reputación y logró quedar finalista en Objetivos de Desarrollo Sostenible. También recibió dos premios de Relaciones Públicas en los CLIO Awards: Bronce en la subcategoría Imagen Corporativa y Plata en Causa relacionada.

La Regla no es un Tema, la Violencia Sí

Softys es una empresa líder en el mercado de higiene personal y limpieza con más de 40 años de trayectoria en América Latina. Es propietaria de Ladysoft, una marca de protección femenina que inspira a las jóvenes a vivir y pensar sin límites ofreciéndoles una amplia línea de productos (Softys, 2022). En línea con el propósito de cuidar a las mujeres y acompañarlas en cada etapa

de sus vidas, Ladysoft Perú busca crear consciencia de la situación de violencia a la mujer en el país (Mercado Negro, 2020).

Según el Instituto Nacional de Estadística e Informática (citado en Mercado Negro, 2020), el 32,2% de las mujeres fueron víctima de una forma de violencia física y/o sexual por parte de su cónyuge o pareja en el 2020. Ante esta coyuntura, la marca organizó la marcha virtual denominada *La regla no es un tema, la violencia sí*, la cual se llevó a cabo el 02 de octubre en el Día Internacional de La No Violencia y contó con la participación de Magdely Ugaz, una reconocida actriz y conductora de televisión peruana, como vocera.

El público podía sumarse a la iniciativa a través de la página web www.laviolenciasiesuntema.pe y personalizar su cartel utilizando el hashtag #LAVIOLENCIASIESUNTEMA desde semanas previas a la fecha de convocatoria. El 02 de octubre a las 5:00 p. m., la primera marcha virtual contra la violencia en el Perú fue transmitida en vivo en las redes sociales de Ladysoft y en diversas pantallas digitales ubicadas en Lima (Brief, 2020). Al año siguiente, la campaña fue galardonada con Oro en los Premios Effie 2021.

Para conocer cómo el uso de la narrativa transmedia corporativa propició el aumento del nivel de la vinculación emocional de la audiencia a favor de los objetivos propuestos en la Agenda 2030 para generar el cambio social, se procede a analizar cada una de las campañas presentadas a partir de las 4 claves de la narrativa transmedia: macrohistoria, puntos de contacto, audiencia participativa y mundo transmedial.

Sobre cada una de las iniciativas se hará un estudio de los mensajes, el ecosistema de difusión de los contenidos y las dinámicas de participación de la audiencia que conforman el mundo transmedial.

Resultados

#YoSoyYVoyA - LifeStreams

La campaña #YoSoyYVoyA – *LifeStreams* de la Fundación Peruana de Cáncer pone en manifiesto una de las principales problemáticas del país. Según el Ministerio de Salud (2022), más de 175 000 personas en el Perú padecen de cáncer y reciben atención oncológica continua. Además, da a conocer el aporte de la organización para contrarrestar dicha situación: Brindar asistencia integral a los pacientes con cáncer más necesitados y contribuir a elevar los estándares de atención y tratamiento oncológico en el Perú (Fundación Peruana de Cáncer, 2022).

La narrativa está construida desde las voces reales de los pacientes con cáncer. Los niños del Albergue Frieda Heller se convierten en los protagonistas de la macrohistoria y cuentan sus testimonios de lucha contra la enfermedad para sensibilizar a la audiencia meta que es la sociedad en general, así como generar vinculación emocional e incentivar a que se sume a la

campaña de recaudación de fondos. Estas historias se difunden a través de un ecosistema digital donde destaca el uso de contenido en vivo en Instagram y la participación de líderes de opinión. La agencia Wunderman Thompson decidió utilizar *Go live with a friend*, una funcionalidad de Instagram lanzada a finales de octubre de 2017 que permite transmitir en vivo junto a una persona dividiendo la pantalla en dos partes (Instagram, 2017). Mathias Brivio, Raúl Romero, Ximena Galiano, entre otros influencers de diferentes ocupaciones, convocan a una transmisión desde sus cuentas personales de Instagram (Mercado Negro, 2019a). Luego, con el botón “Agregar”, unen a los pacientes de cáncer al *live* y les ceden la palabra. Finalmente, invitan a los usuarios a donar a través del sitio web de la FPC (<https://fpc.pe/>) y la plataforma Joinnus (<https://www.joinnus.com/donacion/fpc>) (Mercado Negro, 2019a).

Es importante destacar que la FPC ha diseñado un sitio web que no solo plasma su historia, logros e iniciativas, sino también sirve como plataforma de donación. A través de la pestaña *Dona ahora*, las personas pueden realizar un aporte monetario a la causa de forma online desde cualquier parte del Perú y del mundo. Los donantes pueden escoger el tipo de moneda, el monto, el tipo de donación (mensual o única) y el método de pago según sus preferencias. En relación con Joinnus, se trata de una plataforma virtual que reúne eventos disponibles en una determinada ciudad y permite a los usuarios inscribirse o comprar entradas (UTEC, 2017).

El ecosistema de difusión de contenidos también incluye piezas gráficas en las redes sociales (Instagram, Facebook y Twitter), puntos de contacto que incentivan la participación de la audiencia en la conversación social. En las publicaciones se etiqueta al influencer y se hace uso de los siguientes hashtags: #YoSoYVoyA, #DíaMundíacontraElCáncer, #FPC y #FundacionPeruanaDeCancer. Estas dos acciones contribuyen a que exista mayor notoriedad en el entorno digital.

Otros de los puntos de contacto son los medios ganados. De acuerdo con Wunderman Thompson Perú (2019), la campaña generó más de 50 millones de impresiones y rebote en prensa (El Comercio, Ojo, Mercado Negro, Stakeholders, La Industria, Lucidez) y televisión (TV Perú, América, RPP Noticias). A pesar de no ser canales propios de la FPC, permitieron que las voces de los niños con cáncer se multipliquen y alcancen a más audiencias.

Es así como, a través de la construcción de este mundo transmedial que transmite el propósito de salvar vidas y aliviar el sufrimiento causado por el cáncer (Fundación Peruana de Cáncer, 2022), la Fundación Peruana de Cáncer reafirma su compromiso con el ODS 3 – Salud y Bienestar.

Banco Igualitario

La sostenibilidad es pieza fundamental de la forma de hacer negocios de Scotiabank, por ello su gestión está enfocada en los Objetivos de Desarrollo Sostenible (Scotiabank, 2022). En línea de su compromiso con Igualdad de Género (ODS 5) y la Reducción de las Desigualdades (ODS10), la entidad bancaria, en colaboración con Wunderman Thompson, lanza *Banco igualitario*. Esta campaña refleja una de las principales problemáticas sociales del país: la brecha salarial.

En el Perú, la diferencia entre los sueldos entre hombres y mujeres continúa latente. La cifra se incrementó a casi 30% en la zona urbana del país durante el 2021 (Gestión, 2022). A pesar de que la Ley N°30709 prohíbe la discriminación remunerativa, existe una brecha salarial en favor de los hombres de S/ 506 soles en promedio (Caretas, 2022). En el marco del Día Internacional de la Mujer, Scotiabank se compromete a cambiar esta situación.

Se desarrolla un algoritmo que compara los salarios de las clientas con los de los hombres y, a partir del análisis de diferentes variables, se otorga un salario adicional (Wunderman Thompson, 2020). Las mujeres que abrieron una cuenta sueldo en el mes de marzo recibieron un 29,6% extra en Scotia Point, bonificación que se puede usar como dinero real. Es así como Scotiabank Perú transforma su programa de fidelidad en una innovadora iniciativa para generar conciencia y contrarrestar la brecha salarial entre hombres y mujeres.

El principal punto de contacto con la audiencia meta es la entidad bancaria, ya que las mujeres deben acercarse presencialmente para abrir una cuenta y así obtener el salario adicional. Como parte del ecosistema de difusión de contenidos, en todas las sucursales de Scotiabank Perú se colocan posters, carteles, folletos y materiales promocionales. Otro punto de contacto importante es el entorno digital. A través del sitio web y la aplicación móvil de Scotiabank se canjean los Scotia Points. En relación con las redes sociales, en Facebook se realizan publicaciones y en Instagram, historias. También se hace uso del mailing.

La Regla no es un Tema, la Violencia Sí

En el Perú existen altos índices de violencia contra la mujer. “Reportes oficiales apuntan que 7 de cada 10 mujeres adultas han sido víctima de violencia psicológica, física y/o sexual en algún momento de su vida” (Contreras-Urbina et al., 2021). El aislamiento debido a la COVID-19 ha agravado esta situación. Las llamadas a las líneas de atención de casos de violencia en el hogar aumentaron durante la pandemia (ONU Mujeres, como se citó en Plan Internacional, 2021). Frente a este contexto, LadySoft implementa *La regla no es un tema, la violencia sí* con el objetivo de sensibilizar a la sociedad en general sobre la situación de violencia de género en el Perú e invitarlos a participar de una marcha virtual. La campaña lanzada en marco del Día de la No Violencia está alineada a los ODS 5 - Igualdad de Género y ODS 16 – Paz, Justicia e Instituciones Sólidas.

El principal punto de contacto es la página web www.laviolenciasiesuntema.pe diseñada por LadySoft exclusivamente para esta iniciativa. A través de la plataforma, los diversos usuarios pueden sumarse a la marcha virtual y personalizar un cartel con un texto, su nombre y foto acompañados de los hashtags #Laviolenciasiesuntema y #NiUnaMenos. El contenido creado por los usuarios se transmite en el Día Internacional de la No Violencia a través las redes sociales de la marca, Facebook e Instagram, y diversas pantallas digitales ubicadas en Lima (Brief, 2020). Otro punto de conexión con la audiencia meta es Magdyel Ugaz, embajadora de Ladysoft e influencer, quien comparte la campaña en redes sociales y participa en entrevistas. El ecosistema mediático digital también incluye el uso del sitio web oficial y las redes sociales previo al evento para informar sobre la iniciativa e invitar a los usuarios a participar. Finalmente, es importante

agregar que los medios de comunicación como periódicos, radios y portales web representan un rol clave en la difusión de la primera marcha virtual en contra de la violencia.

Conclusiones

Actualmente, las organizaciones tienen una mayor necesidad de contribuir a la mejora de la sociedad. Para ello, los profesionales de la comunicación corporativa deben ser capaces de construir estrategias que evidencien el actuar socialmente responsable para impulsar una mejora en la sociedad. En efecto, es recomendable apostar por el uso de la narrativa transmedia corporativa pues, a través de historias con sentido completo que se diseminan en múltiples medios y que propician la participación activa, es posible alcanzar a los distintos públicos, sensibilizarlos y motivarlos a sumarse al proceso de cambio.

Las campañas transmedia analizadas presentaron una narrativa que pone en relieve problemas reales de la sociedad peruana y de qué manera se contribuirá a contrarrestar la situación. Esto permite reafirmar el compromiso de las organizaciones con el logro de los objetivos de la Agenda 2030, específicamente: Salud y Bienestar (ODS 3), Igualdad de Género (ODS 5), Reducción de las Desigualdades (ODS10) y Paz, Justicia e Instituciones Sólidas (ODS 16).

Por otro lado, se muestra el diseño de un ecosistema de difusión de contenidos afín a las audiencias meta. Se utilizaron puntos de contacto, como las redes sociales, que fomentaron la conversación, la interacción y el sentimiento de comunidad. En el entorno digital, las plataformas de aporte o donación a una causa representaron una oportunidad para la audiencia de movilizarse y convertirse en protagonista del cambio social. También fue fundamental la participación de líderes de opinión como embajadores de las campañas.

Por último, en la presente investigación se demuestra que el éxito de *#YoSoyYVoyA – LifeStreams*, *Banco igualitario* y *La regla no es un tema, la violencia* sí se debe a una correcta articulación de una serie de herramientas para la generación del compromiso por el cambio social basadas en las cuatro claves de la narrativa transmedia: macrohistoria, puntos de contacto, audiencia activa y mundo transmedial.

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Addressing the Growing Gender Inequalities in New Conflict Areas in Africa: The Case of Cameroon and Nigeria

Ayuk Justine Eta, Helen Linong-Fontebo, and Emmanuel Yenshu
(University of Buea, Cameroon)

Abstract

New conflicts in the post-Cold War era destabilize and lead to new inequalities that significantly restructure African societies. These are either low intensity conflicts or short-lived civil wars with political motives proposed by radical Islam or secessionist movements (violent or peaceful). African societies are evolving towards a situation where gender inequalities are narrowing or gaps bridged for some segments in some countries, there is regression in achievements, stagnation in relation to gender equality and deterioration of conditions in conflict areas. This requires concerted efforts through partnerships at national and international level involving governments, non-governmental agencies and private organizations with the capacity to significantly influence the course of action. This paper sets out to study the impact of conflicts on the rights and status of women in two conflict areas in Africa with limited reference to some field research. The paper highlights the perverse effects of conflicts as they dislocate societies putting a halt to overall development, overturn values and result in losses for agency and value for women and girls. The gains in improvement in gender relations or a narrowing of gender gaps are eroded putting into question prospects of achieving development goals related to gender equality (Goal 5) and equality in general (Goal 10). The call is for more vigorous action not only to put an end to peace as a condition for development but to focus on the problems that arise out of conflict zones, notable amongst which are gender inequalities.

Keywords: gender, conflict, violence, vulnerability, inequality, development, partnership.

Purpose

The end of the Cold War in the late 1980s and the beginning of the 1990s was marked by a decline in armed conflicts of the type that characterized inter-state relations culminating to the Second World War and the balance of terror of the bipolar Cold War era with its proxy wars and wars. In fact, the World Bank and the Human Security Report Project (2008: 9) reported optimistically that:

The world is becoming less war-prone. The number of civil wars dropped by three-quarters from 1992 to 2005, ... (and) the number of international conflicts has been falling since the mid-1970s – the most sustained decline in two activities.

This development was relative because the transition from the Cold War into a new international situation generated new types of conflicts. New conflict spots have risen in the backdrop of new stakes such as the bid for new nationhood status, Islamic religious fundamentalism developing within a peculiar form of clash of civilizations – to borrow from Samuel Huntington (1996)- and the rebirth or revival of identity questions within the nation-state of the post-World War II system. The new conflicts affect societies in which they take place in several ways ranging from human insecurity, disorganization of community life, displacement (internal or external) and psychosocial disorders to loss of strategic rights and vulnerabilities of all kinds. It is within the same period that the United Nations developed, advocated and fostered the Millennium Development Goals (MDGs) to be followed later by Sustainable Development Goals (SDGs) among which are Goals 5 (gender equality) and 10 (reduced inequality). The new conflicts that have arisen within this period seem to be eroding the strategic gains made by multilateral organizations, governments and advocacy groups in the domain of gender relations whether these are within the scope of previous initiatives (notably the Beijing platform for Action which specifically addresses women and armed conflict as one of the 12 critical areas of concern) or within the scope of the development goals.

This paper seeks to examine the developments by critically analyzing the peculiarities of these conflicts and how they are resulting in new forms of gender inequality and abuses that frustrate efforts at reducing such as well as propose collaborations or partnership structures that can minimize gender inequality. This paper makes the point that although action is taken to tackle the conflicts either within the states as the depositories of sovereignty or through collaborations at inter-state and multilateral levels within the context of the war on terror and assist states from failing, these are global level actions that do not target deleterious effects at societal level as one observes with dislocations, regression in gains in gender relations and abuses that debase the humanity of women and girls and that concerted efforts among African countries can make a significant difference in achieving gender equality. The latter catch the attention of the international community, the global powers, state actors, powerful international and national civil society actors, and vocal activities from influential personalities who could collectively address these societal level issues but who seem not to be able to do anything beyond denouncing or very little to salvage the situation. Partnerships between organizations from different sectors in the search for solutions to complex global issues and challenges have increased significantly in recent times. Such collaborations are critical in bringing together people and organizations with diverse experiences and resources to coordinate efforts and tackle common challenges especially gender inequality aggravated by conflicts. Gender equality and empowerment of women and girls are both goals within the 2030 Agenda and drivers of sustainable development in several other goal areas of the SDGS (UNWOMEN, 2018). There is therefore a need for new mobilization efforts that will bring varieties of actors on board in global coalitions to synergize in tackling the problem of gender inequalities, inequities and abuses (target of Goal 5) that are emerging from the new conflicts and conflict areas.

This paper will start with an analysis of conflicts and then proceed to an examination of how they have affected the social contexts where they take place as well as how this has led to gender abuses and widen gender gaps. It will also critically examine how gender power relations

influence, and are influenced by paying attention to the differential impact on men, women, boys and girls in conflict prone communities. The paper ends with research limitations, implications and contributions.

Methods

This contribution uses the comparative case study approach in some trouble spots across the African continent. The situation in North East Nigeria and the English speaking regions of Cameroon is examined using documents and reports as well as some limited ethnographic work. The communication that is based largely on already published sources and some field work will also use the case studies of Boko Haram in the North East of Nigeria and parts of surrounding countries (Cameroon, Chad, and Niger) and the conflict in the English speaking zones of Cameroon (Ambazonia insurrection) as well as carried out a documentary analysis of partnerships that can enhance gender equality in conflict areas. These reports are then discussed in-depth in relation to the literature, gender preoccupations and prospects for action.

Findings

New Trends in Conflicts in Africa

The African continent has over the last thirty to forty years witnessed an upsurge in novel forms of conflict that have been labeled variously as “new wars” (Hagg and Kagwanja 2008: 13; Kaldor 2001) that cut across all regions. These conflicts either come to graft unto older ones or arise out of the new context of globalization and the end of the Cold War that have ushered in what Amin Maalouf (2009) has termed as deregulation of the world or George Corms “new world disorder” (Corm, 1993). Being less inter-state and more of intra-state confrontations but also internationalized with transnational outlooks, they have been classified in different ways by different authors. Working on the African Peer Review Mechanism (APRM) assessment reports on conflicts around the continent, Gluhbegovic identified five types, namely civil interest political conflicts, identity conflicts, resource-based conflicts and terrorism (Gluhbegovic, 2016: 2). Bujra (2002: 6-13), on his part, identified six types of conflicts in addition to inter-state conflicts: rebellions to overthrow governments, secessionist rebellions, coup d'états, Cold War sustained conflicts, many sided conflicts to seize power, rural conflicts over resources and urban conflicts. These two typologies overlap and intersect in that the first five in the second typology are political conflicts while rural conflicts are resource based conflicts. Terrorism is rather a conflict mode while identity points to the stakes behind some of the conflicts. Urban conflicts, on their part, may have a variety of stakes.

These new conflicts have led scholars to think of the post-Cold War era as one which is “unarguably a world of wars and conflict... that of increased civil wars and intra-state conflicts” and thus define the “global landscape” (Enuka, 2012: 19; cf. also Mamdani, 2004, 2009; Wieviorka, 2010). They are considered as largely social rather than inherently political in character such as those of the Cold War era or the preceding epochs in world history (Azar, 1990). They have tended to be destabilizing, disruptive and destructive of social systems characterized as

they are by “unspeakable acts of violence and brutality... new barbarism, an expression of senseless and irrational convulsion of violence” (Enuka, *ibid*: 20). One can add the erosion of social and cultural orders and the open criminalization of societies. The social or societal nature of the new conflicts is thus reflected in their direct impact on the internal social order whereas classical inter-state conflicts were otherwise restricted to battlefields or strategic targets. Some of the observable and recorded impacts have been displacement of populations (whether internal as IDPs or externally as refugees), ensuing humanitarian crises reflected in despondency, homelessness, loss of livelihoods, high death rates among non-combatants, insecurity, the dislocation of social and communal fabrics, a recession in efforts at development and, associated with the latter, unemployment and pauperization (cf. also Aremu, 2010: 554-556).

After having experienced a period of relapse within the years following the years at the end of the Cold War, the development agenda is returning to African countries either directly as in the case of the Development Plans of Cameroon and the continental Agenda 63 or indirectly through “emergence agendas” for a variety of countries (Cameroon, Ivory Coast, Kenya). However lofty these agendas and plans may be, they do not factor the likelihood of conflicts into the equation although it is evident that conflicts retard development and destroy gains made in preceding periods in all domains. The losses are material, social and cultural among which are disruptions in social relations (rights, values, underlying inter-human and intergroup relations). Notable among the latter are the gains that have been made over the years in gender equality and equity including the adoption of UN Security Council Resolution 1325 on Women, Peace and Security where the international community affirmed for the first time that women were not only victims of armed conflicts, but that their potentials must also be harnessed to play an active role in conflict resolution, state building and in all phases of peace processes, thus including a gender perspective in peace and security policy measures.

Insurgencies constitute some of the most socially destructive conflicts in contemporary Africa. They have actually become some of the most obvious forms of armed conflicts around the world with a high cost in material damage, lives, insecurity, psychosocial damage and destruction to the social fabric and communities. Metz and Miller (2004: 2) define insurgency as:

A strategy adopted by groups which cannot attain their political objectives through conventional means or by a quick seizure of power ... characterized by protracted, asymmetric violence, ambiguity, the use of complex terrain (jungles, mountains, urban areas), psychological warfare, and political mobilization all meant to protect the insurgents and eventually alter the balance of power in their favor.

The aim may be as broad as “seizing power” (*ibid*), limited to “separation, autonomy, or alteration of a particular policy” (*ibid*). In that regard, they are characterized by a low level of military sophistication because of inaccessibility to high level conventional weapons, this limiting them to low intensity confrontations. Very often, the aim of the insurgency is to create an impression, inflict moral pain and create a psychological impression rather than win a war. That is why they “avoid battle spaces where they are weakest - often the conventional military sphere – and focus on those where they can operate on more equal footing, particularly the *psychological and the*

political" (ibid, underlining by the authors). Because of the lack of substantial means, insurgents also resort to criminal means such as "smuggling, robbery, money laundering, counterfeiting, merchandise pirating, illegal use of charities, racketeering, and extortion" (ibid: 4). This is where insurgency, illegality and crime intersect so far as financing is concerned. The link is so aptly presented in the interrogation by the World Bank and Human Security Report Project (op. cit.: i-ii): "Is there any practical difference between a criminal gang which grows narcotics and guards its crops with guns, and insurgents who grow drugs to finance their rebellion". Kaldor (op. cit.: 49, quoted in Erika 2012: 20) has also identified a "blurring of the distinctions between warfare, organized criminality and "large-scale violations of human rights".

Metz and Meller (op. cit. 2-3) have classified insurgencies into liberation and national insurgencies although they caution against taking the distinction too rigidly. Whatever the case, the interest for us is the social/sociological impacts which the World Bank and Human Security Report Project sum up in the concept of human insecurity, that is, "[t]he complex of interrelated threats associated with international war, civil war, genocide, and the displacement of populations. Human security means at minimum, freedom from violence and the fear of violence" (op. cit.: i). Next will be a description of the two insurgencies mentioned before an analysis of the impact on development and gender relations.

Two major conflicts broke out in Cameroon in the 2010-2020 years. When the country was celebrating the golden jubilee of its reunification in 2014, the Boko Haram insurgency in Northern Nigeria had made in-roads into the northernmost part of the territory. This posed a major challenge to the country's security before a low-intensity insurrection broke out in the English speaking administrative regions of the North West and South West. While the Boko Haram insurgency was an off-shoot of an Islamic international movement purporting to create a caliphate or Islamic State within the scope of the Islamic State in West Africa Province (ISWAP), and, thus, driven by religious motives, the second movement claims it is out to enable the separation of the two English speaking regions from the rest of the country to create a new nation and state called Ambazonia.

Both conflicts with the state have identity undertones, one being religious and the other working on socio-linguistic differences. They are violent, armed (even if the arms lack sophistication) and draw from post-Cold War tactics of small group insurrections/insurgencies. They respond to two post-Cold War phenomena, first, the dream of creating new nations in order to undo post-World War II arrangements (for the Ambazonia case) and the international Islamic State movement that puts itself outside the confines of the Western European model of the nation-state, each with its own motivations although strategies seem to converge at some point. They may appear to be identity related or even have identity arguments (which they do) but they are situated outside the nation-state sphere as they confront the state of Cameroon from outside (as a diaspora for "Ambazonians" and as a Muslim caliphate that subscribes to the Islamic state and does not recognize the secular modern state system). Drawing from identity arguments (religion for Boko Haram and rights to statehood based on a sociolinguistic difference for Ambazonia), both movements have posed a major threat to security and the integrity of the state of Cameroon and its neighbors (Nigeria, Niger, Chad). The impacts of the two movements have been amply reported.

Boko Haram

This organization has been described as a “salafist terrorist organization” whose aim is to abolish “the secular system of government” and establish a “Sharia system” in Nigeria and by extension all the areas in which it operates. Its avowed strategy was therefore to destroy “all symbols of and institutions of Nigerian statehood” (Mbagwu and Alaiyemola, 2015: 88). It is opposed to the secular westernization of Nigeria especially co-educational learning and democracy and hopes to create an Islamic state in Nigeria or, failing which, in its northern states that have already adopted Sharia Law (Zenn and Pearson, 2014). Originally affiliated to Al Qaida and then to several other jihadist groups (Zenn, 2014), the group became notorious for its methods such as mass destruction of people and property including ransacking of whole villages that become completely deserted, suicide attacks, targeted assassinations, organized prison break-ins, armed robberies, summary executions and homicide, money laundering, kidnapping as “primary method of self-sustaining funding”, extortion and trade in illegal drugs, arms, ammunitions and explosives (Mbagwu and Alaiyemola, op. cit.: 90). Matfess (2017) estimated its casualties at 30,000 deaths and two million people displaced. Economic activities (agriculture, regional trade) have been so badly affected that they will touch 14 million people.

Perousse de Montclos (2014), holds that when Boko Haram moved from insurgency to terrorism they resorted to strikes against political targets such as police stations, which in some remote villages seem to be the only effective state apparatus present and effectively operational in such localities. Prisons were also targeted to release militants who had been sentenced and were serving terms. Schools that symbolised western education as well as mosques and Muslim scholars that contested the moral credibility of the sect as well as politicians and those accused of not properly implementing Islamic laws were also targeted. After the killing of the leader of the group in 2009, the group extended its operations to attacking churches, bridges, power plants, radar facilities of international airports as well as radio and television transmitters. According to Ukpong (2016), kidnappings by insurgents pose a security threat to the population. In general, the insurgency affects foreign as well as indigenous investments thereby hampering economic growth. Cameroon as a nation has also witnessed a series of kidnappings, abductions, armed robberies, and murders of all forms staged by Boko Haram in the northern regions.

The ‘Ambazonian’ Insurgency in the North West and South West Regions of Cameroon

A movement in the Southwest and Northwest of Cameroon which started as socio-professional demands by lawyers and teachers in 2016 later degenerated to an insurgency in 2017. It has targeted schools, government offices, government officials, municipal councils and chiefs, with the intended effect of “making the area ungovernable”. It has also targeted farming activities and occasionally trading activities. It manifested itself in its earliest moments through frequent pressure to halt activities (with the code names “lockdown” and “ghost town”), roadblocks, seizure of farms, and the takeover of villages. It has taken economic forms such as the hijack of property, extortion, intimidation and sabotage. There is destruction of public places, property and ensigns. There have been attempts to ban schools and replace them with what insurgents call “community schools”. UN News (2019) reported that “over 80 percent of schools” in the English speaking

region of Cameroon were closed. Several schools have been attacked and teachers, pupils and students murdered.

The insurgency has tended to adopt criminal attitudes with the evident consequences being plundering of villages, arbitrary assassinations, human rights violations and kidnapping for ransom (United Nations, 2021). Insurgents carry out deliberate attacks on the state symbols (such as schools), public institutions, health facilities, and churches and punish civilians who they think do not support the insurgency. This has affected the people of these regions in several ways. First, it has damaged physical infrastructure, destroyed human capital and caused the displacement of many people. Second, it has affected poverty levels within households that lost their incomes and who cannot afford to pay for health services or send their children to school. This conflict has affected economic productivity, thus exposing households to poverty.

This trend is confirmed by a study that took place in the small town of Muyuka in the South West administrative region (Achale, 2022). Muyuka that is noted for its food production capacity became famous as an epicenter of insurgency activities that caused most businesses to close down. As a consequence of the insurgency, business men, the financially viable, local chiefs, high profile government workers, parents and children of schooling age and persons who could not support the insecurity to escape the town of Muyuka. The insurgency has led to rising prices of goods and services. Farmers have also abandoned their activities as their farms have either been hijacked or subjected to the payment of tribute by insurgents. In fact, the insurgency has caused mass exodus of people. People have been displaced leaving their homes, properties and farms to start a new life in different places of no conflict. This has caused some people to become traumatized. The insurgency has led to a modification of social bonds as members of the same families may have to live in different towns and friendship, neighborhood and communal relations dislocated (Ebua, 2021).

Insurgents have ordered a stop in development projects in the town “postponing development to after the war”, this causing people to abandon personal and collective welfare projects. The spillover effects of frequent and continuous injunctions to halt economic activities (code named “ghost town”) has also affected economic activities. This has caused a drop in economic activities and a fall in the incomes of individuals and households. Work has also slowed down in the neighboring agro-industrial complex of the Cameroon Development Corporation with workers becoming redundant. The insurgency led to the formation of new communities around farm houses in the South West Region by persons who could not migrate to towns for safety. As a result, new economic activities have developed around these settlements but these businesses have tended to be very expensive as the prices of the goods and services are extraordinarily high. Dealers in psychotropic drugs also take advantage of the insurgency to do underground business.

Gender Issues in the Insurgencies

Much has been written about the gender dimensions of the Boko Haram insurgency by scholars and right groups who have reported and analysed abuses such as abduction, torture, women

carrying arms and serving as combatants (even as suicide bombers), gender based violence, sexual violence (including rape), labour in camps, forced marriages and forced sexual relations. Matfess (op. cit.) and the International Crisis Group (2016) have highlighted the tendency for the group to place tighter restrictions on women and stricter gender segregation. Matfess also points to the “subservience of women and girls” as well as expectations of “acquiescence of violence” by victims.

Following the much publicized abduction of girls in a secondary school in Chibok in Nigeria’s North Eastern state of Borno, Human Rights Watch (2014) undertook to probe further into abuses on women and girls in captivity beyond the singular event. The group analyzed the “harrowing experiences” of physical and psychological abuses on women and girls (married or unmarried) who had been targeted because of their religion (Christianity) or their attending school or both. The report highlights forced labour, forced participation in military operations, forced marriages, sexual abuse, performance of household chores in camps and serving as porters. Prominent abuses are discrimination and religious persecution. Targets for abduction were Christian women and women from “predominantly Christian areas” who were forcefully converted into Islam, married to Muslim men or murdered. Such conversions were consistent with the idea of creating a Muslim caliphate in the area coinciding with Northern means of Nigeria where Sharia law had been imposed by 2012 (Zenn and Pearson, 2014: 50).

Several scholars have pointed to different types of abuses although there is convergence on some critical issues. Gender based violence stands out in most studies with reports of “gang rape of Christian women, while Muslims were spared” (International Crisis Group op.cit.: 7), the resort to traditions of using “women and girls as rewards to fighters” (ibid) and women abducted to “serve as sex slaves and war wives” (Mbagwu and Alaiyemola, op. cit.: 90) which are “extreme expressions(s) of gender based violence” (ibid.: 87). Concerning gender based violence, Zenn and Pearson (op.cit.: 50) report sexual violence, acts such as rape, torture, murder and discrimination against women (particularly Christian women) following an ideology that “promoted narrow gender roles for men and women, enforcing strict rules on women’s dress and sexual conduct and... other discriminatory and abusive practices against women” as well as “hyper masculine combat roles” and “combative ideological masculinity”.

The contextual implications or consequences of the insurgency on gender relations have also been identified. While men were abducted for their virility and specific skills that could be useful in combat or were simply killed, women were captured and subjected. This development has resulted in an imbalance in terms of gender composition of the population in affected areas. Women who lose male companions (husband) or relatives (sons) are left alone to look after families and themselves (International Crisis Group, op. cit.: 1). The strategy of raiding and ransacking target communities has generally led to the displacement of large numbers of displaced people (Matfess, op. cit.). In fact, some villages are completely deserted and livelihood activities abandoned. The resultant effect are losses in gains in a situation where “many women [had become] economic providers in their own right, [selling] goods in the market or from home, or perform farming activities, while others work in offices” (International Crisis Group, op. cit.: 3). Such vulnerabilities are compounded for girls when schools are targeted and shut down. The

increase in levels of education that had been contributing to narrowing the gender gaps or differentials has witnessed a regression with the shutting down of schools. In this regard, gains in empowerment will be lost over the years as women's autonomy is eroded. Internal displacement can be a particularly disempowering experience for women who are often overburdened by the realities of displacement when traditional protection mechanisms are eroded and violence in communities increases, given that traditionally women are responsible for children, the elderly and domestic work. The empowerment of women greatly contributes to the Gross Domestic Product of a country and to poverty reduction. Given that women outnumber men as internally displaced persons (IDP) and that the needs of women and men differ, the absence of a gender perspective in the assistance to internally displaced persons and in the literature illustrate that gender is either being ignored or is not properly understood.

Difficulties experienced in camps hosting refugees or internally displaced persons only add to the vulnerability, despondency and increasing dependency that arise from conflict situations irrespective of gender. Although some women may make gains by adhering to the apparently "liberating" impact of Boko Haram, such as protection for female adherents, this is insignificant in comparison to overall losses. Other core rights such as the right to freedom of belief, education, choice of sexual partners and, above all dispose of one's body and person are violated. This is definitely inscribed in a wider global context characterized by the rise of a combative (Jihadist) ideology and movements with links to Islam.

This is definitely different with the Ambazonian insurgency that is overtly secular in its posture and claims although similarities in strategies and effects can be identified in some respects. The Community Centre for Integrated Development (CCID) (2021: 50) has also observed "disruption in social and gender structures" characterized by gender based violence, domestic violence, forced marriages, child marriages, an increase in early marriages, and a drop in school attendance rates for all but with a disproportionate impact that disfavours girls. Physical and psychological abuse adds to new vulnerabilities arising out of insecurity that have engendered new forms of female single headed households, sex work for survival, the abandonment of regular livelihood activities (farming) and the adoption of new ones as there is a generalized drop in incomes and as women replace men in several spheres of activities. Although there are some opportunities for political participation at local and regional or national level (such as activism towards achieving peace), the organization has observed a "halt in the pursuit of gender equality due to the armed conflict" that has: "... brought new challenges to the population, such as sexual violence, killings, displacements, threats and all types of insecurities. As a result, achieving genuine gender equality has been set aside. The realization of gender equality and equity might not be the first priority of NGOs³⁴, political and social actors, or women at this time" (ibid.: 63) with the stress on survival, gender based violence (GBV) and insecurity. "The attempts to increase gender equity and achieve gender equality [have] rarified as the crisis turned into a full-scale conflict. Instead protection of people from GBV due to the Anglophone crisis" (ibid.: 63). As insurgents have succeeded in closing schools in many areas, the opportunities for achieving

³⁴ Internally displaced persons.

equality and equity through education have been compromised although there is a general drop in school attendance.

Cases of rape, forced marriages and forced pregnancies have been reported in the ongoing insurgency in the English speaking regions of Cameroon. The case of a wardress who was gang raped, openly mutilated and murdered as well as filmed and disseminated over the social media (Whatsapp, Facebook) by a group of insurgent militias in the Pinyin area of the North West Region became symptomatic of the extreme barbarism that characterizes attitudes and treatment of women in the conflict. Several young women were molested, battered, stripped naked, murdered or buried alive in several localities in the North West (Bamenda, Batibo) and South West (Kumba, Muyuka) Regions. Men have also been treated in similarly violent ways but the treatment of women has been humiliating, demeaning and marked by the desecration of their bodies. Social media images of young and middle aged women maltreated by insurgents are often nude as if meant to degrade what is sacred to them, namely their intimacy. This is the more so when such women are suspected of dating soldiers of the regular army, of being spies or of both. Several adult and elderly women accused of being witches, refusing to obey/violating instructions of insurgents, or openly opposing (collectively or individually) the latter's abuses have been severely tortured to the extent that they have sustained injuries that took long to heal or enduring scars. Some were simply disabled. This is not to say that men have not had their share of abuses but the violation of bodies and intimacy is specific to women. Men have not been able to resist better but the majority migrate to safer zones leaving wives and children to face the insecurity and brutalities almost single-handedly. The intimidations and threats have resuscitated the attitudes of silence that were already disappearing from a substantial number of women in this area with efforts at empowerment. Women are, once more, re-emerging as a muted category in the affected areas.

Collaborative efforts and partnership are observed at global multilateral level (Ellingrud, et. al. 2017) but these can be extended beyond the habitual concern with gender in peace time and in non-conflict areas. UNWOMEN has established strong partnerships with various stakeholders working in its targeted areas to strengthen mainstreaming of gender for gender responsive programmes alongside governments, civil society organizations, local communities, academia, development partners and other UN agencies among other actors (UNWOMEN, op. cit.). United Nations Development Fund for Women (UNIFEM), on its part, provides financial and technical assistance to innovative programmes and strategies that promote women's human rights, political participation and economic security as it works with other UN bodies, governments and non-governmental organizations (NGOs) to promote gender equality. These efforts are meant to link women's issues and concerns to national, regional and global agendas by fostering collaboration and providing technical expertise on gender main streaming and women's empowerment strategies. It is our argument that these initiatives be extended to factor gender inequalities, inequities and abuses against women in conflict areas.

Research Implications

Development Implications of Conflicts

Generally, conflicts lead to losses of the gains made in the protection of women, the enhancement or empowerment of women through affirmative action, efforts in bridging the gender gap and enforcement of rights as enshrined in national and international instruments such as Convention on the Elimination of all Forms of Violence against Women (CEDAW). The context of conflicts affects development efforts directly by targeting development gains and efforts. This is exemplified in the result of the study in the locality of Muyuka in Cameroon who affirmed that “development can wait till the end of the war”. Conflicts also cause material and non-material (social and cultural) losses. Infrastructures built over time are destroyed, livelihoods are compromised and social relations that have been improving over time deteriorate or degenerate. The losses in the present cases are in the non-material domain and specifically the social and cultural. Conflicts also disrupt societies and the security without which development is impossible. Post-conflict situations concentrate efforts at peace and security compromising resources that should otherwise have gone to improve previous development efforts. The new conflicts in Africa compromise development efforts from a multidimensional perspective. CCID (ibid.) holds that the “prospects for the economic future” of the affected areas become “derisory”. Losses in gender equity and equality are some of the most pernicious effects of these conflicts. The growing inequalities and inequities arising as a consequence need to be addressed as much as the conflicts themselves if the development goals have to be met.

Conflicts affect development indirectly as they create insecure contexts for people who are both agents and beneficiaries of development. They disrupt communities, social structures of conviviality and displace people from their habitual residences that have over the years become “natural contexts” (in an ethnographic sense). Family and kinship relations are altered while social relations are dislocated, reworked or destroyed. Vulnerabilities emerge for disadvantaged groups and categories as not everyone is able to cope with the new challenges of instability that conflicts generate. For instance, when homes dislocate in conflict areas, men may relocate leaving women behind who assume greater responsibilities within households (often without adequate means) or become vulnerable to abuses of the type described above. When whole communities are displaced or have to abandon when forced by belligerents as in the case of the Boko Haram insurgency (but also in other cases on the continent) or by force of circumstance, victims become IDPs or refugees. Either housed and taken care of by good willed persons (relations, friends, well-wishers) or put in camps (benefiting from humanitarian assistance), victims of conflict insecurity lost in agency and became dependents. Despondency, dependency and assistantship have become widespread in the new conflict areas with their new forms of barbarism.

The Conflict and Gender Nexus: Meanings and Trends in Africa

The concept of gender in the context of conflict, peace and security and social relation analysis remain the yardstick of gender and development (Razavi and Miller 1995). The relevance of gender is important in coming up with a planning program or project for conflict peace and

security. As such, as women and men have different positions within their societies and different control over resources, they not only play different and changing roles but also often have different needs (Moser, 2005). However, feminist scholars in the field of gender and conflict have raised growing concerns about the ghettoization of gender and gender inequality issues (more specifically) as potential causes and consequences of conflict (Sjoberg, 2013; Kinsella, 2003). Most analysis of conflict rooted in realist, liberal and constructivist ideologies pay very little attention to gender in the understanding of the “meanings, causes and consequences of conflict (Carpenter, 2003). Nevertheless, recent trends in conflicts notably from South (African countries inclusive) suggest that the meanings, causes and consequences of conflict are gendered.

Contrary to earlier conflicts characterized by clearly defined combat fields, recent trends in armed conflicts disrupt families and have negative consequences for women, men and children. Though both women and men are victims, women disproportionately suffer from the consequences of war (Goetz & Treiber, 2012). This explains why a significant momentum of the gender equality drive has been directed to the recognition and consolidation of women’s roles in conflict prevention as well as strategies to address violence against women and girls in situations of conflict (Domingo et al., 2014). This drive is against a backdrop of the numerous threats to women posed by conflict and violence. Hence, the promotion of sustainable peace and security is strategic to women’s contributions in creating stability and promoting reconciliation, peace and security (ibid.; United Nations 2010).

Women usually do not initiate conflicts but they do suffer heavily from the consequences. According to Eriksson-Baaz & Stern (2010), sexual violence is part of a larger pattern of generalized violence against both women and men. This pattern belongs to a long history of violence. Conflict spurs much higher rates of sexual violence and renders women acutely vulnerability to poverty, loss of jobs and destruction of property. In addition, women and girls become the individual systematic targets of sexual violence, specifically when rape and sexual assault are used as weapons of war. Women living in war zones are vulnerable even if they make efforts to adapt to and survive the violence, loss, and deprivation that goes hand in hand with conflicts. This perception of women likewise disregards their experience of war as combatants, promoters of peace, or community leaders (Laudati 2013). Thus, the very real protection and assistance needs of women living in armed conflict should not be overlooked. As such, refusing to recognize their agency means that many of the most fundamental decisions regarding their security and access to material resources will be taken without reference to them or without their consent.

Gender Inequalities, Power Relations, and Sexual and Gender Based Violence (SGBV) in Situations of Conflict

Sexual and gender based violence is rooted in attitudes towards gender roles and relations. Through social interactions, individuals learn what is expected, see what is expected, act and react in expected ways and simultaneously construct and maintain the gender order. Gender refers to the social difference between men and women in societies as well as the roles, responsibilities societies assigned to men, women, boys and girls. unlike sex (biological/

physiological differences between male and female) which is static, gender is a dynamic concept and is strongly shaped by socio-cultural norms and traditions that are deeply rooted in patriarchy. Gender is a social construction, varies with time and is context specific.

Given that most societies are gender stratified, the subject 'man' and 'woman', and the expected behaviors, attitudes, and responsibilities are defined in different and unequal ways. Though there may be variations, the subject woman and its attendant behavior and status is often held in less esteem than the status 'man' (Lorber, 1994). Consequently, men and women are placed in roles and positions of power, with women often in disadvantaged positions in relation to men. When gender intersects with class, race, ethnicity, women of favored groups (e.g. white, upper class) command more power, prestige and property than those from disfavoured groups (lower socio-economic categories, poor, etc.). As a result, disfavoured groups (particularly women) suffer from marginalization, exclusion and are more vulnerable to human right abuses and SGBV in pre-conflict societies.

Pre-conflict societies are plagued with both direct (physical) and indirect (structural) violence at the micro- (household) level as well as societal/institutional (macro) levels. At the individual (micro) level, gender inequalities expose women to physical violence such as rape, partner battery, abuse by partners and family members, honor killings, exposure to sexually transmitted diseases, harassment, injuries, murder, and so on.. Sexual and gender based violence is a direct manifestation of male dominance. Perpetrators see SGBV as a way of exercising dominance, privilege, power and control over others (who are considered victims, subordinate, less powerful and vulnerable).

In the event of a conflict, communities and family support systems are broken down, families separated, law and order is almost absent, and health facilities and police services understaffed or completely absent. There is also an increase in human rights violations and impunity, increased displacement and vulnerability. These conditions are fertile grounds for the intensification of SGBV. As tension increases during conflict coupled with frustration, powerlessness and loss of traditional male roles and identity, the incidence of sexual and gender violence increases substantively such that rape, force marriages, forced prostitutions, torture, mutilation, forced pregnancies and physical assault become acceptable acts during conflict.

Recent situations of conflict have seen warring parties perpetuate these types of violence as a strategy to punish opponents. Women and girls are significantly affected. Reports of conflict related sexual violence highlight the use of SGBV against women and girls to displace communities, expel "undesirable" groups and to seize contested land and other resources (United Nations, 2019). Cases from South Sudan, DR Congo, Nigeria, Syria and Burundi point to situations in which militias rape women as a means of repression, terror and control as well as those perceived to be political opponents. In some instances, victims are raped by up to 10 men sometimes in front of their parents or children. Others are detained as sex slaves. Non-state actors including armed group, local militias and criminal elements are largely responsible for the majority of incidences of SGBV although some cases of sexual violence involving state actors – national armed forces, police and other security entities have also been documented.

A relative new phenomenal observation in conflict is the inter link among SGBV, trafficking and terrorism with terrorist group increasingly involved in the trafficking of women and girls. Intensification of violence extremism is often associated with discriminatory gender norms that limit women's roles and enjoyment of basic rights. Through acts of human trafficking and exposure of captives to various form of SGBV, terrorist spread terror among civilian populations (Swiss & Giller, 1993). Cases of terror related SGBV have been documented in North-Eastern Nigeria and Mali (United Nations, 2019). Sexual violence against women and girls also play an important role in the political economy of terrorism with the presence of physical and online slave markets where terrorists generate revenue from abduction and trafficking of women and girls (*ibid.*). These trends explain why conflict related SGBV has been identified as one of the main reasons for forced displacement of civilian populations, particularly women and girls. Many women and children flee their homes not necessarily for fear of death from gun shots but from fear of rape, forced pregnancy, physical assault and other forms of SGBV. Even when they flee, women and girls are still exposed to SGBV in the course of displacement and navigating their way through borders and across checkpoints without documentation, money or legal status.

Upon arrival at refugee or internally displaced peoples (IDP) camps, women and girls are vulnerable and could easily be taken advantage of by several persons. The United Nations has documented cases where refugees and IDPs have reportedly suffered from SGBV at the hands of state employees working in such camps, armed groups, smugglers, traffickers, and even peacekeepers and others who control resources and services in humanitarian context (United Nations, 2017). In situations of extreme vulnerability, some parents force their daughters into early marriages to reduce risk of exploitation by strangers or in order to gain access to resources for the rest of the family (United Nation, 2019). It is also common to observe deeply entrenched gender-based violence such as intimate partner violence in displacement and resettlement camps, primarily affecting women and girls.

The formation of networks (peace alliances) by women can promote cooperation and trust which may eliminate the causes of conflict (Mpangala, 2004). Owing to the consequences of conflict on all categories of persons (men, women, boys and girls), women have been active in the peace process. This, however, remains an elite phenomenon. The elite women involved in the processes of conflict prevention, promotion, consolidation and reconstruction of peace and security (Mbuoben, 2018) seek to strengthen and promote women's organizations and initiatives that promote peace and foster an atmosphere of conviviality in their communities. However, these efforts by elite groups that rose up to decry and to protest the desecration of women within the conflict are far from successful. Much is observed in the campaigns and very little as to a modification of the situation on the ground. Local women's organizations have also stepped up their efforts in trying to bring about peace negotiators and mediators between warring parties and encourage dialogue at local level (Coning, 2013). Some resistance has been recorded for women's local grassroots activist social movements of the type that was observed in the transition into independence and critical moments in political history in Anglophone Cameroon as reported by several scholars for the Anlu of Kom (Mougoué 2018), the Fumbwen for related peoples of Babanki (Diduk 1989; Federici 2004) as well as Aghem (Fonchingong et al., 2008), and the more varied organizations of the Bamenda metropolitan area (Diduk 2004). For instance, women were

reported to have staged protests against insurgents in the Babanki communities (Big Babanki and Babanki Tungo) and Oku but these protests were rather timid and did not achieve the intended effect of putting an end to the abuses of the former. On the contrary, they have been met with more violent torture and repression. In fact, this has not contributed in any considerable way to improve the situation. The peaceful protest in Babanki Tungo was met with open fire from insurgents leading to the death of a woman and several others wounded. The leaders of the Fumbwen traditional social movement in Big Babanki were rounded up, kept in custody and tortured for several weeks by insurgent elements in 2020 on the grounds that the former had dared oppose their violence and activities or were collaborators of the “enemy” (code named “black legs”). When women in Oku marched in late March 2022 in protest over the brutality of local operatives of what have been styled Restoration Forces, insurgents placed an indefinite “lockdown” (code name of a ban on all activities) in the whole locality.

Besides the ineffectiveness of the initiatives, one observes the disjoint between what Touré et al. (2003) have styled the “two faces of African feminism”, one elitist and intellectual and another local and popular that has exposed not only the ineffectiveness of the disconnect but also the emasculation of either in the face of the new forms of violence. Local women cannot effectively face guns mobilized towards causes over which they have no control. They have lost their agency as guardians of the moral and social order as givers and sustainers of life (mothers, farmers, domestic caregivers and providers) that used to be effective because of the appeal these references used to have in the peaceful times and critical moments of their history (Diduk, op. cit.). For now, the social order has been disrupted and the moral order overturned. The campaigns, slogans and activism of the elite intellectual segments have been timid with limited audiences within belligerent circles. Whether at grassroots or at elite levels, women’s voices are once more disappearing and being muted.

Coming to the government, Cameroon drew up a National Plan of Action for the implementation of Resolution 1325 of the United Nations Security Council on Women, Peace and Security, and Companion Resolutions, banking on the fact that the country was considered for a long time as a model of peace in Africa. However, nowadays, it is confronted with enormous security challenges provoked by political instability in neighboring countries, on the one hand, and the insurgencies that it is facing and which are discussed in this presentation. Like other member countries of the UN, Cameroon has to take the necessary measures for the implementation of Resolution 1325 and Companion Resolutions on the consideration of gender in peace, security, conflict prevention and resolution processes, given the humanitarian crisis the country is facing and the reconstruction processes in which it is engaged. However, such efforts are coming at the same time that the government itself is an actor as both target (for insurgents) and seeker of solutions (as the guarantor of the security and welfare for the people). The problem is that of how it can provide solutions to problems where it is the target of a violent movement that seeks to sidestep it and create a new world. Solutions cannot be conventional or in the order of the status quo.

Limitations

The insecurity of the study areas in general and the inaccessibility in North East Nigeria was a major difficulty in collecting primary data. The essentially documentary nature of the data limits the contribution that could eventually go further to describe and explain the real life experiences of the women. Facts on which the discussion is based are essentially qualitative and are therefore a summary. Detailed investigations and analysis with both quantitative and qualitative data will definitely give more insights into what is largely a reflection that is meant to inform action.

Originality/Value of the Paper

Observing the developments and mutations in gender relations towards equality and respect for difference in improving the conditions of women at the turn of the century, Alain Touraine (2005) had observed the advent of a new paradigm in which the world was entering a “society of women”/“Nous sommes déjà entrés dans une société des femmes” (ibid.: 379). Developments point to opposite trends and reversals, if not a regression, with a concomitant development of new conflicts. Our reflections point to the fact that disruptions in local communities, internal displacement, the introduction and persistence of terror, and imposition of customs that insist on traditions of male dominance have led to losses in the gains of the Development Decades (1960-1980s), the Beijing Conference and public policies that have benefitted women in African countries. Some groups deliberately advocate for a return to traditions that enforce gender inequalities and inequities while violent conflicts render women vulnerable. Others perpetrate several forms of abuses in situations of breakdown in the moral and social order and disruptions in the social fabric. National governments tend to be helpless when confronted with the abuse of women’s conditions when they are violated by combatants in conflict situations. For instance, there was an outcry at both national and international level about the fate of the “Chibok girls” in the hands of the Boko Haram insurgent but no significant action - single handed or collaborative - was undertaken to rescue them. Some of them escaped or were purportedly freed but these were disproportionately a minority that recounted the horrors as captured in the Human Rights Watch (op. cit.) report heading: “*Those Terrible Weeks in their Camps*”. The fate of the rest is unknown as it is with that of others who suffer or lose their lives in the barbarism of the new conflicts. On the contrary, the tendency is for the international community to end only at condemnation without any means of confronting and putting an end to the abuses. The dominant discourses and actions on gender inequalities tend to assume situations where conflicts are absent especially when these are initiated within national contexts with relative stability. That is why it is important to revisit the new context of conflicts that differs from the otherwise contexts of peace and stability (cf. Koch, 2008).

Moreover, there is a need to focus on the abuses on the gender dimension whereas the focus has been disproportionately on stamping out terrorism or insurgencies which are the major preoccupations. Since 2001 and following the 9/11 attacks, there have been significant international mobilization towards combating terrorism and inter-state cooperation in counterinsurgency. For example, western governments have been cooperating with countries in the Sahel in fighting jihadist groups such as Boko Haram. So far as the conflicts persist the

problems will continue but ways are not sought to target the growing inequalities in the context of conflict itself. The preoccupations of some multilateral organizations are significant (OECD 2017) but these seem not to meet with equal vigor from regional/continental, national and local levels. There is therefore a need for intervention and action involving all levels of actors in partnership to provide new policies and take action to ensure equality and equity in these situations. This will require concerted action from national governments, multilateral organizations, civil society organizations, advocacy groups and local level grassroots organizations where top-down and bottom-up approaches converge. In this regard, governments, multilateral organizations and the intervention agencies need to add a gender dimension as they confront or resolve conflicts while they are on or after they have come to an end.

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Le Processus de Décentralisation Au Cameroun: Avancées, Pesanteurs et Perspectives

Ndoumbe Richard Alain (Ministry of Décentralisation, Cameroon)

Resume

La principale orientation de la Stratégie Nationale de Développement 2020-2030 (SND30) en matière de décentralisation et de développement local au Cameroun est d'accélérer et d'approfondir le processus de décentralisation et de renforcer la gouvernance locale pour faire des Collectivités Territoriales Décentralisées (CTD), des pôles de croissance et de développement aux niveaux régional et local. Toutes choses qui favorisent l'atteinte des Objectifs de Développement Durable (ODD) en faveur des populations à la base à travers l'amélioration de leurs conditions de vie. Cependant, malgré le transfert des compétences et des ressources en direction des Communes et des Régions par l'Etat, force est de constater que la pauvreté persiste, en particulier en milieu rural. L'objectif de ce travail vise donc à analyser les défis qui s'imposent au processus de la décentralisation et du développement local au Cameroun, et suggère quelques pistes en vue de son amélioration.

Mots clés: Cameroun, décentralisation, pesanteurs et perspectives.

Introduction

L'objectif de cet article qui analyse le processus de décentralisation au Cameroun à travers ses avancées, ses pesanteurs et ses perspectives s'inscrit dans une démonstration historique de ce modèle de gouvernance local. En effet, il y a une soixantaine d'années, les débats sur le développement des Etats africains s'orientaient davantage autour de la théorie de la modernisation (Rostow, 1962). L'on pouvait ainsi croire que la centralisation était consubstantielle de ces Etats nés des indépendances. De fait, plusieurs auteurs s'accordèrent pour reconnaître que les politiques de décentralisation mises sur pied dans les années 1960 dans bon nombre de pays africains, loin de favoriser l'érection d'un véritable pouvoir local, ont davantage réussi à établir un mouvement de déconcentration avec pour finalité, un meilleur contrôle du local par le centre. Au demeurant, avec le vent de la démocratisation amorcée au niveau de la quasi-totalité des pays africains dans les années 1990 et le contexte favorable au changement profond des modes de production avec en l'occurrence la mise en œuvre des réformes démocratiques, de nouvelles réformes de la décentralisation sont opérées. Le rapport annuel de la Banque Mondiale pour l'année 1999 place ainsi au centre de son analyse les notions de mondialisation et de localisation, en faisant même des phénomènes majeurs du XXI^e siècle.

Une importante littérature issue de la presque-totalité des sciences sociales rend compte des évolutions de cette notion de décentralisation à géométrie variable³⁵. Dans cette dynamique, pour Fay, la décentralisation en tant que mode de gouvernance, fonctionne à certains égards comme un leurre, une rhétorique séduisante mais entachée de déficit théorique (Fay et al, 2006). De même, Leclerc-Olive analyse la contribution singulière du traitement de la question des pouvoirs publics locaux en rapport avec les théories de la démocratie (Leclerc-Olive, 2001). Rösel quand-à lui fait une partition entre une « vision sceptique »³⁶ et une « vision emphatique »³⁷ de la décentralisation (Von Trotha et Rösel, 1999) qui balbutie selon Deberre entre décentralisation et développement local (Deberre, 2007). Pour lui, la décentralisation est de nature à intégrer toutes les formes de développements communautaires. De ce fait, en notant que « l'insuffisance politique » des collectivités locales compromet quelque peu leur aptitude à contrôler les déséquilibres socioéconomiques et culturels qui apparaissent, il se questionne tout de même sur la propension des réformes à cantonner les élus dans un rôle de simple « *catalyseur de l'action* ». En définitive, la décision semble être l'enjeu de ces débats relatifs à la centralisation - décentralisation, dans la mesure où ils « *contestent aux organes de l'Etat central le monopole de celle-ci, tout en pouvant considérer que la décentralisation ne serait qu'une ruse de l'Etat qui conserve par devers lui la sélectivité des normes* » (Thalineau, 1994 : 10).

Le Cameroun, comme beaucoup d'autres pays africains post-indépendantistes, s'inscrit parfaitement dans cette importante dynamique de la décentralisation relayée par les auteurs. En effet, consacrée par la Constitution du 18 janvier 1996 qui fait du Cameroun un État unitaire décentralisé³⁸, la décentralisation est une politique publique qui occupe une place importante dans la démarche de consolidation démocratique de ce pays et d'atteinte de ses objectifs de développement durable. La loi fondamentale mentionnée dispose en effet en son article 55 (1) que la Commune et la Région constituent les deux types de Collectivités Territoriales Décentralisées (CTD). L'alinéa 2 du même article de cette loi précise par ailleurs les principes directeurs de la décentralisation que sont l'autonomie administrative et financière, la libre administration par des conseils élus, l'exercice de la tutelle de l'État dans les conditions définies par la loi et le développement harmonieux de toutes les CTD sur la base de la solidarité nationale, des potentialités régionales et de l'équilibre interrégional. Le processus de la décentralisation ainsi déclenché au Cameroun, qui vise à susciter le développement à partir de la base et permettre d'atteindre plus facilement les Objectifs de Développement Durables, connaît une véritable accélération notamment à partir des années 2018 à 2019.

Sur la base d'une littérature grise, l'épure théorique et conceptuelle de cette étude tourne autour du constructivisme structuraliste et du néo-institutionnalisme historique. En effet, d'inspiration Bourdieusienne, le constructivisme structuraliste qui se situe dans la double dimension objective

³⁵ La décentralisation oscillante entre la déconcentration à la réelle dévolution des pouvoirs aux collectivités territoriales décentralisées.

³⁶ La décentralisation est considérée comme un des moyens de produire des décisions relevant de procédures démocratiques légitimes. De la sorte, le jeu entre l'Etat central et les collectivités déconcentrées est à somme nulle, les uns gagnant ce que les autres perdent.

³⁷ La décentralisation est considérée comme un avatar de la démocratisation, un passage obligé pour parvenir à la démocratisation, les maîtres mots étant : autonomie du local, proximité, participation et libération des « capacités ».

³⁸ C'est nous qui soulignons.

et constructive de la réalité sociale, permet d'allier le rôle de l'individu dans la construction des savoirs et l'influence des structures sur les individus. Dans le cadre de cette étude, le constructivisme structuraliste permet de comprendre comment les structures existantes au niveau central et empreinte d'un habitus de pouvoir, continuent de peser sur les logiques de décentralisation du Cameroun et les aspirations au développement à partir de la base. Quant au néo-institutionnalisme historique de Theda Skopold notamment, il recherche les facteurs les plus à même de jeter une lumière sur les phénomènes de développement historique et les transformations contemporaines de l'Etat-providence. Il repose ainsi sur le postulat suivant : les règles politiques formelles et les politiques publiques établies sont la source de contraintes institutionnelles qui infléchissent les stratégies et les décisions des acteurs politiques. Il sera donc également question dans cette étude de vérifier ce postulat en regard avec la politique publique de la décentralisation au Cameroun et l'armada des règles politiques y-relatives.

Sur le plan méthodologique, cet article est organisé autour de la question principale du bilan réel de la décentralisation au Cameroun. Il se fonde ainsi sur l'hypothèse d'un développement local inclusif et durable induit par l'accélération et l'approfondissement du processus de décentralisation. Bien plus, l'analyse SWOT³⁹ est mobilisée pour identifier les forces, les faiblesses, les opportunités et les menaces du processus en cours. Relativement à sa structure, le travail comporte deux parties. La première partie consacrée aux avancées du processus de la décentralisation au Cameroun de 1996 à 2021. Elle sera subdivisée en deux sous-parties. L'on s'intéressera tout d'abord aux évolutions sur le plan juridique et ensuite aux avancées sur les plans institutionnel et opérationnel.

La deuxième partie quant-à-elle portera sur les pesanteurs à surmonter de même qu'aux perspectives qui s'offrent au processus de décentralisation au Cameroun.

Les Avancées du Processus de Décentralisation au Cameroun : de 1996 à 2021

La décentralisation qui consiste en un transfert par l'Etat, aux CTD, de compétences particulières et de moyens appropriés⁴⁰ a pour objectif final de procéder à l'amélioration des conditions de vies des populations à la base. Le but visé est le développement véritable à partir de la base, du local. Cette politique publique locale s'est inscrite dans un processus relativement long. S'il a été consacré par la constitution du 04 mars 1960, il est important de reconnaître que c'est avec la constitution du 18 janvier 1996 que la décentralisation a été véritablement cotée à la bourse des valeurs démocratiques tant sur le plan normatif que sur le plan opérationnel.

Sur le Plan Normatif : un Cadre Normatif en Pleine Évolution

Le cadre normatif qui encadre la décentralisation, avec en toile de fond la promotion du développement local, a connu ces dernières années un important saut qualitatif. Tout commence par la constitutionnalisation de la décentralisation en 1996 qui a fait du pays un Etat unitaire décentralisé. Par la suite, il y a eu les lois de 2004, principalement la loi N° 2004-17 du 22 juillet

³⁹ Strengths, weaknesses, opportunities et threats.

⁴⁰ Art 40 (1) du Code Général des CTD.

2004 d'orientation de la décentralisation⁴¹, la loi N° 2004-18 du 22 juillet 2004 fixant les règles applicables aux communes⁴² et la loi N° 2004-19 du 22 juillet 2004 fixant les règles applicables aux régions⁴³. Suivront les lois de 2009, en l'occurrence la loi N°2009-011 du 10 juillet 2009 portant régime financier des collectivités territoriales décentralisées et la loi n°2009/019 du 15 décembre 2009 portant fiscalité locale⁴⁴. A la faveur de la loi N° 019/024 du 24 décembre 2019 portant Code général des CTD, inspirée des conclusions du Grand dialogue national instruits par le Chef de l'Etat et qui s'est tenu du 30 septembre au 04 octobre 2019, une nouvelle ère s'ouvre dans le champ de la gouvernance locale au Cameroun⁴⁵. Les changements apportés à l'architecture de la décentralisation, d'une ampleur inédite, concernent aussi bien l'échelon communal déjà effectif, que les régions, encore futures à cette époque. Ces importantes reforms touchent des sujets aussi divers que les droits et obligations de l'élu local, l'essence de la tutelle sur les collectivités territoriales décentralisées, la participation citoyenne ou le financement de la décentralisation. A partir de là, les CTD sont désormais dotées de plus d'autonomie, de ressources, la tutelle est amenuisée, la gouvernance plus élargie et participative, et un statut spécial est accordé aux régions anglophones Nord-Ouest et du Sud-Ouest.

Cet ordonnancement normatif a été magnifié par les six décrets du 28 décembre 2021 portant notamment sur l'Organisation-type de l'administration territoriale, la Répartition de la Dotation Générale de la Décentralisation au titre de l'exercice budgétaire 2021, les Modalités d'exercice de certaines compétences transférées par l'Etat aux Régions en matière d'urbanisme, d'organisation et de la gestion des transports publics interurbains, de protection de l'environnement, de tourisme et loisirs. Ces textes d'émanation présidentielle, même s'ils confirment le pilotage de l'Etat qui conserve ainsi le rôle d'opérateur (Brisson, 2022)⁴⁶, consacrent par ailleurs la décision des pouvoirs publics d'allouer plus de ressources notamment financières au fonctionnement des conseils régionaux au cours de l'exercice 2022. Ils devraient permettre à la décentralisation de franchir un palier important et aux CTD en général de mieux se déployer dans la perspective d'apporter un coup d'accélérateur au développement local.

⁴¹ Cette loi aborde, entre autres, le principe du transfert des compétences ; l'organisation et le fonctionnement des collectivités territoriales ; la tutelle sur les collectivités territoriales ; les organes de suivi de la décentralisation.

⁴² Ladite loi parle de la gestion et de l'utilisation du domaine privé de l'Etat, du domaine public et du domaine national ; des compétences transférées aux communes ; des organes de la commune ; du régime spécial applicable aux agglomérations urbaines ; de la coopération et de la solidarité intercommunales.

⁴³ Cette loi se rapporte à la gestion et de l'utilisation du domaine privé de l'Etat, du domaine public et du domaine national par les Régions ; aux compétences transférées aux Régions ; aux organes de la Région ; à la coopération et de la solidarité inter-régionales ; et aux dispositions financières.

⁴⁴ Ministère de la décentralisation et du développement local, 2005. *Recueil des lois de la décentralisation*, Yaoundé, SOPECAM.

⁴⁵ Ministère de la décentralisation et du développement local, 2019. *Décentralisation.com*, N°003, Edition spéciale, Yaoundé, p. 5.

⁴⁶ Jean-François Brisson estime que le pilotage est encore au cœur de la fonction administrative où l'Etat a su conserver un rôle d'opérateur, notamment grâce à la puissance financière. Ainsi, bien qu'inscrite dans la constitution, l'autonomie financière des collectivités territoriale ne serait qu'un leurre, les « ressources propres » garanties à ces collectivités ne correspondant pour l'essentiel qu'à des dotations budgétaires ou à des impôts nationaux que l'Etat module à sa guise.

Des Institutions et Instances de Suivi Mise en Place et Opérationnelles

L'impulsion sur le plan institutionnel et opérationnel semble également significative, même si d'aucun y trouvent un moyen pour les administrations de l'Etat de « *se mêler à la direction des politiques locales* » (Brisson, 2022)⁴⁷. Au Cameroun, ce mouvement institutionnel est rendu manifeste avec la création et l'opérationnalisation effective des institutions et instances dédiées à la mise en œuvre et au suivi de la politique publique de la décentralisation. En ce qui concerne le suivi de la décentralisation, il convient de relever la mise en place du Conseil National de la Décentralisation (CND), créé le 03 novembre 2020, avec pour principal mandat le suivi et l'évaluation de la mise en œuvre effective de la décentralisation⁴⁸ ; du Comité Interministériel des Services Locaux (CISL) mis en place le 09 novembre 2020, en tant qu'organe de concertation interministériel placé sous l'autorité du Ministre chargé des CTD, avec pour mission d'assurer la préparation et le suivi des transferts des compétences et des ressources aux Collectivités Territoriales Décentralisées⁴⁹ et du Comité National des Finances Locales (CONAFIL), créé le 21 décembre 2020, comme organe de concertation placé sous l'autorité du Ministre chargé des CTD, chargé du suivi de la mobilisation optimale des recettes des collectivités territoriales décentralisées et de la bonne gestion des finances locales⁵⁰.

Il s'agit ensuite de l'organisation des Assises Générales de la Commune et du Grand Dialogue National. En ce qui concerne les Assises Générales de la Commune tenues les 06 et 07 février 2019, sous la présidence du Premier Ministre, Chef du Gouvernement camerounais, qui ont mobilisé l'ensemble des 360 exécutifs municipaux et des 14 Délégués du Gouvernement de la République, si elles sont parvenues à la conclusion que les communes sont le moteur du développement local et ont un rôle fondamental à jouer dans l'atteinte des objectifs de développement durable (ODD) et les autres agendas mondiaux tels que le Nouvel agenda urbain et les agendas panafricains à l'instar de l'agenda 2063 de l'Union Africaine, elles ont également, tout en saluant l'élaboration des plans communaux de développement devenus systématique, relevé les questions de cohérence, de faible ancrage de la planification locale dans celle faite au niveau central et surtout les problèmes de suivi-évaluation. Bien plus, ces Assises ont relevé que les points cruciaux relatifs aux ressources financières, matérielles, logistiques et humaines sont au cœur de l'enjeu de l'autonomie des communes, si l'on veut qu'elles exercent convenablement leurs compétences. En définitive, ces travaux ont permis de dresser un diagnostic profond de la politique publique de la décentralisation, pour une institution communale renouvelée et afin de préparer l'opérationnalisation des régions.

⁴⁷ Dans cette optique, les administrations d'Etat disposent de nombreux titres de compétence : décision conjointe, pouvoir de substitution, pouvoir de sanction. L'extraordinaire développement de la contractualisation entre l'Etat et les collectivités territoriales trouverait ici, à la suite des contrats de plan Etat-régions, conçus dès l'origine comme une déclinaison du plan national, son explication principale.

⁴⁸ République du Cameroun, Décret n° 2020/676 du 03 novembre 2020 portant organisation et fonctionnement du Conseil National de la Décentralisation.

⁴⁹ République du Cameroun, Décret n° 2020/689 du 09 novembre 2020 portant organisation et fonctionnement du Comité Interministériel des Services Locaux.

⁵⁰ République du Cameroun, Décret n° 2020/6635 du 21 décembre 2020 portant organisation et fonctionnement du Comité National des Finances Locales.

Pour ce qui est du Grand Dialogue national, il a été convoqué par le Chef de l'État a convoqué du 30 septembre au 04 octobre 2019, dans l'optique d'examiner les voies et moyens de répondre aux aspirations profondes des populations des Régions du Nord-Ouest et du Sud-Ouest, mais aussi de toutes les autres composantes de la Nation camerounaise. Des huit thématiques examinées par les participants, figurait en bonne place celle relative à la décentralisation et au développement local. À l'issue de ces assises, des recommandations fortes ont été formulées pour une modernisation du cadre juridique de la décentralisation, la consolidation du cadre institutionnel, la disponibilité de ressources humaines qualifiées, avec notamment la mise en place de la fonction publique locale, la mobilisation et l'optimisation des ressources financières en direction des CTD, le renforcement de la participation des populations à la gestion des affaires publiques au niveau local et la consécration du statut spécial pour les régions du Nord-Ouest et du Sud-Ouest.

En définitive, le bilan de la première phase de la décentralisation effectué dans le cadre de ces instances de suivi a mis en évidence de nombreuses insatisfactions liées au fonctionnement de la commune et au retard dans l'entrée en service des régions. Ce diagnostic confirmé par les premières Assises Générales de la commune et le Grand Dialogue National, a rendu nécessaire l'avènement de la deuxième phase de la décentralisation camerounaise qui, au plan institutionnel s'est concrétisée par la création, par décret présidentiel du 02 mars 2018, du Ministère de la Décentralisation et du Développement Local (MINDDEVEL), alors chargé de l'élaboration, du suivi, de la mise en œuvre et de l'évaluation de la politique du gouvernement en matière de décentralisation ainsi que de la promotion du développement local⁵¹. Enfin, il convient de relever dans ce registre institutionnel, la création du CND le 03 novembre 2020⁵² et la mise en place, à l'issue des élections du 06 décembre 2020, de la Région, dernière étape dans la mise en œuvre des institutions prévues par la Constitution, dès lors investie d'une mission générale de progrès économique et social, à l'effet de contribuer au développement harmonieux, équilibré et durable du territoire.

Malgré cette importante dynamique du processus de la décentralisation au Cameroun tant sur les plans juridiques et institutionnels, et même si les perspectives y relatives sont engageantes, les pesanteurs sur le terrain restent nombreuses et nécessitent des efforts encore plus soutenus, à l'effet de pouvoir parvenir à un véritable développement local durable et inclusif. La difficulté ici réside dans le fait que, la décentralisation renvoyant à l'idée de division du travail entre le centre et la périphérie mais aussi à la non-exclusion du centre dans la mesure où elle est construite sur la racine "centre", doit impérativement résoudre l'équation dans laquelle la division égale l'unité. En effet, évoquant « *le dogme de l'unité de l'Etat* », Aubry indique que « *le pluralisme, ne peut cohabiter ... qu'en tant que compromis* » (Aubry, 1992).

⁵¹ République du Cameroun, Décret n° 2018/190 du 02 mars 2018 modifiant et complétant certaines dispositions du décret n° 2011/408 du 09 décembre 2011 portant organisation du Gouvernement, Article 8 (5) bis.

⁵² Créé par Décret présidentiel n° 2020/676 du 03 novembre 2020, le CND est une structure chargée principalement chargé du suivi et de l'évaluation de la mise en œuvre de la décentralisation

Les Pesanteurs et Perspectives du Processus de Décentralisation au Cameroun

Des Pesanteurs au Processus de Décentralisation et de Développement Local au Cameroun

Les pesanteurs auxquelles fait face le processus de décentralisation au Cameroun restent nombreuses à relever, il s'agit notamment de la gouvernance de l'action publique au niveau local ; de l'accélération du transfert effectif des compétences et des ressources aux CTD ; et de l'élaboration des référentiels de mesure des progrès accomplis en matière de décentralisation et du développement local.

En ce qui concerne la gouvernance de l'action publique au niveau local, il est précisément question de la répartition et de la compréhension des rôles et responsabilités entre les acteurs de l'Etat et les acteurs locaux⁵³, et c'est là l'une des plus grandes transactions collisives (Dobry, 2008) entre acteurs déconcentrés et décentralisés. En effet, compte tenu de la nouveauté du processus de régionalisation, voire de décentralisation, le principal risque est que tous les regards soient tournés vers l'Etat central et que rien ne se passe tant que de nouvelles décisions ne viennent pas du Gouvernement. Or, les Conseils régionaux en l'occurrence, disposent d'ores et déjà de leviers qu'ils peuvent actionner, à l'instar de ce qui est fait par certains exécutifs. C'est donc cette culture qu'il faut développer en sus de celle de la recevabilité (Untermaier-Kerleo, 2022)⁵⁴. L'Etat central et singulièrement le MINDDEVEL ont une double responsabilité. D'une part, ils doivent être les garants de la bonne avancée du processus, ce qui implique un fort travail de conviction auprès de l'ensemble des autres Ministères mais aussi des Services du Premier Ministre et de la Présidence de la République. Sans la sortie des décrets spécifiant les modalités d'exercice des compétences transférées, l'attribution réelle des budgets ou la mise en place des organigrammes, tout le bénéfice des avancées du processus sera vite perdu. Aussi, faut-il absolument maintenir un rythme soutenu de concertation, d'information et de sensibilisation auprès de tous les acteurs impliqués dans ce processus. D'autre part, le MINDDEVEL doit aussi porter l'esprit de décentralisation, y compris dans son fonctionnement et son comportement. Il peut être compris que cette administration prenne à sa charge certaines missions des Régions dans la phase de mise en place, mais cela ne saurait durer au risque de complètement gâcher l'esprit même de la décentralisation. C'est clairement un défi.

Relativement à l'accélération du transfert effectif des compétences et des ressources aux CTD, comme indiqué dans la première partie de ce travail, un certain nombre de ressources sont déjà transférées à ces entités. Il en va ainsi la portion de la dotation générale de la décentralisation qui leur est allouée et de la création effective de la fonction publique local à travers le décret présidentiel portant organigramme-type y relatif. Cependant, lesdites ressources demeurent insuffisantes pour impulser un véritable développement à partir de la base. En effet, pour ce qui

⁵³ Conseils Régionaux, Maires de ville, Maires ; place du Gouverneur, du Préfet et du sous-préfet ; outils des coopérations entre les acteurs.

⁵⁴ Indépendamment du risque d'atteinte à sa propre réputation et à l'image de sa collectivité, tout élu doit être conscient d'un double risque juridique auquel il s'expose lui-même ou expose sa collectivité, en cas de manquement à ses obligations déontologiques dans le cadre du processus décisionnel : le risque d'annulation de la décision par le juge administratif ; le risque d'engager à titre personnel sa responsabilité tant pénale, que financière, civile voir disciplinaire.

est des compétences transférées aux collectivités territoriales décentralisées, notamment aux Régions, sur 20 projets de textes y relatifs attendus, seulement quatre (04) font déjà l'objet d'un décret présidentiel. Il s'agit précisément des Décrets fixant les modalités d'exercices de certaines compétences transférées par l'Etat aux Régions en matière d'environnement ; de tourisme et loisirs ; de travaux publics ; et d'urbanisme et d'habitat, tous signés comme indiqué, le 28 décembre 2021 par le Président de la République. Six (06) autres textes ont été validés par le CISL et le Secrétariat permanent du Conseil national de la Décentralisation (SP/CND) et sont en attente de promulgation par le Président de la République. Ce sont les projets de Décrets fixant les modalités d'exercices de certaines compétences transférées par l'Etat aux Régions en matière de gestion des eaux d'intérêt régional ; de culture et de promotion des langues nationales ; de promotion des petites et moyennes entreprises et de l'artisanat ; de promotion des activités agricoles ; de gestion des ressources naturelles ; et d'action sociale. Neuf (09) textes validés par le CISL sont en attente de validation du SP/CND et de la suite de la procédure. Il s'agit des projets de Décrets fixant les modalités d'exercices de certaines compétences transférées par l'Etat aux Régions en matière de jeunesse et d'éducation civique ; de formation professionnelle ; d'éducation ; de sport et d'éducation physique ; dans le cadre de leur participation à l'organisation des transports interurbains ; de promotion des activités de productions pastorale, aquacole et halieutique ; d'organisation des foires régionales et salons commerciaux régionaux ; d'alphabétisation ; et de santé. Le dernier texte fixant les modalités d'exercice des compétences transférées par l'Etat aux Régions en matière d'élaboration et de mise en œuvre de plans Régionaux spécifiques de prévention des risques et d'intervention d'urgence n'a jusqu'alors pas connu de début d'élaboration. Pour ce qui est des ressources financières, bien qu'on observe une augmentation des ressources du budget d'investissement public (BIP) allouées aux communes passant de 3% en 2016 à 7 % en 2019⁵⁵, elles demeurent faibles et centralisées en ce qui concerne leur conservation et leur mobilisation effectives. Certes, le code général des CTD promulgué en décembre 2019 fixe à 15% au moins la proportion des recettes du Budget de l'Etat à transférer aux CTD⁵⁶, mais la situation en 2020 reste encore loin de cet objectif. A titre d'illustration, la dotation générale de la décentralisation inscrite au budget de 2020 est de 49,9 milliards de francs CFA, pour un budget total de 4951,7 milliards ; ce qui représente un taux de 1%. Au-delà la dichotomie urbain-rural, la présence d'importantes disparités entre les dix régions que compte le Cameroun est fortement marquée. En effet, la région de l'Extrême-Nord qui concentre à elle seule 36% des pauvres, ne reçoit, par exemple, que 12% des transferts du BIP par rapport aux régions de l'Ouest et du Littoral où vivent respectivement 5% et 3% des pauvres, mais qui perçoivent presque autant (11%).

En définitive, il reste énormément du chemin à parcourir pour terminer tous ces chantiers et concrétiser l'une des deux thèses émises relativement à la création du MINDDEVEL, à savoir, celle de « l'espoir frappée du sceau de la reconsidération de l'importance des acteurs du « bas » dans la définition de l'action publique locale de l'Etat du Cameroun » (Minkonda et al, 2020), en vertu de laquelle les différents transferts sus-évoqués, sous la coordination de ce nouveau-né du pouvoir exécutif, vont booster le processus d'autonomisation administrative, technique et financière des CTD en offrant véritablement aux acteurs locaux le soin de décider eux-mêmes de

⁵⁵ Ministère de l'Economie, de la Planification et de l'Aménagement du Territoire, données de 2019.

⁵⁶ Art 25 (3) du Code Général des CTD.

l'avenir et du destin de leur communauté⁵⁷. De fait, pour accélérer le processus de décentralisation et du développement local, il est plus que nécessaire, d'une part, de renforcer la mobilisation des ressources des collectivités, et d'autre part, d'améliorer l'affectation et l'utilisation efficace de ces ressources pour la mise en œuvre, à partir de la base, de la Vision 2035 du Cameroun, de sa stratégie Nationale de Développement 2020-2030 (SND30) et de l'Agenda 2030 des Objectifs de Développement Durable (ODD).

En Guise de Perspectives

Au-delà de toutes les pesanteurs susmentionnées à relever, les perspectives de la décentralisation au Cameroun se trouvent dans l'implantation d'un véritable développement local à travers l'élaboration des cadres référentiels aptes à parachever le processus de décentralisation, le suivi-évaluation des actions en cours et la mise sur pied d'une véritable démarche participative à l'effet d'associer tous les acteurs à l'effort de développement local.

En effet, dans la conduite du processus de décentralisation et du développement local, le manque de référentiel consensuel de mesure du développement local, de la gouvernance démocratique et de la gestion communale constitue un obstacle dans le pilotage stratégique de cette politique publique au Cameroun. La plupart des indicateurs de développement, en particulier ceux des ODD ne sont pas décentralisés. Bien qu'un Indice de Développement Local (IDL) soit en cours de validation, le pilotage de la décentralisation requiert des métriques pratiques. Ces dernières devraient permettre à la fois de mesurer les progrès accomplis en matière respectivement de transfert des compétences et des ressources, de fonctionnement des CTD, ainsi que d'évaluer l'efficacité des politiques locales de développement et de participation citoyenne mais aussi de mieux orienter les interventions.

Au niveau socioéconomique, l'inégal niveau de développement entre les communes est une réalité incontestable, d'une localité à une autre. De même, si l'on observe en général une tendance à la baisse de la pauvreté, celle-ci cache en réalité une augmentation du nombre de pauvres et, faute de ciblage approprié et des dispositions spécifiques aux groupes de populations nécessiteuses, aucune solution pérenne n'est envisageable. Dans ce contexte, l'adressage de la pauvreté des collectivités locales et des populations devient donc important, et même davantage lorsque l'on considère la rareté des ressources destinées au développement local, dans un environnement national déjà fortement contraint, en raison des nombreux défis de toutes sortes (sécuritaire, sanitaire, etc.) auxquels sont confrontées les finances publiques. En vue de remédier à cet état de choses, le Secrétariat Permanent du Conseil National de la Décentralisation et le Ministère de la Décentralisation et du Développement Local, avec l'accompagnement du Programme des Nations-Unies pour le Développement, mettent actuellement en place un outil de pilotage stratégique de la décentralisation et de développement local à travers la conception d'un indice de performance de développement local, de la gouvernance démocratique et de la gestion communale. Pour ce faire, une enquête socioéconomique des 374 communes et

⁵⁷ L'autre thèse évoquée est celle « négativiste de l'inutilité » en vertu de laquelle le MINDDEVEL n'aura aucun effet sur le développement des localités à cause de la culture centralisatrice qui est basée sur l'idée-force de l'unité nationale qui impacte significativement sur toutes les institutions publiques de l'Etat camerounais.

communautés urbaines est en cours. Les données recueillies serviront non seulement à dresser le profilage socioéconomique et de pauvreté des communes, mais également le Mapping des opportunités et la cartographie des interventions des partenaires techniques et financiers. Toutes choses qui permettraient non seulement de définir les initiatives pertinentes à mener à tous les niveaux, mais également de s'assurer du respect du principe d'harmonisation des actions de l'Etat et des collectivités. En effet, l'action de l'État et celle des collectivités territoires doivent se dérouler en symbiose dans l'harmonie (Owona, 2011 : 50)⁵⁸

S'agissant du suivi-évaluation, il convient de relever que dans le cadre de la mise en œuvre des Accords signés avec des partenaires techniques et financiers, plusieurs projets et programmes sont en cours ou envisagés au Cameroun, dans le sous-secteur de la décentralisation et du développement local. Il en est ainsi des projets PRADEC⁵⁹, PAMEC⁶⁰, PAMFIP⁶¹ avec la Coopération allemande (GIZ) ; du projet PAADD⁶² avec le PNUD ; du projet PROCIVIS⁶³ avec l'Union Européenne ; des projets PAAD-C⁶⁴ et FADDEL⁶⁵ avec la Coopération française ; etc. Tous ces projets visent plus ou moins l'accompagnement du Cameroun pour l'accélération de son processus de décentralisation et le développement local. Si l'on peut apprécier la diversité de ces projets et programmes, de même que le nombre important de domaines adressés et de partenaires impliqués, il convient cependant de relever pour le déplorer que plusieurs de ces projets ou programmes, mis en œuvre de façon isolée, s'adressent parfois à la même cible au niveau de laquelle ils tentent de résoudre le même problème, en y mettant quelques fois d'importants moyens financiers. Cet état de fait, au-delà des doublons qu'il occasionne, s'accompagne d'un énorme gaspillage des moyens mis à disposition, notamment financiers. Il s'impose dès lors l'urgente nécessité de développer et de mettre en œuvre un système efficace de suivi-évaluation de la coopération avec les différents partenaires techniques et financiers,

⁵⁸ La loi d'orientation de 2004 précise que le transfert de compétences obéit « aux principes de subsidiarité, de progressivité et de complémentarité » (article 2, 2^e alinéa).

⁵⁹ Programme d'appui au développement communal. Il vise à améliorer l'exercice par les municipalités de leurs fonctions, pour un développement communal durable. La deuxième phase du PRADEC en cours s'étale de 2021 à 2023.

⁶⁰ Programme d'appui à la modernisation de l'Etat civil. Ce programme a pour but de permettre au Ministère en charge de la Décentralisation, au bureau national de l'état civil et aux communes partenaires de garantir la mise en œuvre d'un système inclusif et en mesure de rendre compte en matière d'état civil et de statistiques démographiques.

⁶¹ Programme d'appui à la modernisation des finances publiques. L'objectif majeur de ce programme est d'axer davantage la gestion budgétaire sur le développement, et de rendre plus efficaces la gestion des recettes et les relations de coopération entre les organes administratifs centraux et locaux. Il est rendu à sa troisième phase qui couvre la période 2020-2023.

⁶² Projet d'appui à l'accélération et l'approfondissement de la décentralisation et du développement local. Le PAADD est prévu jusqu'en 2025 et devra permettre de collecter un peu plus de 12 milliards de Francs Cfa en cinq ans dans le but principal de créer des emplois directs décentralisés.

⁶³ Programme d'appui à la citoyenneté active du Cameroun. Il est financé par le CAON-FED dans le cadre du 11^{ème} FED et a pour objectif global de renforcer l'Etat de droit et la gouvernance démocratique au Cameroun via la promotion et la consolidation de la citoyenneté définie comme la pleine reconnaissance faite aux personnes de leur statut de citoyens disposant de tous les droits civils et politiques.

⁶⁴ Projet d'appui à l'accélération de la décentralisation au Cameroun. Financé par le Centre de crise et de soutien (CDCS) du Ministère de l'Europe et des affaires étrangères (MEAE), ce projet se déploie au Cameroun à la faveur de la mise en place des régions et vise à appuyer la formation des acteurs de la réforme, d'accompagner le personnel et les formateurs de la *National School of Local Administration (NASLA)* et à participer à l'élaboration de la Charte de la déconcentration.

⁶⁵ Facilité d'appui à la décentralisation et au développement local. Financée par le Contrat de développement et de désendettement, et mise en œuvre par Expertise France, cette facilité vise à appuyer le processus d'accélération et d'approfondissement de la décentralisation, notamment l'opérationnalisation des régions.

singulièrement de suivi de la mise en œuvre des projets et programmes issus de cette collaboration.

Outre l'identification des pistes pertinentes d'amélioration continue desdits projets et programmes en faveur des populations, un tel système de suivi-évaluation permettra, à partir des données de terrain, d'élaborer une cartographie précise des partenaires et autres acteurs intervenant dans les domaines de la décentralisation et du développement local, de circonscrire avec exactitude leur spectre d'action, de rationaliser les activités et les ressources y-dédiées dans le cadre de ces projets et programmes, de tirer le meilleur parti de la collaboration avec les différentes parties prenantes et d'atteindre plus sereinement les objectifs de développement durable à travers l'amélioration du cadre et des conditions de vie des populations à la base.

Enfin, au sujet du renforcement de la participation citoyenne, il semble opportun de rappeler les propos l'ancien président Béninois, Nicéphore Soglo selon lesquels : *«la démocratie doit chercher sa validité et son épanouissement dans une décentralisation authentique. Autrement dit, la démocratie sera à la base ou ne sera pas »* (Métodjo, 2008 :13). Ces propos présentent en effet la décentralisation comme un levier de renforcement de la démocratie à travers notamment le rôle et la participation des citoyens de la base.

En tout état de cause, à travers l'autonomisation des collectivités territoriales, l'État cherche notamment à remédier la crise de représentativité, en associant davantage les populations à la gestion de leur localité (Métodjo, 2008)⁶⁶.

La participation citoyenne se présente dès lors comme le critère déterminant de durabilité de tout projet de société. Elle est au début et au bout d'une politique de développement portée par la politique publique de la décentralisation. Sur la base de l'encadrement juridique actuel, à savoir le Code général des collectivités territoriales décentralisées (CGCTD), cette place centrale de la participation citoyenne pourrait s'appréhender à partir de trois piliers. Tout d'abord l'élection à travers laquelle les populations participent à la désignation des conseillers municipaux, et par là-même des conseillers régionaux et des sénateurs qui, in fine, tirent leur pouvoir du suffrage universel. Ensuite l'orientation du développement de la collectivité. A ce niveau, la participation citoyenne devrait être recherchée dans le cadre de la production de certains documents de planification dont les plans communaux et régionaux de développement. C'est d'ailleurs à juste titre que le CGCTD prévoit que *« toute personne physique ou morale peut formuler, à l'intention de l'Exécutif Communal ou Régional, toutes propositions tendant à impulser le développement de la Collectivité Territoriale concernée ou à améliorer son fonctionnement »*⁶⁷. Enfin, le contrôle des élus et des projets réalisés ou à réaliser pour le compte de la collectivité. Sur la base de ce pilier et tel que formulé par le CGCTD, *« tout habitant d'une collectivité peut, à ses frais, demander la communication des procès-verbaux des organes délibérants, des budgets, des projets de rapports annuels de performance, plans de développement, comptes ou arrêtés »*⁶⁸. Cela induit

⁶⁶ En effet, dans la plupart des pays africains où la nomenclature ethnique riche et où la « logique de terroir » est très prégnante dans l'imaginaire collectif, le pouvoir central est parfois rejeté par les communautés ou groupes ethniques absents.

⁶⁷ Ministère de la décentralisation et du développement local, 2019. *Code Général des collectivités territoriales décentralisées*, article 40 (1), p. 10.

⁶⁸ Ministère de la décentralisation et du développement local, 2019. *Code Général des collectivités territoriales décentralisées*, article 40 (2), p. 10.

nécessairement un autre principe, celui de la reddition des comptes. En définitive, il y a lieu de regretter que les organes des Collectivités territoriales décentralisées (CTD) n'aient pas encore pris la pleine mesure des retombées positives que pourrait charrier la mise en œuvre effective du principe de la participation citoyenne sur la gouvernance locale. En réalité, ces organes ont l'obligation de sensibiliser leur population sur les conditions, les formes et les modalités de leur participation.

Cela s'inscrit d'ailleurs dans l'esprit et le sens de la décentralisation que le Cameroun, comme plusieurs pays d'Afrique francophone, a adopté au cours des dernières décennies, dans le but d'accroître l'autonomie locale en ce qui concerne la création, la gestion et la redistribution des ressources locales, et d'augmenter le contrôle citoyen dans la prise de décision. Toutes choses qui améliorent la participation de la population aux projets communautaires à travers le concept de développement local inclusif (DLI) rénové, et facilite pour ainsi dire l'atteinte à partir de la base, des ODD.

Conclusion

La présente étude portant sur le processus de décentralisation au Cameroun qui a été analysé à travers ses avancées, ses pesanteurs et ses perspectives invite à dégager deux constats. Premièrement, le processus de décentralisation au Cameroun a connu d'importantes avancées aux plans juridique et institutionnel. Sur le plan juridique, la principale avancée est le Code général des collectivités territoriales décentralisées qui apporte plusieurs innovations en la matière, notamment plus d'autonomie et de ressources pour les CTD. Sur le plan institutionnel, la principale évolution concerne la création du Ministère de la décentralisation et du développement local, avec pour mission l'élaboration, la mise en œuvre, le suivi et l'évaluation de la politique du gouvernement en matière de décentralisation ainsi que de promotion du développement local. Secondairement, malgré les avancées et perspectives qui s'avèrent engageantes, de nombreuses pesanteurs subsistent sur le chemin de la décentralisation et du développement local au Cameroun. Au rang de ces pesanteurs, la gouvernance de l'action publique au niveau local, précisément, une bonne compréhension et répartition des rôles et des responsabilités entre les acteurs de l'Etat et les acteurs locaux. Comme autre pesanteur, l'accélération du transfert effectif et des ressources, en particulier financières, aux CTD. Du point de vue des perspectives, il semble opportun tout d'abord d'élaborer des référentiels de mesure des progrès accomplis en matière de décentralisation et de développement local. Un préalable essentiel à cet effet est une définition claire et sans équivoque de la notion d'intérêt public local à travers le juge administratif, « *parce que la légalité des interventions locales est subordonnée à son respect* » (Pontier, 2022). Ensuite, il paraît tout aussi judicieux de mettre une emphase particulière sur le suivi-évaluation des projets et programmes de développement local en cours ou en perspective, à l'effet d'améliorer continuellement leur mise en œuvre, d'harmoniser les activités et actions des partenaires et d'éviter ainsi les doublons et le gaspillage des ressources. Enfin, il s'avère également fort nécessaire de procéder au renforcement de la participation citoyenne au niveau local, car il s'agit là du seul gage véritable de la durabilité de tout projet de société.

En définitive, « *la décentralisation consacre la création de personnes morales de droit public dotées d'une réelle autonomie (...) soumises à un contrôle de la part de l'État, qui manifeste*

l'unité de l'ordre juridique de l'État unitaire » (Verpeaux, 2022 : 1). Ce processus en cours au Cameroun engrange, au fil des années, d'importants résultats qu'il conviendrait de capitaliser, notamment sur le plan pratique, afin d'améliorer effectivement le cadre et les conditions de vie des populations à la base et de progresser vers l'atteinte des Objectifs de Développement Durables (ODD) en leur faveur.

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Exploring the Role of Ethics and Sustainability in the Decision Making of Engineering and Construction Professionals: Toward Developing Sustainable Cities and Communities

Clifton Farnsworth, Jacob Neil, and Andrew South
(Brigham Young University, United States)

Abstract

The built environment is the backbone of sustainable cities and human settlements. Thus, engineering and construction (EC) professionals have a direct impact on achieving goal 11 of the United Nations' Sustainable Development Goals (SDGs) through designing, building, and operating sustainable cities and communities. However, the built environment is also heavily connected to many of the other SDGs. This research reports the exploration of EC professionals' approaches to sustainable development, and the extent to which ethics and aspects of sustainability motivate their decision making. Semi-structured interviews with a range of EC professionals demonstrate how various decisions are professionally evaluated as touching each of the 'three pillars of sustainability' (economic, social, and environmental). Economic motivations are embedded in virtually all decision making, while social and environmental aspects of sustainability are more varied in their implementation. Social aspects comprise a broad array of motivating factors, while environmental aspects are heavily influenced by regulation. Most surprising is the extent to which some EC professionals decouple ethics from sustainability-related decisions, placing responsibility fully upon the shoulders of their clients to make sustainable decisions and act appropriately. The ASCE statement on sustainability suggests that engineers should "do the right project" (2021b). However, practice seems to indicate that often EC professionals inform their clients about what may be "right," but take no responsibility to insist on any sustainable action beyond regulatory minimums. EC professionals have an opportunity to take greater leadership roles in directly and indirectly supporting the SDGs via professional work in the built environment.

Keywords: Ethics, Sustainability, Decision Making, Civil Engineering, Construction

Introduction

Background/Motivation

The United Nations' Sustainable Development Goals are compelling calls to action. At the macro, national policy level, many countries are making changes towards a more sustainable future. However, at the meso-organizational and micro-individual levels (the implementation levels) these changes are happening more sporadically. Organizations developing, designing, building, and operating/maintaining the built environment--engineering and construction (EC) firms--have

an immediate impact on the development of sustainable cities and communities (SDG goal 11). EC professionals are also directly involved in:

- the development of systems for providing clean water and sanitation services (SDG goal 6)
- producing affordable and clean energy (SDG goal 7)
- facilitating decent work and economic growth (SDG goal 8)
- supporting industry, innovation, and infrastructure (SDG goal 9)

Additionally, EC professionals indirectly participate in other SDGs, for example:

- transportation networks and food cultivation & distribution systems - zero hunger (SDG goal 2)
- medical care facilities - good health and well-being (SDG goal 3)
- primary, secondary and higher education facilities - quality education (SDG goal 4)
- resources for building materials - responsible consumption and production (SDG goal 12)
- energy consumption from structures - climate action (SDG goal 13)

While national policies are enacted to shape the built environment, which in turn leads to improvements among the above-mentioned SDGs, EC organizations play a significant role in the implementation of those policies. However, EC organizations have the potential to do much more to promote sustainability than what is required by policy. This research sought to explore how sustainability and ethics are connected to the professional decision making of EC professionals. We frame it in the role EC professionals have in developing sustainable cities and communities (though as previously illustrated, EC professionals and the built environment encompass many of the SDGs). First, we review the relevant literature on sustainability in engineering, ethics in engineering, and professional decision making by EC professionals. We then outline our research approach, in which a group of EC professionals participated in semi-structured interviews which informed us as to how economic, social, and environmental aspects of sustainability, and ethical motivations, are considered by EC professionals. We present our findings and provide discussion relating to SDG 11 and other SDGs centered in the built environment. While the EC industry has an embedded role in many of the SDGs, for the purpose of this paper we focus on SDG 11 - *make cities and human settlements inclusive, safe, resilient and sustainable* and its targets.

Literature Review

Sustainability in Engineering and Construction

In June of 1992 the United Nations' Conference on Environment and Development (1992) outlined 27 principles that influenced the creation of the Millennium Development Goals (Sachs, 2012), which served as precursors to the SDGs (United Nations General Assembly, 2015). Today's unifying SDGs recognize social, ecological, and economic sustainability needs. The SDGs address multiple domains of interest directly related to the EC professions, including the efficient use of natural resources, waste reduction, pollution prevention and integrated environmental systems management. The promotion of human rights development, global social equity, environmental justice, and the elimination of world poverty are indirectly related. Looking across the globe, the distribution of these "goods" (e.g. wealth, natural resources, food, housing, technology) and "bads" (e.g. pollution, resource depletion, poverty, industrial disease) associated with the built environment "raises major issues about justice, equity, human rights, and opportunity for health and prosperity" (Manion, 2002).

In business literature these social, ecological, and economic needs are connected with the concept of the triple bottom line (TBL). The TBL identifies three distinct areas to measure organizational impact--people, planet, profits, though the appropriateness of this notion has been questioned (Norman and MacDonald, 2004). Others debate how the three areas should be evaluated, with some arguing that they should be taken together, as the TBL "is explicitly based on the *integration* of the social, environmental, and economic lines" (Alhaddi, 2015). Independent or collectively, these three areas are also considered the oft-noted 'three-pillars' of sustainability. Despite their frequent use it has been argued that these pillars lack a theoretical basis (Purvis et al., 2019). Regardless of these debates, the construct 'sustainability' is increasingly raised throughout academic discourse and the popular press. The fact that there is significant attention paid to the concept of sustainability, without a clear consensus of meaning, suggests that there are many opportunities for further academic research in this domain (Martins et al., 2019). For the purposes of this paper, we acknowledge the various debates of origins, theory, and application, and proceed with the construct of sustainability in a conventional form, as both a motivator and a goal for purposive efforts that seek to improve and even harmonize interactions within what we term the total environment -- the natural, social and built environments.

The EC industry has a significant impact on the total environment. In 2018, researchers suggested the EC industry "consumes 50% of natural material resources, 40% of energy, and is responsible for 50% of total waste" (Khodeir and Othman, 2018). With such an outsized impact on the planetary ecosystem, there is perhaps no more important domain for sustainability research than the EC industry.

Ethics in Engineering and Construction

In the widely-cited work *Ethics in Engineering Practice and Research*, emphasis is brought to bear on the "difficult ethical problems engineers encounter in their practice and in research"

(Whitbeck, 2011). Whitbeck further stated that “in many ways, these problems are like design problems: they are complex, and often ill defined; resolving them involves an iterative process of analysis and synthesis; and there can be more than one acceptable solution.” The notion of complexity and challenge in ethical engineering decision making is perhaps not surprising, but that there is no closed-form solution or definitive model leaves much to individuals and the profession to guide how decisions should be approached.

An alternative generalized view of ethics suggests that “there’s no such thing as engineering ethics,” but rather universal guiding principles applied to the engineering domain (Veatch, 2006). Veatch’s argument is based on John Maxwell’s argument that “there is no such thing as business ethics—there’s only ethics...Ethics is ethics. If you desire to be ethical, you live by one standard across the board” (2007). This conceptualization of ethics speaks beyond a requirement for specific contextualized ethics frames and focuses more on personal belief systems, culture, and deeper meanings about moral appropriateness, which in turn can be applied to specific domains (e.g. the EC industry).

While interesting, the framing of ethics in engineering is not the primary thrust of this research, but rather how ethics frame EC professionals’ decision making toward sustainability-centered actions. We take from the aforementioned perspectives that the application of ethics in engineering is difficult and culturally bounded, but suggest it is fundamental to some of the more challenging issues that SDG 11 presents.

Connecting Ethics and Sustainability

Sustainable decision making requires ethical thinking. While the study of ethics is broader than the idea of sustainability, the application of ethical ideals is central to effective sustainable design and construction. Sustainable decision making cannot be made without the application of numerous ethical considerations, because “virtue, rightness, consequence, and context are all ethically important in navigating sustainability” (Jennings, 2016). Ethically-based decision making is necessary to accomplish SDG 11 and its targets. For example, target 11.2 includes a component for “improving road safety.” Jurisdictional safety requirements exist, which new and retrofitted road infrastructure systems must adhere to, but is adhering to existing regulations an improvement when data suggests greater factors of safety for certain circumstances are warranted? Similarly, target 11.5 aims to “substantially decrease the direct economic losses relative to global gross domestic product caused by disasters...” However, existing regulations exist in the forms of building standards, codes, and design guidance based on historical data. Yet these regulations may fail to consider the dynamics of current and future conditions brought on by aspects such as climate change. Is it therefore ethical to design to existing standards in areas which are at risk of greater frequencies of disaster? It is the ethical character of the professional that must adopt a more proactive-cautionary stance or build additional resilience into a system when not required and at a potentially higher cost.

Unfortunately, development of and care of the built environment currently includes many unsustainable practices. Society is increasingly acknowledging this, resulting in expectations that new engineering and construction projects be designed and built in a sustainable manner. This

transformation in behavior requires the direct application of ethical thinking. Ethical concerns are implicit in the term sustainability, as “sustainability means taking into account not just utility (that is, the usefulness of something), but also moral values and goals.” It is far too common that the “ethical aspects of sustainability [...] remain implicit, since most analyses focus on economic, social, environmental, and technical issues” (Kibert et al., 2012). There is a tremendous need to make the ethical dimensions of sustainability more explicit, which are in fact central to sustainable development.

The idea that sustainability and ethical decision making are intertwined has also been integrated into engineering education. The American Society for Engineering Education’s (ASEE) statement for sustainable development education indicates that “engineering students should learn about sustainable development and sustainability,” further noting that “studies of economics and ethics are necessary to understand the need to use sustainable engineering techniques” (1999). Similarly, professional codes of ethics promote ideals of sustainable development within the built environment. The National Society of Professional Engineers (NSPE) code of ethics states that “engineers are encouraged to adhere to the principles of sustainable development in order to protect the environment for future generations” (2019). This professional code of ethics further defines sustainable development as the “challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.” Interestingly, the code provides a definition for sustainable development, yet sustainable development cannot occur without the application of the ethical code. Finally, the American Society of Civil Engineers (ASCE) code of ethics states that “engineers adhere to the principles of sustainable development; consider and balance societal, environmental, and economic impacts, along with opportunities for improvement, in their work; mitigate adverse societal, environmental, and economic effects; and use resources wisely while minimizing resource depletion” (2021b).

It is clear that sustainability should be a key component in the day-to-day ethical considerations and decisions of EC professionals. What is not clear in the literature is how and to what extent EC professionals’ decision making frames include ethically motivated sustainable thinking.

Professional Decision Making in Engineering and Construction

Researchers have investigated how large-scale, major strategic decisions take place in the EC industry. Hansen and Tatum came to the conclusion that “strategic decisions spring from many sources external to a formal planning process and that the strategy formation process is not linear.” Their research was conducted on the premise that “conventional methods of viewing strategy formation do not reflect the importance of dynamic elements (clients, champions, technical competence, etc.) in making strategic decisions.” Rather, motivation, risk, timelines and technology frame decision making (1996). Kam and Fischer contribute to the idea that dynamic variables are present and important, and suggested technology-based tools such as virtual design and construction (VDC) for use as a decision dashboard for “clear and flexible evaluation, and quick re-formulation of AEC [Architecture-Engineering-Construction] alternatives” (2004). Other technological tools have been suggested for decision making such as building information

modeling (BIM) and a “single bond VR real-time synchronization system” to enhance collaborative decision making (Du et al., 2018).

In addition to dynamic elements and technological solutions, scholars suggest that “significant decisions in construction projects are reliant on heuristic processes where assumptions are developed from past experience” (Sujan et al., 2019). It is unsurprising that past experience provides a baseline for future decisions, but the range of dynamic variables makes it unlikely that the same combination of variables, and the same levels of intensity, would be present for repeated decision points. In sustainable development projects, a multidisciplinary framework has been proposed, which may help solve the issue of different disciplines involved in a project using a variety of frameworks that cannot easily be compared in the decision making process (Xue et al., 2022).

A review of this literature gives a glimpse into the scope of professional decision making for EC companies by including technological tools, and dynamic multidisciplinary frameworks, which can incorporate sustainability related aspects. However, it is both obvious and surprising that ethical considerations are not a conscious focal element, despite such strongly and prominently positioned language of professional associations championing ethics and sustainability. This suggests a need for continued research in this domain and underscores the importance of this exploratory study.

Research Approach

This research employed a qualitative exploratory approach to understand how ethics and sustainability are connected in the professional decision making processes of EC professionals. To provide perspectives of ethics and sustainability in decision making within the built environment, EC professionals were invited to participate in semi-structured interviews. Semi-structured interviews are somewhat informal, allowing a researcher to ask questions about specific topics while remaining flexible as to the flow of informants’ responses and then asking appropriate follow-up questions (Longhurst, 2003). An informant-interview protocol was developed to provide clear and consistent initial guidelines for researchers, including primary open-ended question prompts and optional sets of follow-up question prompts.

For this study, 15 informants participated through individual interviews lasting an average of 46 minutes. Informants were selected from small/mid-sized for-profit companies in the Intermountain West. Informants were purposefully sampled across three organizational levels -- executive, management, and production (see Table 1). Each interview was conducted via video conferencing, recorded and later transcribed. The 645 minutes of interview transcripts were “open coded” to identify key concepts (Corbin and Strauss, 2008). These concepts were then thematically coded (Gibbs, 2007), and assembled into a register of the informants’ engineering and construction decisions and actions related to sustainability. This register was categorized by each action’s connection to one of the three pillars for sustainability: economic, social, environmental. Acknowledging the ubiquity and flexible application of the three pillars conception (Purvis et al., 2019), this research uses the sustainability pillars as a useful heuristic for thematic

organization. The transcripts were also thematically coded for decisions and actions along ethical dimensions.

| Respondent | Field | Level |
|---------------------|--------------|--------------|
| <i>Informant 1</i> | Construction | Management |
| <i>Informant 2</i> | Construction | Production |
| <i>Informant 3</i> | Engineering | Executive |
| <i>Informant 4</i> | Construction | Management |
| <i>Informant 5</i> | Engineering | Marketing |
| <i>Informant 6</i> | Engineering | Production |
| <i>Informant 7</i> | Engineering | Executive |
| <i>Informant 8</i> | Engineering | Executive |
| <i>Informant 9</i> | Construction | Production |
| <i>Informant 10</i> | Engineering | Production |
| <i>Informant 11</i> | Engineering | Executive |
| <i>Informant 12</i> | Engineering | Production |
| <i>Informant 13</i> | Engineering | Executive |
| <i>Informant 14</i> | Engineering | Management |
| <i>Informant 15</i> | Engineering | Executive |

Table 1 - Categorization of Informants, (Neil, 2022)

Findings

Through the lens of sustainability's three pillars (economic, social, and environmental), this research into EC professionals' ethical and sustainable decision making produced four key findings. First, economic considerations are embedded in virtually all decisions. Second, social decisions are seldom regulated or prescribed. Third, environmental decisions are highly regulated. Perhaps most surprising was the finding that, with respect to ethical decision making, there is conscious and non-conscious decoupling of ethics from EC professionals' decision making. As this research was decidedly exploratory and inductive, we draw extensively from the thoughts, concepts, and context presented by the informants, some of which are quoted (*italicized*) throughout the remainder of this paper.

Embedded Economics of Sustainability

As the concept of economics was presented generally to informants, we found overwhelming evidence that economics is a primary driver of professional decision making related to sustainable action. As informants shared their perspectives on sustainability, it was often prefaced with the theme of 'economics first'. One executive-level engineer said, *"I don't know if it's kosher to say it like this, but we value money and profits... We don't do work when we don't think it is going to be profitable; we just... there's no reason to do that."* In addition to EC professionals' own

organizational motivations, EC professionals shared similar sentiments when speaking of project owner's motivations. Another executive-level engineer explained, *"If the economics prove that we could build this facility to handle a product, and they can turn a profit, the project will go, it will execute. And if it's shown that the risk is too high for that to happen, then they won't do it."* In a capitalistic market this particular finding was perhaps unsurprising, but it was surprising to see the degree this focus was conscious and solely egocentric. Informants in this research seemed to indicate that the secondary impacts of economics were not regularly considered, that is how EC actions economically affected non-project participants. Meaning many private sector organizations prioritize financial return first for their organization (and to some extent their project team), a necessary condition, but are indifferent towards the economic sustainability of other stakeholders.

EC professionals stated that they wanted to act sustainably, but it is clear that if the economics within a project did not work, then EC professionals were unlikely to recommend or pursue such actions. For this reason, we consider economic sustainability (on the part of the EC professionals and the organizations for whom they are agents) as embedded in professional decision making. A management-level construction professional summarized this concept of economic embeddedness: *"In a lot of ways the economic, social, and environmental factors do work together. It's not a perfect world, they don't always align. Sometimes the costs don't justify it, and even though you would like to be a little more involved with some of those things, it's not financially feasible for the project."*

Non-Regulated Social Elements of Sustainability

Considering the 'social' pillar of sustainability, EC professionals regularly provided insights within three different categories: employees/co-workers, clients, and the public/community. One executive-level engineer commented, *"The founders of the company were very good from the beginning about instilling their same values in employees, and they put a high premium on giving a lot of responsibility and a lot of reward to employees who earn it, from a very young age even. They always made it a priority to put our clients and our employees first [and to] make sure people are treated well."* This "interest" or "priority" on people seemed to be motivated intrinsically. In contrast to the embedded nature of economic elements driving sustainable decision making, social elements tended to be voluntary, and of a normative or cultural nature.

Employees

Informants' comments regarding social sustainability factors in EC organizations frequently highlighted employees. One management-level construction professional said,

So when I hear 'social' related to a job, the first thing that I always think of is our staff and our subcontractors and making sure that it's a project that we can do successfully without putting undue stress or strain on our staff or our subcontracting staff...making sure that we only take projects that we can be successful on and that our subcontractors can be successful on and that we're respectful of our staff and the work life balance that needs to be maintained there.

This normative consideration of employees and subcontractors demonstrates some moral and ethical motivation for non-required or non-regulated social sustainability actions. As there was no direct economic or regulatory motivation in these situations, it may suggest there is an ethical connection to social sustainability for employee and subcontractor treatment. These indirect motivations to retain employees and subcontractor options may also point to embedded economics, simply with a longer-term time horizon.

Clients

A client-focused aspect of social sustainability, motivated by core organization values, was also discovered. One executive-level engineer shared: *“We’ve actually done some post-surveys about people, what they think of our company and those core values, ... the ability to get things done and being responsive is one of the things that I think our clients really appreciate about our company, that we were responsive to their needs, we listen. And sometimes social factors will be important to a client.”* It may be that the desire to uphold a company’s reputation will encourage sustainable action on the social front. However, another executive-level engineer explained, *“So our first focus is always to make sure our clients are happy. The easier we make their job, the happier they are with us, and the more likely they are to hire us again.”* This line of reasoning re-emphasizes the finding of embedded economics.

It was surprising how often informants spoke to the theme of client-focus. There were different ways to approach it, but for the majority of EC professionals, it was a primary priority. A production-level construction professional shared, *“Owner relationship is super important, so our owners come first. We want to make sure that they’re happy and they’re treated well. We don’t believe in doing claims; we don’t ever claim our owner. So, top priority is to make sure that our owners are happy.”* In these instances, the economic and social motivations became fuzzy and difficult to disentangle, reaffirming that the relationships between the pillars of sustainability are complex and integrated, requiring them to be taken together.

Public

The public was also identified by informants when it came to professional actions regarding social sustainability. Although, EC professionals at times defer to their clients for direct engagement of public stakeholders. One executive-level engineer explained, *“Public outreach is an important component of the decision making process, and maybe even keeping the public informed through construction as things progress. Those are all generally driven by the owner.”* Many EC firms displayed an aspiration or intent for their professionals to strike a balance of understanding, considering, and informing the client of their impact to the community, but ultimately putting decision making in the client’s court. Another engineer commented: *“We’re not necessarily in charge of all the decision making because our clients are paying for it. We typically try to put the decision in their court, it’s their job to weigh things like social versus monetary and then long-term value for the municipality.”*

In other cases stakeholder engagement (as a public-facing social sustainability strategy) seemed to be motivated by factors, such as the desire to add value and minimize costs to people. One executive-level engineer shared:

...these projects, [they] impact people's monthly water and sewer bill, and so the lower on the economic scale a household is, the harder it is to be able to pay for that monthly bill. So on the social side, certainly, we try to be as efficient as possible with the budget that we have and deliver not necessarily the cheapest project, but what we think is the right blend of value without spending money for something that's not going to provide value to the municipality.

This awareness leads to a desire for a positive impact on people, which we find to be in-line with SDG 11- targets 11.1, 11.2 (11.1 - ensure access for all to adequate, safe and affordable housing and basic services & 11.2 - provide access to safe, affordable, accessible and sustainable transport systems for all). These EC professionals understood or perceived an expanded role and responsibility in the industry and were trying their best to act sustainably in the ways they felt were possible for them. Some EC professionals really take their work to heart; they want people to benefit from the work that they do. One engineer mentioned, *"For my particular work people drink the water that we produce and so for me, making sure that public health is protected is one of the key social parts of my work."*

In some instances, EC professionals were explicit about motives being mixed, at least partially financially motivated for socially beneficial decisions and actions. Once again, the complexity of social and economic considerations is a fuzzy puzzle to unpack. One production-level construction professional said, *"I mean, at the end of the day, it probably is driven by finances because we're thinking about future jobs and future relationships. But also, I think a lot of the time it's more than just that. We're thinking about the people in these communities."* These sentiments should motivate future research to understand questions related to the interconnectedness of the pillars of sustainability as well as an exploration of additional motivators driving socially conscious actions.

Regulated Natural Environmental Considerations of Sustainability

Regulations were found to be the focal driver for decisions regarding environmental sustainability. An executive-level engineer summarized, *"First of all, what's required by law? And then also a consideration of the client's long-term concerns."* This response was indicative of most respondents' approaches. Regulators' efforts to guide organizational decisions regarding environmental sustainability appear to be successful. Additionally, there is evidence suggesting that EC professionals are making decisions beyond regulatory minimums. One management-level construction professional said:

So [the] environment recently has become much more important to contractors and to owners. In the last few years, I think we've really realized that there's a lot of improvements that we can make in construction related to our environmental impacts. Every contractor has to comply with basic environmental laws, you know there's wastewater contamination, there's dust control, there's a

number of things that just everyone has to do, regardless. And you have to put plans together and show how you're going to comply with those things, but the good contractors nowadays are taking it a step above that and figuring, "what can I do to minimize even above and beyond what's required of me?"

This provides an encouraging picture for succeeding with environmentally sustainable actions, beyond what is required by regulation. It also demonstrates a general feeling in the industry that there is a shift towards more environmentally conscious work and attitudes.

While environmental regulations do seem to be a driving aspect of sustainability decisions, yet again economics were shown to be closely intertwined. One construction professional noted: *"A lot of times you'll have sustainability consultants on projects that can help you figure out, 'what are the best ways to design your project to make it more sustainable?' [A]nd a lot of times there's a lot of benefit to the owner with that as well, because it might create a cost up-front for [the owner], but the life-cycle costs on the building will justify some of those initial costs."* Additional efforts to demonstrate to stakeholders long-term economic benefits of social and environmentally positive actions may provide a more certain way to increase sustainable community development.

Risk mitigation, largely an economic factor for environmentally focused decisions, is also intertwined beyond purely regulatory compliance. A management-level construction professional shared, *"Before we start any project, any lender is going to require an environmental study for any piece of ground and they're going to lend on. That's pretty standard industry practice, to make sure that land is not tainted and that you're not going to have liability before you acquire land or before you develop on it."* Understanding the importance of risk management and its relationship with the SDGs may provide a compelling reason for many EC professionals and owners to act sustainably. A production-level construction professional further shared:

It just depends on the job and the location and what is sensitive, environmentally, in that area....There are usually laws and we already know about them going into the projects. A lot of times it's already written into the projects because of the existing laws. We also get environmental consultants involved that are more well-versed in those areas. They help us with those plans to make sure that we know what we're doing and we're not putting ourselves in a place to get fines because environmental fines can be pretty damaging to projects... Any fines you get are going to affect your bottom line so we avoid those at all costs.

This supports continued broad public influence in determining what is environmentally sensitive and producing laws to require continued environmentally sustainable decision making. It may be possible to take the successes of regulatory requirements for environmentally sustainable decisions and broaden them to include an expanded set of socially sustainable requirements.

Summarizing the Three Pillars of Sustainability for Decision Making

To summarize how EC professionals' decisions are influenced by sustainability elements, our informants provided multiple examples of economic and social actions, which were almost

completely voluntary, and environmental actions that were predominantly regulated (see Table 2). However, a more nuanced view of voluntary economic and social actions suggests that while economic actions are voluntary, they are embedded in almost all other decisions. That is to say, the economic effect of a sustainability-centered decision appears to always be evaluated with another aspect of the decision (social or environmental), whereas social elements may not be consciously considered in economic or environmentally centric decisions.

| Respondent | Economic | | Social | | Environmental | |
|--------------|------------|-----------|------------|-----------|---------------|-----------|
| | Regulatory | Voluntary | Regulatory | Voluntary | Regulatory | Voluntary |
| Informant 1 | - | 2 | - | 3 | - | 1 |
| Informant 2 | - | 1 | - | 3 | 5 | - |
| Informant 3 | - | 4 | - | 8 | - | - |
| Informant 4 | - | 8 | - | 5 | 2 | 4 |
| Informant 5 | - | 1 | - | 3 | - | - |
| Informant 6 | - | 2 | - | 4 | - | 2 |
| Informant 7 | - | - | - | 4 | 1 | 3 |
| Informant 8 | - | 3 | 1 | 6 | 3 | 3 |
| Informant 9 | - | 1 | 2 | 1 | 1 | - |
| Informant 10 | - | 1 | - | - | 1 | - |
| Informant 11 | - | 6 | - | 4 | 2 | 1 |
| Informant 12 | - | 3 | - | 3 | - | - |
| Informant 13 | - | 1 | - | 1 | 2 | 1 |
| Informant 14 | - | 4 | - | 4 | 2 | 1 |
| Informant 15 | - | 4 | - | 4 | - | - |
| Total | 0 | 41 | 3 | 53 | 19 | 16 |

Table 2: Regulatory vs voluntary drivers of EC professionals decisions regarding sustainability actions, (Neil, 2022)

The Decoupled Ethics of Sustainability

The most surprising finding from this study was a lack of conscious ethical responsibility for decisions related to sustainability. EC professionals appear to have decoupled their ethics from the outcomes of sustainability decisions. One informant, an executive-level engineer, said, *“We’re not necessarily in charge of all the decision making because our clients are paying for it. We typically try to put the decision in their court. It’s their job to weigh things like social versus monetary and then long-term value for the municipality.”* It seems clear that EC professionals have an ethically motivated perspective in sustainability-framed decisions but bound their responsibility to the evaluation and communication of potential outcomes, not in the outcomes themselves. One engineer explained:

I think that the ethical part of it is for me to be aware of it, and then also to bring it up to my client in a transparent way, and then to frame it for them so that they can make a decision based on their value system. But ultimately, because I’m an engineering consultant, and the owner makes decisions about elective things, such as what you’re talking about – [the] balance between social,

environmental and budget and money. It really is, I feel that it's up to them. And I think the ethical part is recognizing that we all, because we have impact on those items, that we need to be abreast of it and the considerations behind it and then it's incumbent on us to talk about it. And then for the client to ultimately decide what is the right balance between those items for their community.

This helps explain the conscious thinking of some EC professionals who feel that they have a duty to inform their clients with regards to sustainability while not forcing action in a certain way.

Other informants further distanced themselves from an ethical imperative to act sustainably. An executive-level engineer shared, *“because we're the consultants and we're hired by these entities...we just respond to what they're concerned about. We're not trying to push them in any particular direction. We just give them information so that they can make their own decisions.”* Another executive-level engineer completely separated himself from the ethical duty to act sustainably. He said, *“Honestly, it's not a topic that I think very much about in my job. I understand the concepts, but again as a professional service industry, I think most of this is out of our hands, out of our control. At least while on the job, I have little influence on sustainability.”* A total surrender to the idea that civil infrastructure will be designed and built by professionals without conscious regard to sustainability-centered thinking is unsettling. If this sentiment is widespread, it may be very difficult for EC professionals to justify turning down projects that counter the related SDGs and their targets.

One management-level construction professional did however provide a more hopeful outlook regarding the intertwining of ethical motivations for sustainable decision making.

I feel like we have an ethical responsibility to be responsible environmentally as builders. We're in an industry that has a large environmental impact, and we are getting better and figuring out ways to do it and minimize those impacts....what impact is that going to have down the road, on my company, on this building for the owner, and on the environment for my kids?...I don't think that all environmental pursuits are justified, I think sometimes people get a little carried away with it, but I do believe that we have the responsibility as a contractor to be conscientious of what effect we have and do what we can to help minimize those impacts.

While there was little additional evidence from our informants to support this broad ethically motivated way of sustainable thinking, it offers a positive notion that ethical motivations within EC professionals can lead to conscious sustainability decisions. Still, the lack of this sentiment more frequently presented throughout the study is troubling.

Discussion

Within the built environment there are a host of stakeholders, but none are more central than EC professionals. EC professionals are involved in early project- and program-shaping phases, planning, design, construction, and operations. EC professionals are present at each step of built asset life cycles. EC professionals are well-trained, with professional associations to guide certification, continued education, and even standards governance. Given the

organizational/structural position of EC professionals within the built environment, and their high degree of responsibility in developing the built environment, who better to act as stewards of processes that lead to sustainable communities and cities?

The findings of this research pointed to several ways that EC professionals can contribute further to SDG 11 and the other SDGs. If sustainable actions make economic sense for owners or EC professionals, they will become standard in the industry because capitalistic markets incentivize positive financial returns. Regulations and the desires of the owner are powerful drivers in efforts to make cities and settlements more sustainable. The desires of the public often create regulation and/or influence owners to want what the public desires. There are also some EC professionals that will act sustainably because of intrinsic motivations, including ethics. For example, even if ensuring access to safe and affordable housing and basic services for all (SDG Target 11.1) may not be the most profitable for EC professionals to begin with, government funding can cause their design and construction to make economic sense; regulation can require EC professionals to design and build new infrastructure according to that goal, or EC professionals, owners and the public can be taught their ethical imperative to help all people have access to basic human rights. Thus, the findings of this research can be similarly applied to the other targets of SDG 11 as well as SDGs 7, 9, 12, and 13.

Ethical intrinsic motivation can lead to great results in many of the SDGs through EC professionals. A good example is SDG 11.2; instead of merely providing transportation services that perform their proper function, EC professionals committed to sustainability ethics will take a step back to see if their actions will help those in need or if there is a better way to do it. For SDG 11.3.2, participation of citizens in the planning and management of their communities will increase as ethically motivated EC professionals seek out the advice of those who will permanently live with what is being designed and constructed. For SDG 11.4, rather than regulation and public pressure driving the protection of natural and cultural heritage, EC professionals will feel a personal responsibility to care for the natural and cultural environment where they are designing and building infrastructure. For SDG 11.5.1, EC professionals will ask themselves if they are building resilient infrastructure whether it is required of them or not, which will decrease the number of deaths and affected persons from disasters.

The findings of this research may be used to enact change towards more sustainable development in other ways as well. For SDG 11.5.2, if those who fund infrastructure projects and the public at large can be shown the money they will lose because of inaction (economic loss due to disasters), economic drivers can help build more resilient infrastructure even though it will have a greater upfront cost. For SDG 11.5.3, disruptions to basic services could be seen as both a social and an economic factor. People and businesses could get behind funding projects that will help them prosper socially or economically if they know it will really help them. Both targets of SDG 11.6 could be heavily influenced by regulation since they are environmental factors; these changes could be driven by the public or EC professionals wanting to make a difference. The targets of SDG 11.7, while more on the social side, are measurable, and therefore could potentially be enforced through regulation or encouraged through economic incentives. SDG 11.a speaks of plans and policies. EC professionals are knowledgeable in their fields, and if they feel

an ethical responsibility to these things, they will be more likely to get involved and use their expertise to make a difference in their jobs. Also, as citizens they will be more likely to be active in their local government. SDG 11.b.2 similarly speaks of action at the local government level regarding disaster risk reduction. If there is an ethical alignment with these needs, construction and engineering professionals could use their expertise to make a lot of good happen. SDG 11.c mentions using local materials. Although there may be a habit of using imported materials, EC professionals can step into the role of advising owners to use local materials to build sustainable and resilient buildings.

Our findings also align strongly with SDGs 7, 9, 12, and 13. EC professionals touch many aspects of society through their work. With regards to SDG 7, ensuring equitable access to energy can be accelerated as the public is educated on this front and EC professionals connect with their intrinsic motivating factors regarding the people their projects are affecting. Some EC professionals really care about their end-users. If that care can be replicated by a greater number of EC professionals, this goal may be attainable at a faster pace. Our findings suggest that SDG 9, as it relates to building resilient infrastructure, will be changed quickest through regulation and social drivers such as the desires of the public or the owner. What is required or desired will be designed and built. More specifically, SDG 9.4 could be achieved through economic incentives and regulation in each country as it relates to upgrading infrastructure and adopting more sustainable technologies and processes. Construction consumes many resources, so achievement of SDG 12 will be heavily influenced by the degree to which EC professionals either decide to act sustainably or are compelled to. For instance, SDG 12.2 speaks to sustainable management of natural resources; this can be realized if there is intrinsic motivation, or if it is required by regulation, or desired by owners or the public. If the public desires it (enough), the owner will either elect to use it, or it will become regulated. SDG 12.8 speaks to people being educated on the front of sustainable development; this could be met by EC professionals understanding their responsibility to teach their clients and the public about sustainability as understood through the lens of their professions. Similar to SDG 12, SDG 13 is heavily influenced by the engineering and construction industry because of the emissions that are produced in the building and operation of infrastructure. The findings of this research can be employed to target specific ways to influence change in the industry, including helping EC professionals understand their ethical duty to minimize their impact on the environment and helping the public understand how they can influence change on this front.

Conclusion

The American Society for Civil Engineers has outlined four priorities for changing engineering practice toward more sustainable development, including “doing the right project” (priority 1), and “doing the project right” (priority 2) (2021a). This research highlights the need to advance these priorities by:

1. encouraging EC professionals to move beyond strictly economic foundations for sustainable decision making,

2. expanding training for EC professionals in the scope of social sustainability actions, such as the specific targets for SDG 11
3. working with regulators to enlarge appropriate actions to meet sustainability goals and objectives
4. and train and empower EC professionals to *re-couple* their ethical motivations to sustainable project goals and objectives.

Moving beyond economic foundations of project decision making will require institutional efforts to enhance the role and position of EC professionals. EC professionals are central in project identification, design, construction and operations, yet they lack a degree of autonomy for decision making toward sustainable outcomes. This suggests more policy interventions, education and new professional mentoring, and institutional work to change the culture of EC professionals' roles and services from advising, to responsibility for project decision making.

This research also indicates that social sustainability objectives are the least consistent in EC professionals' decision making. Providing additional training, beyond technical design and analysis, will enable engineers to be more conscious of their decision outcomes on various internal and external stakeholder groups. This is an area where a dearth of information is found, leading EC professionals to continue to emphasize technical solution finding at the expense of broader social progress.

It is clear from this study that regulatory constraints for environmental sustainability actions have been successful. EC professionals successfully incorporate regulatory imperatives as project 'design requirements,' which fits well with EC professionals' technical decision framework. This begs the question, should social sustainability requirements be expanded, and would EC professionals be able to incorporate such 'social design parameters' successfully into projects?

Lastly, this research suggests that ethics, as it relates to sustainable decisions, is overwhelmingly decoupled from EC professionals' decision making paradigm regarding sustainable actions. EC professionals view themselves as service providers, and either consciously or unconsciously decouple their personal and organizational ethics frames from sustainability-related project decisions. However, if EC professionals are societally positioned as stewards of the built environment, with follow-on responsibility for impacts to the natural and social environments, then more tightly connecting their ethical motivations to decision making authority is an imperative.

This research supports efforts in training individuals and organizations on their role in ethical and sustainable decision making. Further, it suggests that there is much institutional work to do in empowering EC professionals to leverage their ethical motivations to developing sustainable cities and communities. One informant illustrated this momentous challenge: *"I heard a lot more about sustainability in school than I've heard about it in the industry. You get into industry and you want to do the right things, but there is 100 years of tradition and weight behind the way that the industry is already doing things. You throw yourself up against that and you try to make incremental changes where you can, but it's difficult."* This research acknowledges and embraces

the gravity of this challenge, and calls for educators, professional governing bodies, and policy makers to encourage and support capacity-building efforts for EC professionals in consciously connecting ethical motivations to sustainability-centered decision making.

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The World Towards the Future. Global Initiative for Healthy Cities. Piura, Peru

Trinidad Fernandez (Fraunhofer IAO, Germany) and
Stella Schroeder (University of Piura, Peru)

Abstract

Today, more than half of the world's population live in urban areas. To achieve sustainable and healthy development, it is essential to rethink the way cities are built and organized. Health means much more than the physical situation of a person or a community or the health care system; A healthy city is based on a commitment to improve the living conditions of all its inhabitants. However, in practice, many of them continue to be planned and designed without considering its citizens' needs and scales of well-being. This research is based on the work of the MGI Morgenstadt Global Smart Cities Initiative in Piura, an intermediate city in Peru that is strongly affected by the consequences of climate change. Through a City Lab, the initiative seeks to generate replicable and viable solutions and strategies using advanced technologies and an in-depth analysis of local development demand. Based on a selection of indicators and their impact factors, comparative data is used to evaluate Piura's performance holistically, supporting the concept of a healthy city and the local action needed to comply with the SDGs and the New Urban Agenda. The analyzed data and its results help to define urban projects at the local level that aim to address the challenges identified in the city and building on the achievement of a long-term vision development. The proposed solutions are based on aspects of health in its different dimensions, combining with opportunities for social and economic innovation that support sustainable urban development.

Keywords: healthy city, wellbeing, City Lab, sustainable development, Piura

Introduction

As of 2018, more than half of the world's population lived in urban areas. It is expected that in 2050 cities population reaches near 2.5 billion people leading to a rapid urban sprawl together with dense and congested cities, mainly in countries of the Global South (UN, 2018). Market-driven trends have contributed to increasingly unhealthy lifestyles as well as unequal living conditions in cities, leading to overwhelmed and underprepared planning authorities when addressing these emerging urban challenges. (Barton and Grant, 2013). An example is the rapid urban expansion, resulting in increasing car-dependency of citizens (Rao *et al.*, 2007) as well as areas without access to basic services (Fekade, 2000), which new concepts of sustainable urbanism seek to improve. Several international bodies have recognized the key role of an integrated sustainable urban development vision, most notably through the UN 2030 Agenda for Sustainable Development, its Sustainable Development Goals (SDGs), and the New Urban Agenda (NUA) adopted in 2018 at the Habitat III UN Conference. This outlook has been promoted

by the research and innovation policies of various international bodies, such as the European Commission with its smart cities and nature-based solutions programs, the incorporation of city-based initiatives and projects within the International Climate Initiative (ICI) of the German Federal Ministry for Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), or the Healthy Cities initiative of the World Health Organization (WHO), even though it was originally conceived in the 1970s, has become more prominent for the implementation of the SDGs and the WHO health promotion agendas. While there is an understanding that supporting sustainable urban development could improve the health of the city's population (Portney and Sansom, 2017), it is essential to rethink the way cities are built and organized to achieve it.

To comprehend the relationship between healthy city and sustainable city, defining the meaning of health is required. From one part, the term *health* in general is often related to physical health, or the absence of illness on a person. It appears as a human right in several legal structures and first-level international agreements such as the Universal Declaration of Human Rights since its creation in 1948 (OHCHR, 2008). However, health encompasses many more areas of a person's life than merely physical, as reflected by the WHO as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1946). Mental health is linked to the emotional, psychological and social well-being, as it affects how people think, feel and act when facing life. This concept incorporates the prevention, treatment and rehabilitation of people suffering several conditions related to mental disorders (WHO, 2019). Furthermore, social health was identified as the ability to adapt and self-manage towards environmental changes and challenges, including the capacity of developing satisfactory relationships with others (WHO, 2021). Additionally, the concept of environmental health arises, and it is determined by the and environmental factors with an impact people's lives. This last concept is based on the disease prevention and creating environments for an improved health (WHO, 2018).

Within the UN Agenda 2030 and the SDGs, health appears as a key element to achieve sustainability, specifically within the objective 3 that is related to good health and well-being. The SDGs have built a functional framework to have a common global approach while supporting local mechanisms for implementation to close the disparities in the distribution of health gains. Health can be found in all 17 objectives as an overarching concept that needs to be considered in all aspects of planning strategies.

Cities play a key role in achieving the SDGs. They account for about 70 % of global carbon emissions (Eames *et al.*, 2013) and consume more than 60 % of the natural resources (Williams, 2019). Rural-urban migration is driven by the advantages, services and benefits for their inhabitants, such as job creation and educational opportunities, becoming centers of innovation, modernization, and wealth creation (Ichimura, 2003). Rapid urbanization results in an increasing number of inadequate and overburdened infrastructure and services such as waste collection, water and sanitation systems, roads and transport, worsening air pollution and unplanned urban sprawl (UN, 2015a). SDGs are considering the urban challenges, aiming at designing more inclusive, safe, resilient, and sustainable cities and human settlements, as referred within the SDG number 11. Ensuring access for all to adequate housing and urban infrastructure are essential when building a holistic healthy society, as it takes in consideration aspects from social,

mental and environmental health (Ramirez-Rubio *et al.*, 2019). There are several cases where green and public spaces are frequently not enough and the physical activity levels of their inhabitants are under the healthy recommended average (Mueller *et al.*, 2017; Nieuwenhuijsen, 2020a). Due to the strong interlinkages between the 17 SDGs and their 169 targets, it is considered essential to establish integrated approaches to effectively implement and operationalize the SDGs at the local level.

Furthermore, cities are key players on decarbonization and meeting the Paris Agreement targets (Wei, Wu and Chen, 2021) on rapid emission reduction, resilience building and local action (UN, 2015b). A healthy city then is based on a commitment to improve the wellbeing of all its inhabitants. According to WHO (2018), a healthy city refers to a process where cities become conscious of health and strives on its direction to improve its performance towards it.

A large part of health afflictions is produced by living in an urban environment. Cities are susceptible to several health risks related to basic infrastructure, such as food and water insecurity, neighborhoods designed to discourage social interaction, air and water pollution, extreme temperatures, flooding and droughts aggravated by climate change. Gasparrini *et al.* (2015) expose that extremely high temperature may be related to 0.4 % of annual premature mortality worldwide. According to the research of Cohen *et al.* (2017) an approximate amount between 5.7 million to 7.3 million people die each year because of high air pollution levels, and there are also 3.2 million death related to inadequate physical activity. Stevenson *et al.* (2016), conducted an urban modeling to reflect the health impact of the compact city concept which considers the enhancement of land-use density and variety and the distance reduction to public transportation to lower motorized mobility, such as walking, biking, and public transport. This modeled compact city resulted in health improvements for all cities, especially for diabetes, cardiovascular and respiratory disorders, this translates into a global health gain from 420 to 826 DALYs⁶⁹ per 100,000 people. Commitment for urban health improvement, a process and structure to achieve it needs to be reflected within urban plans and strategies. A healthy city creates and improves continually its physical and social environments, enabling people to support each other to build communities.

According to Nieuwenhuijsen (2020b) several cities still lack a clear vision of a sustainable, livable, and healthy city or how to transfer this vision into concrete standards, policies, plans, and procedures. Many cities continue to be planned and designed without considering its citizens' needs and scales of well-being. Health disparities and inequities are often related to factors such as access to and quality of available public spaces, representation and participation degree in shaping processes, and urban environment maintenance. Current growth rate worsen urban problems and challenge planning institutes, e.g., green spaces accessibility tends to reduce as cities grow, directly affecting the people's experience of urban nature and decreasing mitigation capacity (Fuller and Gaston, 2009). Fragkias *et al.* (2013) highlight a close direct relationship among inhabitants and the amount of CO₂ emissions in a city. Even though behavior and

⁶⁹ Disability-adjusted life year (DALY) is a measure developed by Harvard University in 1990 for the World Bank to track overall health and life expectancies based on the potential years lost due to premature death or healthy life lost (WHO, no date).

acquisition power have a higher influence on it, population rate and economy growth have a direct incidence on how fast the city is expanding, challenging urban planning and strategies to adapt to the new boundaries.

There is a need to move from data and information to knowledge and action for urban sustainability and human well-being when understanding large urban infrastructure systems (Ramaswami *et al.*, 2016). The influence of infrastructure on the health of and in cities is addressed by different authors, for instance, Nieuwenhuijsen (2020b) argues that a design of a city with large infrastructure for vehicles, will produce eventually that people decide to drive even more, generating several impacts such as a higher amount of air pollution, noise and stress levels, rise of the urban temperatures (urban heat island), lack of exercise, and to an increase of related diseases such as cardiovascular and respiratory disorders, decreased cognitive performance and thus premature mortality. On the contrary, a city designed with an investment in infrastructure for cycling will produce eventually more people using bikes. As well as argued by Gehl (2010), it is important to invite the people using healthier infrastructures and thus improving cities life. As cities are complex entities, there is no general solution recipe that can be applied in all cities to fulfill their needs. Thus, every strategy and intervention should be tailored and specified for each city.

This research is based on the work of the Morgenstadt Global Smart Cities Initiative (MGI), a project funded by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) through the International Climate Initiative (IKI) increasing urban resilience to tackle climate change impacts, as well as to support their greenhouse gas (GHG) emission reduction efforts. In order to overcome these challenges and ensure a healthy, safe and prosperous place to live, City Labs are implemented to identify possible areas to intervene and co-create project ideas with various stakeholders, improve resilience and climate change adaptation potential. The initiative leverages on the analysis, identification and development of sustainable cross-sectoral solutions to optimize urban infrastructures, processes or services in cities of India, Mexico and Peru.

In Peru, project action takes place in Piura (Figure 1), the fifth largest city in the country with around 480,000 inhabitants (INEI, 2017) and strongly affected by the consequences of climate change. The city experienced an exponential growth driven by the need for housing and the occupation of urban land through invasions or illegal land markets (Cockburn, 2019), challenging all urban services. The Metropolitan Development Plan developed in 2020 as part of the Reconstruction with Changes Plan after the last El Niño and financed by the Ministry of Housing, Construction and Sanitation (MVCS) of Peru is still in process of approval. So far, Piura does not have any valid urban development plan or other tools supporting spatial development. Although, health aspects in city planning are not part of the local agenda yet, their importance is mentioned at the national level with the SDGs and their identified contributions. However, there are no guidelines focusing on concrete measures on how to follow them or requiring their implementation at local level.



Figure 1. Location of Piura. Source: Authors based on National Georeferenced Data Platform Geo Peru (Gob.pe, 2022)

This research paper seeks how a quantitative and qualitative data-based analysis of Piura's challenges and opportunities can contribute to the design of project ideas driving a health-oriented sustainable urban development. The paper explores the MGI approach and its proposing solutions in relationship with healthy city aspects, combining different opportunities for social and economic innovation that support sustainable urban development.

Methodology

The City Lab is a framework (Radecki, 2019) for designing individual sustainability strategies for cities based on innovation aspects, promoting the use of clean technologies, and establishing a broad interdisciplinary dialogue with local stakeholders. This methodology consists of an in-depth city analysis based on performance indicators that assess quantifiable sustainability performance and key action fields essential for sustainable development. In addition to these quantitative elements, expert interviews and workshops are conducted with key stakeholders from the public, private and academic sectors to identify the unique impact factors influencing the urban system of each city, ensuring a high degree of local participation and complementing the quantitative analysis and the co-creation of sustainable projects for the city development.

According to this methodology, the research focusses on healthy city planning solutions and consists of three parts:

First, a considerable amount of information is analyzed regarding the city performance. The indicators are selected according to the concept of a healthy city planning. Considering for example, indicators directly related to the health system of the city, also considering health in a wider context including indicators that measure the access to public spaces, basic services or

infrastructure. Benchmarks used are rather on national or international basis, or following proposed standards defined on global level. The data is used to evaluate Piura's performance holistically. Second, based on the on more than 30 interviews with local stakeholders and its correlation with reliable performance indicators data, a total of 24 impact factors were revealed that have a substantial influence on health-oriented development and systematically seek to understand the unique and characteristic elements of the city. Third, a prioritization to arrange the project ideas are derived, based on the SDGs, the Agenda 2030 goals for a sustainable and healthy city, and other components such as the alignment of the ideas with the city's objectives and vision, the engagement of local stakeholders identified during the City Lab activities, the potential for replicability within the region, as well as their potential regulatory constraints and risk of approval. This way, projects are arranged according to its relevance to address the challenges identified in the city and building on the opportunities on the achievement of a long-term vision to boost sustainable and healthy development of Piura.

Results

This section shows the main results of the quantitative and qualitative data-based analysis of the City Lab and the relationship of selected project ideas with each other and towards a development of Piura that supports aspects of a healthy city planning. Moreover, three project ideas are presented that help the transformation of Piura.

Indicators

The analysis of the indicators has been carried out based on a benchmarking system, where each value is evaluated against a specified range to determine its performance in terms of low-medium-high compared to the average and later defined as below average, average or above average. Data for the indicator analysis have been collected using primary and secondary sources, including remote data collection, evaluation of various statistical reports such as policy documents and Piura development plans, along with information obtained during interviews with local experts and stakeholders, as well as knowledge shared by local partners.

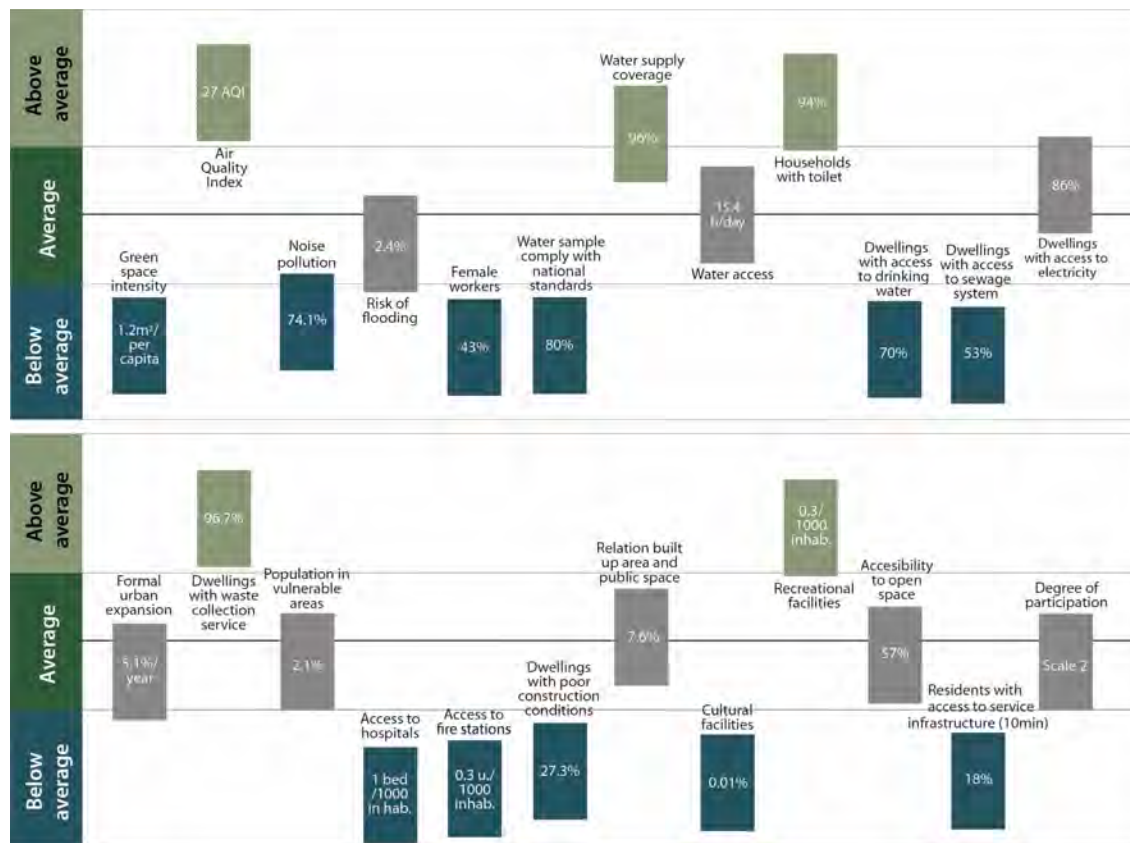


Figure 2. Indicator data of Piura related to benchmarking system.

Source: Authors

A list of 24 indicators assesses different dimensions that relate to a healthy city, including its social, environmental and economic aspects. The analysis reveals that, in Piura, 13 indicators are performing satisfactorily, while 11 indicators are in a critical state and require action. Figure 2 shows the results of this first phase of the work. The photographs of Figure 3 demonstrate the local situation in Piura related to the indicators of formal urban expansion, dwelling with poor construction conditions and population in vulnerable areas.



Figure 3. Photographs of Piura (1) informal urban expansion in the Southwest of the city informal settlement Villa Chulucanas, (2) poor construction conditions in the humane settlement of Las Dalias and (3) vulnerable living conditions in the human settlement of Santa Julia.

Source: Authors

Findings shows that Piura has distinctive strengths and weaknesses in terms of sustainability. As main results, the highest percentage of the population resides in inadequate physical housing and has at least one unmet basic need, highlighting the vulnerability of its resident population. In addition, the city has been growing over the last 10 years, which has been increasing exponentially and will continue this trend. In this sense, as has happened at the national level, the informal urban sector in Piura has been emerging due to the constant urban growth, first carrying out subsistence activities such as the sale of their own crops, handcrafts, etc. According to local information it is estimated that about 70 % of the city's urbanized land is occupied by informal or spontaneous constructions.

Piura has a sanitation coverage of 94 % (INEI, 2017), corresponding to an optimal scenario, as for the classification above. It is worth mentioning that from this percentage, only 66.4 % of the inhabitants are connected to the public sewage network inside their dwelling. In the area of sanitation, access to toilets is a highly relevant indicator for defining part of a healthy city. This parameter represents the percentage of the population with access to toilets. UNICEF and the WHO (2015) define the following benchmarks for this indicator: critical = < 50 %, average = 50 - 90 % and optimal = > 90 %, considering that people have the right of access to a decent sanitation facility. This definition includes the public sewage network inside the dwelling, the public sewage network outside the dwelling but inside the building, the septic tank, the septic tank or biodigester, the latrine and the cesspit.

Another challenging indicator identified is the green space intensity, with 1.3 m² per inhabitant. This indicator points out the challenging situation in Piura on this matter, as the city has a very low level compared to the WHO recommendation that establishes a minimum green area of between 10 m² to 15 m² per inhabitant, distributed proportionally in relation to population density. Many other deficits can be observed in the technical and social infrastructure of the city, access to hospitals or fire stations, adequate access to schools, hospitals, as well the deficit of cultural facilities.

Overall, the indicator analysis shows that Piura has made some important steps towards becoming a sustainable and healthy city, but still has some challenges to address moving towards this goal.

Impact Factors

Within the Fraunhofer Morgenstadt methodology employed by MGI, a sensitivity analysis was conducted that seeks to represent a partial set of variables that affect a complex system such as an entire city. For this analysis, 87 impact factors were identified for Piura, which were evaluated according to their correlation with each other and are represented in an illustration based on Frederic Vester's sensitivity model. This system allows understanding the behavior of the city system as a whole, for which a distinction is made four factor categories. The first one called "drivers" refers to factors with a high influence on other factors but that are independent of other factors. Other factors are the levers that have a high impact in and from other factors. The third category refers to indicator factors that have low influence on other factors but instead are

influenced by other factors. However, these factors are important to consider as they are the ones that shows changes in the systems, so they are mostly used to identify transformation processes. The latter category includes those that do not have a great influence are not influenced and have a low influence in other factors, being therefore consider as inactive or buffer factors. Nevertheless, these are not explained in detail, as they do not have a great impact on urban transformation (Onyango, 2016).

While these factors analyze the city as a system, the following are highlighted as related to the healthy city concept for the city of Piura. Figure 4 demonstrates the model of all three impact categories.

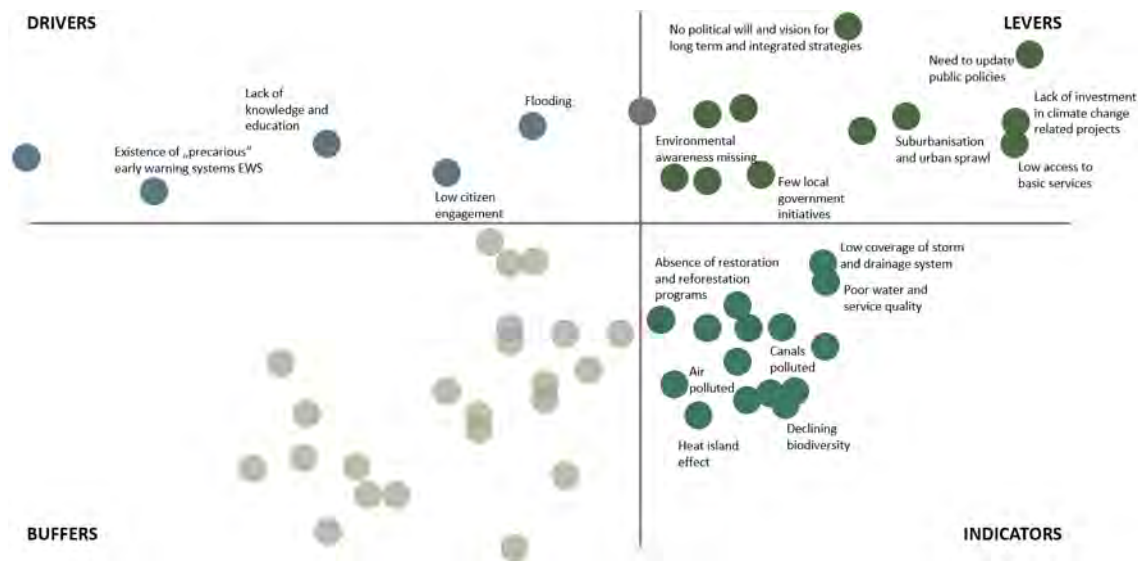


Figure 4. Model of all three impact categories related to the healthy city concept.

Source: Authors

Levers factors: Within the lever factors, they are found in two main thematic areas on urban strategies and accessibility. The first area includes factors related to the strengthening or need for long-term and integrated plans or strategies, need to update of public policies, lack of an environmental commissions, lack of governmental initiatives, lack of investment in climate change adaptation and mitigation projects and lack of environmental awareness. The second area refers to the rapid growth of the city, which has meant an increase in informal housing and self-constructed dwellings, lack of maintenance of public spaces, limited reach of the municipality within the most vulnerable areas and low coverage or access to basic services such as water, electricity and sewage connection as well as inadequate infrastructure for the proper functioning of the city. It is considered essential to work on these two major areas in order to strengthen the transformation towards a healthy city. These factors will become strong for urban development and bring stability for the implementation of long-term and integrated plans and strategies.

Drivers factors: In the case of drivers factors, four main factors are identified, of which two are directly related with the population, and two to the physical characteristics of the city. The first area contemplates lack of knowledge and education, understanding its contribution to people's capacities to solve the problems posed by climate change and urban sprawl. Also, it includes the inequality, poverty, segregation and social exclusion that exist in the city today. The second theme contemplates flooding factors, which multiply urban problems and that although they cannot be stopped, it is possible to work on prevention and adaptation of the city in the same and that must be supported by early warning systems (EWS), which are currently considered precarious due to their lack of precision. Supporting projects and plans into the direction of these drivers factors strengthen the city capacities, especially building upon social sustainability and its geographic conditions that cannot be changed.

Indicator factors: It is in these areas that citizens will recognize that development occurs in the first place and affect the city's quality of life. In relation to the healthy city, the factors of polluted waterways, declining biodiversity together with the absence of restoration and reforestation programs, air pollution, poor solid waste management together with ineffective management of the water and sewerage service provider are identified, poor service and water quality being considered a risk to the health of the population, the existence of unconventional sources of drinking water supply, isolated solutions for storm drainage and the existence of heat islands resulting from the increase in air temperature mainly due to the growing urban sprawl and the scarcity of vegetation. These factors have a strong relationship with the indicators developed in 3.1. However, their condition within the city is considered a factor, as they are influenced by other but highlights changes within the system.

City Projects

One of the biggest challenges when planning a city is to translate the main gaps and vulnerabilities of a city into specific measures, planning strategies and local orientated project ideas.

Project ideas in Piura focus on improvements to prevent settlement in vulnerable areas of the city, better access to basic needs and social infrastructure system, as well as new green areas. Three of the prioritized projects are presented in this paper because of their high potential to create healthy and sustainable cities. Table 1 sums up the relation to the indicators defined and analyzed in an earlier step of this work and that are supposed to be improved by the implementation of the project. In addition, the projects are aligned with the different goals, targets and indicators of the SDGs enabling them to relate and comply with the Agenda 2030 goals for sustainable and healthy cities. Projects are described highlighting the key components of the project ideas, including their objectives, demonstrating how it can influence the urban development of healthy cities in a positive way).

Table 1: Project Ideas Related to SDG Targets and Indicator System Presented in 3.1

| Projects | Related UN SDG | Related SDG Target | Related SDG Indicator | Relation to MGI indicators |
|--|---|---|---|---|
| Decentralized system for sustainable water management | SDG6: Clean water and sanitation | Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all | Indicator 6.1.1: Proportion of population using safely managed drinking water services | Dwellings with access to drinking water |
| | | | | Water access |
| | | Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations | Indicator 6.2.1: Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water | Households with toilets |
| | | Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally | Indicator 6.3.1: Proportion of domestic and industrial wastewater flows safely treated | Water sample comply with national standards |

| | | | | |
|--|--|--|---|--|
| | | Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity | Indicator 6.4.1: Change in water-use efficiency over time | <i>no indicator suitable</i> |
| | | | Indicator 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources | <i>no indicator suitable</i> |
| | | Target 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate | Indicator 6.5.1: Degree of integrated water resources management | <i>no indicator suitable</i> |
| | SDG3: Good health and well-being | Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination | Indicator 3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services) | Dwellings with access to sewerage system |
| | SDG9: Industry, innovation and infrastructure | Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional | <i>no indicator suitable</i> | <i>no indicator suitable</i> |

| | | | | |
|--|---|--|---|-------------------------------------|
| | | and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all | | |
| | SDG11: Sustainable cities and communities | Target 11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums | Indicator 11.1.1: Proportion of urban population living in slums, informal settlements or inadequate housing | <i>no indicator suitable</i> |
| | | Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations | Indicator 11.5.3: (a) Damage to critical infrastructure and (b) number of disruptions to basic services, attributed to disasters | Water supply coverage |
| | SDG13: Climate action | Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and | <i>no indicator suitable</i> | Population in vulnerable areas |
| | | | | Risk of flooding |

| | | | | |
|---|---|---|--|---|
| | | natural disasters in all countries | | (drainage system) |
| Reforestation of urban green corridors – arborizing the city | SDG11: Sustainable cities and communities | Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management | Indicator 11.6.2: Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted) | Air quality index |
| | | Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities | Indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities | Accessibility to open space |
| | | | | Green Space Intensity |
| | | | | Residents with access to service infrastructure (10min) |
| | | | | Recreational facilities |
| | SDG3: Good health and well-being | Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination | Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution | no indicator suitable |
| | SDG13: Climate action | Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and | no indicator suitable | Risk of flooding (drainage system) |

| | | | | |
|--|--|---|---|---|
| | | natural disasters in all countries | | |
| | | Target 13.2: Integrate climate change measures into national policies, strategies and planning | Indicator 13.2.2: Total greenhouse gas emissions per year | Air quality index |
| | SDG15: Life on land | Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world | Indicator 15.3.1: Proportion of land that is degraded over total land area | Relation built-up area and public space |
| | | Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts | <i>no indicator suitable</i> | <i>no indicator suitable</i> |
| Tactical urbanism, including pocket parks | SDG11: Sustainable cities and communities | Target 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and | Indicator 11.3.2: Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically | Degree of participation |

| | | | | |
|--|---|---|--|---|
| | | management in all countries | | |
| | | Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities | Indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities | Accessibility to open space |
| | | | | Green Space Intensity |
| | | | | Residents with access to service infrastructure (10min) |
| | | | | Recreational facilities |
| | SDG3: Good health and well-being | Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination | Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution | Air quality index |
| | SDG5: Gender equality | Target 5.c: Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels | Indicator 5.c.1: Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment | Female workers |
| | SDG10: Reduced inequalities | Target 10.2: By 2030, empower and promote the social, economic and political inclusion of all, | Indicator 10.2.1: Proportion of people living below 50 per cent of median income, by sex, | <i>no indicator suitable</i> |

| | | | | |
|--|---|--|---|------------------------------|
| | | irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status | age and persons with disabilities | |
| | SDG13: Climate action | Target 13.b: Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities | Indicator 13.3.1: Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment | Degree of participation |
| | SDG17: Partnerships for the goals | Target 17.16: Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular | Indicator 17.17.1: Amount in United States dollars committed to public-private partnerships for infrastructure | <i>no indicator suitable</i> |

| | | | | |
|--|--|-------------------------|--|--|
| | | developing countries | | |
|--|--|-------------------------|--|--|

Source: Authors

Decentralized System for Sustainable Water Management

As Piura is located in a desert region; natural water sources, both underground and atmospheric (rain), are scarce. Adequate management of water resources is important, as the water management cycle in the city is deficient. This situation is the result of a lack of sustainable planning and the lack of consciousness when using this resource (e.g., using drinking water for irrigating green areas). Thus, the project focuses on the implementation of a decentralized wastewater treatment systems to avoid irresponsible drinking water consumption (i.e., where drinking quality water is not necessary). Moreover, this new decentralized system can secure access for sustainable water management, aiming to motivate the private sector to move towards a circular economy and increase interest in its replication in other areas. In addition, implementing this type of system promotes environmental awareness around using water in a responsible way. This project seeks to improve the sewage system of the city as it has a direct relation to the urban water system. Furthermore, it contributes to the vision of an inclusive city by providing and ensuring access to drinking water, focusing on citizens who don't have access yet. The project direct impacts the SDG6 on clear water and sanitation, however, it is expected that it contributes to better living conditions for its inhabitants (SDG3), improving the existing water infrastructure (SDG9), facilitating access to water for those most in need (SDG10) and supporting sustainable urban development (SDG11) and climate action (SDG14).

Reforestation of Urban Green Corridors – Arborizing the City

Reforesting the city contributes to mitigating urban heat islands - areas with an increase of temperatures as a result of the built environment, enhancing the thermal comfort of microclimates to reduce energy consumption through the shade provided by the planted trees. At the same time, the project focuses on urban corridors, representing an opportunity to promote sustainable mobility (e.g., combined with bike lanes) while contributing to a better air quality. The intervention fosters the potential of Piura's main streets and the river corridor to increase urban vegetation cover within these areas and become green corridors. Therefore, this project aims to not only improve the quality of the urban infrastructure, but it will contribute to the citizens' well-being as it improves access to a public recreation space. From the environmental point of view, it introduces native species that are representative of the region or climate adapted ones, greening the corridors, providing shade as a very important element to enhance its use in a desert City like Piura and improving the appearance and attractiveness of the city. The project aims mainly to enhance the sustainable urban development in Piura (SDG11). It also improves thermal comfort (SDG14) and life conditions in the city (SDG3) and support biodiversity and species conservation through green corridors (SDG15).

Tactical Urbanism and Pocket Parks

Through tactical urbanism as a fast, low-cost and scalable approach temporarily changing the urban environment, the project seeks the transformation of the public spaces in Piura, making them more environmentally friendly and pleasing to the population. In this way, with the creation of pocket parks as a small intervention in several areas within the city, the project reinforces the idea of an inclusive and sustainable city with better access to recreation spaces and cultural activities, that can be offered by these new public spaces.

Part of the proposal includes the creation of new job opportunities for the vulnerable; the socially and occupationally excluded population, as they can make use of the space by vending local products or offer gastronomic services. This aspect of the project can strengthen local food markets and access to groceries, supporting the concept of a 15-min city, promoting walking and cycling. The program includes education and training tools around the generation of these kind of interventions, replicating the interventions over time, thus contributing to local development and relying on the talent of the community. Moreover, tactical urbanism includes aspects of public engagement, as it involves the community in decision making and design and use of the space. The design of these interventions proposes using viable, sustainable, low-cost, flexible construction systems and methods for reusing greywater, since water resources are scarce in the city. Considering all the above, the project aims to provide quality public spaces for everyone starting with one intervention to be replicated in several areas covering the whole city. While the project focuses on creating new green spaces in the city for a more sustainable Piura (SDG11). This new place will improve the life quality of its inhabitants (SDG3), will offer a new public space (SDG10). Partnerships with the neighbors and local businesses around the intervened site will be initiated to use and maintenance of the space (SDG17), fostering activities with productive activities, such as urban gardening, with minority groups and women (SDG5).

Conclusions

People's health is the result of a large number of inter-related factors that include social, economic, political, physical and environmental aspects. Any deficit in the city can influence the health of the community as a whole. The ultimate goal of both, healthy cities and sustainable development is to provide a framework for the application of a participatory and inclusive process to grant access to basic needs to improve citizens' living standards for all and create a truly healthy community. However, this implies that both neighbors and decision-makers, recognize and work together in processes that favor adequate sustainable urban development. Furthermore, the concept of healthy cities is not new, but it has a potential to support other urban concepts such as smart or resilient cities, combining efforts for a better environment.

The definition of the 17 SDGs has a strong relevance for all governmental levels and are recognized targets to reach prosperous development worldwide. However, cities at local level are the ones with the capacities to have a direct influence climate change adaptation and mitigation by protecting the environment and improving well-being of its inhabitants. Although cities are mostly represented in SDG 11 on sustainable urban and community development, it is important

to work with them for their development at the local level, and to understand that they are not isolated goals, but interlinked and mutually reinforcing. While working with the SDGs, it is considered crucial for local governments and identify indicators to measure the city performance linked to them. The SDG targets and indicators can support them, however, the framework has challenges when referring to local actions, as their focus are still conceived with filling gaps and addressing challenges on a national level. Tools as the Morgenstadt MGI framework focus on solutions that have a bigger impact on the local level. This way, cities can focus their efforts to reduce the gap of the sectors supporting sustainable urban development.

The results presented in this paper include a quantitative and qualitative data-based analysis of the city's challenges and opportunities and action-oriented project ideas. The study thus is looking for opportunities and understanding problems as new challenges, while maintaining a multi-sectoral approach. The proposed solutions combine ecological and resilience objectives with opportunities for social and economic innovation that support the concept of a sustainable and healthy urban development. In this vein, political commitment and intersectoral action are indispensable for the progress and further step for project implementation. Furthermore, connecting the indicators with the proposed solutions highlights more than just their performance and impact in a specific area. They reflect their interdisciplinary nature and relevance to other urban sectors, contributing to a city's environmental, social and economic sustainability.

Situations such as the Covid-19 pandemic or natural disasters as a result of geographic location, climate change, or both, such as the extreme flooding event in Piura due to the, the ENOS (El Niño–Southern Oscillation), force cities to think about strategies to prevent and keep the wellbeing of their citizens. In both cases, planning strategies and actions with an understanding of the urban system performance to bridge the gaps are considered essential. Cities will benefit from measuring and monitoring urban indicators to comprehend the complex urban ecosystem, as well as to better identify which areas to intervene in, thus distributing efforts and available resources more efficiently.

As a next step, the MGI project continues detailing each one of the pilot project ideas and develops a smart financial report to find suitable financial mechanisms and seek for possible funding options and investors. Furthermore, the project will work on the implementation of one pilot project in the city, as part of the initiative considers a brief seed funding for it. The project selected relates to concepts of tactical urbanism, converting one problematic space of the city into a new public area with green areas, vegetation with little water demand and an integrated irrigation system, supporting the healthy city concept. The whole process is accompanied by participatory workshop for sensibilization with the local population living close to the area, schools and neighborhood associations.

Further research includes focusing on healthy cities as a governance transformation process to reach the SDGs, to understand the appliances of the concept within all government levels. This scope could also focus on how these institutions are transforming their way, to conceive planning and designing their urban strategies after the definition of a healthy city concept. Furthermore, new efforts could be oriented around the application of this concept in a city who has to include it

within its urban or metropolitan development plan to validate its performance, the opportunities and challenges when implementing it. Finally, further research to understand how illnesses, or for instance the effects of the Covid-19 pandemic on a healthy city is recommended as a research focus to look into next.

Acknowledgements

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Improving Air Quality by Reducing Aircraft Fuel Use and Emissions with Semi-Autonomous Electric Tugs

Brett Stone (Utah Valley University, Utah, United States),
 Matt Jensen (Utah Valley University, Utah, United States), and
 John Salmon (Brigham Young University, Utah, United States)

Abstract

In order to ensure healthy lives and promote well-being for all at all ages even as the demand for global air travel grows, reducing emissions from aircraft is increasingly important. Previous attempts to minimize the amount of time aircraft engines are turned on before take-off are examined and analyzed. The proposal to use electrically powered, semi-autonomous tugs to ferry aircraft on the ground and its ability to produce a significant reduction in fuel use and thus emissions is evaluated. Analysis is performed using the Federal Aviation Administration's Aviation Environmental Design Tool analysis software to simulate the effects implementation would have at the busiest airport in the United States (Hartsfield-Jackson Atlanta International Airport). A design for such a tug and control and coordination system is proposed and described. It is shown that implementation of such a system would result in significant reductions in fuel use and emissions. Areas of future research are outlined.

Keywords: Air quality, Emissions, Electric vehicles, Autonomous, Fuel use, Aircraft, Airliner

Nomenclature

AEDT..... Aviation Environmental Design Tool

APU..... Auxiliary Power Unit

CNG..... Compressed Natural Gas

ICE..... Internal Combustion Engine

LIDAR..... Light Detection and Ranging

LTO..... Landing and Takeoff Cycle

SDG..... Sustainable Development Goals

Background

Goals 3.9 and 11.6 of the United Nations' Sustainable Development Goals (SDGs) and Targets for

the 2030 Agenda articulate the great importance of reducing air pollution [1]. Even in developed countries, air pollution can have significant negative impacts on health and well-being. In Utah in the United States, research has found that approximately 5,000 people die prematurely annually because of poor air quality caused by pollution, reducing the average life expectancy of state residents by more than two years [2]. Globally the story is similar, especially as emerging economies develop a growing appetite for activities such as airline travel. In China, for example, between 1990 and 2017, air traffic increased 29-fold, with corresponding increases in pollutants, despite reductions in per passenger emissions during the same time period [3].

Civilian air travel accounts for about two percent of anthropogenic CO₂ emissions, but air travel is predicted to increase 400 percent by 2050 [4]. Airlines, airports, and other stakeholders, including the general public, face multiple sources of exigent pressure to reduce airliner emissions, including increasing regulations [5], fluctuating fuel prices [6] and the need to reduce greenhouse gas emissions related to environmental concerns [4]. As well, air quality near major airports (commonly near cities) is usually worse than elsewhere [7, 8]. This is especially true of PM 2.5 emissions. Rangel-Alvarado et-al. summarized research from various sources and show that emissions from aircraft idling, taxiing, and taking off tend to have an out-sized correlation with PM 2.5 levels at the airport and surrounding areas [8]. For these reasons, reducing the fuel use of passenger aircraft during those stages will be essential to achieving SDGs 3.9 and 11.6 [9, 10].

The typical approach to reducing fuel use has been to find ways to increase fuel efficiency of airplanes themselves. This effort, while laudable, usually results in one of two scenarios: In the first scenario, a marginal increase in fuel efficiency is achieved by taking an evolutionary step forward such as adding winglets or increasing the use of carbon-fiber composite parts to lighten the aircraft [11, 12]. This route requires extensive engineering design and testing work and usually results in improvements in fuel efficiency in the range of 1-6 percent [13].

The second scenario involves the proposal of some revolutionary new airliner design, such as a flying wing or a blimp or an electrically powered aircraft [12, 14]. These design proposals, while likely to deliver step-change improvements in fuel efficiency and worthy of research and development, also demand orders of magnitude more in terms of design and testing than scenario 1. It is understandable then, why they are often considered to be ‘perpetually 10-20 years in the future’. Even if such a new airliner could be designed, tested, and ready to produce immediately, it would take years if not decades to replace the current fleet of jet airliners. Commercial jetliners tend to have long lives. For example, Boeing’s 737-200, which was first introduced in the late 1960’s, still had 60 aircraft being flown by airlines in the year 2020. One 737-200 in particular has been in active service since May of 1974 [15, 16].

Stettler et al estimated that as much as 36 percent of emissions for a typical airline flight are produced during the “LTO” or Landing and Take-off cycle [17]. LTO includes the portions of a flight that occur below 3,000 feet above ground level, including departure taxi-out and idle, takeoff roll, climbout to 3,000 feet above ground level, approach from 3,000 feet above ground level, and arrival taxi and idle [18]. Other sources put the maximum number for LTO emissions closer to 25 percent of the total [11]. Of those, taxi operations are often the largest source of emissions [11,

19]. The fact that such a significant portion of emissions are produced while the plane is still on the ground begs the question if there is a method of mitigating, if not eliminating, these emissions produced before the plane and its passengers are even in the air.

Some attempts have been made previously to address this “low-hanging fruit” opportunity. Deonandan and Balakrishnan evaluated strategies for reducing taxi-out emissions at airports and identified and evaluated three different options: using fewer engines to taxi, towing aircraft out to the runway before starting their engines, and reducing taxi times by optimizing taxi “traffic” flow at airports [20].

In all cases, they point out that all aircraft must warm their engines up before take-off, for a conservative estimate of five minutes. Thus, any taxi-out operation that requires less than five minutes would not benefit from an alternative taxiing strategy such as the ones proposed. Given this threshold, they calculate that at most major U.S. airports, a reduced engine taxi strategy would result in a reduction in taxi-related emissions of between 20 and 40 percent[20]. Similar conclusions were reached by British officials at Heathrow International Airport [21].

Additional benefits to this approach include minimal operational changes for pilots, crew, and airport staff [21] and, of course, no change to the airplanes themselves. Potential drawbacks to “single-engine” taxiing, as it is commonly called, include reduced maneuverability, especially for twin engine aircraft, as well as increased potential for damage due to jet blast as a result of increased thrust per engine still running [20]. The Auxiliary Power Unit, or APU on some aircraft may be required to run at a higher capacity during reduced engine taxiing, offsetting some of the reductions as well [21].

If instead, aircraft are towed out to the runway by traditional internal combustion engine (ICE) powered airport tugs, all the engines of the aircraft can remain off until the required 5-minute warm up pre-takeoff. However, now the emissions of the tugs must be considered. The authors analyzed diesel, gasoline, and CNG powered tugs and found that while fuel burned during taxiing was reduced on the order of 75 percent, net emissions of some pollutants, such as NO_x or CO doubled or quadrupled and these calculations did not include the tugs’ return trips after delivering the aircraft close to the runway. They also noted that using traditional tugs would reduce taxiing speeds significantly and reported that Heathrow airport experienced a 3x increase in taxiing times when they attempted to implement such a system [20]. Other cons for this approach include increased communications required between the pilot, control tower, and tug driver [22].

Others have attempted to take the tug tow-out concept further and address some of these issues. TaxiBot, a joint effort by Honeywell and Safran until 2016 used an 800 hp hybrid-electric drive-train tug that claimed to maintain normal taxi speeds while reducing all emissions. Pilots controlled the tug during taxiing and a tug driver controlled the tug at other times such as during return trips [23].

NASA Ames investigated the possibility of a fully autonomous, ICE powered tugs for towing out aircraft in 2015 and concluded that autonomous vehicle technology, deployed in a controlled space such as an airport tarmac, would be significantly more feasible than deploying self-driving vehicles

on freeways or public roads. They calculated that a tug fleet of roughly 1/3 the number of aircraft to be serviced would result in a throughput rate that matched the scenario of aircraft taxiing on their own [24].

Wheeltug, one example of a so-called “EGTS” or Electric Green Taxiing System, mounts electric motors to the nose-wheels of an airplane and draws power from the plane’s Auxiliary Power Unit (APU) to allow the plane to taxi under its own power [25, 26]. While the system eliminates the need for tugs entirely and claims to reduce emissions compared to traditional taxiing (although no documentation of this could be found), the added weight of the motors and other hardware (nearly 700 pounds) negatively impacts any other reduction in emissions [26].

Finally, Deonandan et al. examined the potential effect of optimizing the flow of tarmac traffic at airports. Optimistically, this could result in as much as a 60 percent decrease in LTO fuel consumption [20]. Many other researchers have considered a variety of methods for optimizing ground traffic flow at airports over the years [27–29]. Their estimates for improvement vary. Rathinam et al, for example, estimated an average decrease in taxi time of about 6 minutes with their algorithm [27]. Li et al. used a genetic algorithm and found a 17 percent reduction in fuel consumption during taxiing [29].

Potential benefits of tarmac traffic optimization include requiring no change to the design of the planes and, it is assumed, minimal or no change to the hardware in use at airports. Their effectiveness depends on a variety of factors including how faithfully the mathematical models chosen represent the complex reality of airport traffic management, and how well they are implemented by individual airports. They tend to be highly dependent on controllers having real-time access to high-fidelity data and may lose effectiveness if the built-in assumptions, such as conditions on the tarmac related to weather or upkeep are not as assumed in the model [29]. Agent-Based Modeling is one proven modeling approach that allows system designers to extract emergent behavior from the integration of multiple agents, such as aircraft, within a world such as an airport, where external stimuli can be explored such as weather or between agents such as scheduling conflicts between arrivals and departures.

Proposed Design

Methodology

Deriving from the research cited in the Background section, the design of a device and/or strategy to reduce the emissions produced by aircraft on the ground at airports would need to be evaluated based on the following performance metrics:

- 1) Minimize *overall* fuel consumption during LTO operations, including jet engine, APU, tug, or other fuel consumption. Reducing overall fuel consumption will, in turn, reduce PM 2.5 and 10 in accordance with SDG 3.9 and 11.6 [1].
- 2) Maintain taxiing speeds equivalent to all engines-on

- 3) Maintain aircraft maneuverability while taxiing
- 4) Not increase the weight of the aircraft
- 5) Minimize changes to the aircraft themselves
- 6) Minimize changes to operational procedures
- 7) Maintain safety on the tarmac
- 8) Perform well in less than ideal or even anomalous situations

It is proposed that a fully-electric tug, capable of autonomous as well as remotely controlled functionality, can achieve these desired performance metrics, especially that of reducing fuel use and emissions during the LTO cycle.

Such a tug would use batteries and electric motors for propulsion and attach to aircraft in a manner similar to tugs already in use. An array of sensors, including cameras, GPS, LIDAR, radar, and other sensors connected to a computational system will allow the tug to autonomously navigate the highly controlled tarmac area safely and efficiently. Fully autonomous road vehicles have been under development for more than 15 years, with multiple teams successfully completing the 2004 and 2005 DARPA Grand Challenges [30, 31]. While full vehicle autonomy has been achieved for quite some time, autonomous vehicles still remain out of consumers' reach due to the highly variable environment cars may operate in, as well as privacy and ethical questions that arise[32, 33]. Unlike passenger vehicles, aircraft tugs operate in an environment that is, at all times, highly controlled and maintained. Because the precise location of every moving entity on the airport tarmac is known, building a fully operational and safe autonomous tug can be achieved using existing technologies. Additionally, communications equipment to allow the tug to send data to and receive data from other sources (such as a pilot or other source) would be included to allow for remote control of the tug and act as a fail-safe in the event the autonomous controlled failed.

The autonomous functionality of the tug would allow it to arrive at an airplane ready to back away from the terminal and to leave a plane that had just been delivered to the end of the runway. Upon completing the taxi process for a plane, the tug would find another plane that needs to be tugged, or return to a designated recharge station. While the tug is attached to the plane and providing the needed thrust to propel it on the tarmac, it could act either autonomously, or be remotely controlled to varying degrees by either the pilot of the aircraft or by some other controller. This flexibility would allow different carriers, airports, or even individual pilots the degree of control they may desire. See figure 1.

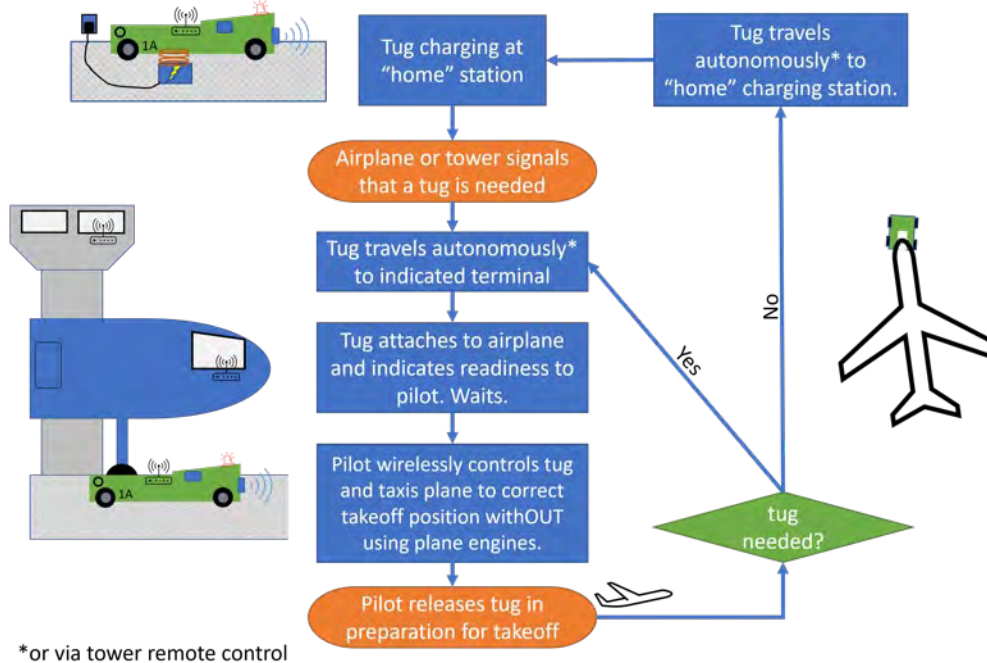


Fig. 1 Flow diagram for potential semi-autonomous electric tug activity

This design would allow the plane to taxi with all engines off and avoid emissions from the tug as well. While considered outside the scope of this paper, since the tug is electric, the power source to charge it could also be a renewable or green source of electricity, thus further improving the reduction in emissions and environmental impact of the flight. Regarding use of the APU, it is possible that an umbilical or other connection from the tug to the aircraft could be supplied along with the towing connection so that the aircraft's APU would not need to be used during taxiing either. This possibility will be considered in greater detail in future research.

As demonstrated by the Taxibot [23], normal taxiing speeds and maneuverability can be maintained with a tug tow-out as long as the tug is properly sized and powered. The weight of the aircraft will be unaffected by the proposed approach since no new hardware will need to be introduced on the aircraft themselves. And, given the fact that the tugs will return autonomously from towing out aircraft, sensing and avoiding obstacles along the way to their next destination, operational procedures at the airport should remain largely unchanged. In the event of a tug that malfunctions and is unable to complete a tow-out, the aircraft could simply be detached from the tug and complete its taxiing procedure attached to a different tug or under its own power.

Modeling

To further analyze the effectiveness of the idea, computer simulations modeling the impact of such a proposal in a real-world scenario were created. First, data for all 2019 flights to and from Hartsfield-Jackson Atlanta International Airport were downloaded from the U.S. Department of Transportation's Bureau of Transportation Statistics [34]. Then, using the Federal Aviation Administration's Aviation Environmental Design Tool (AEDT) [35], fuel and emissions reductions

were calculated for 10 of the most common and impactful aircraft using Hartsfield-Jackson Atlanta International Airport. See figure 2. Hartsfield-Jackson is the busiest airport in the United States and one of the busiest in the world [35]. Despite the ongoing pandemic, in 2020 alone, the airport saw nearly 43 million passengers pass through its gates[35].

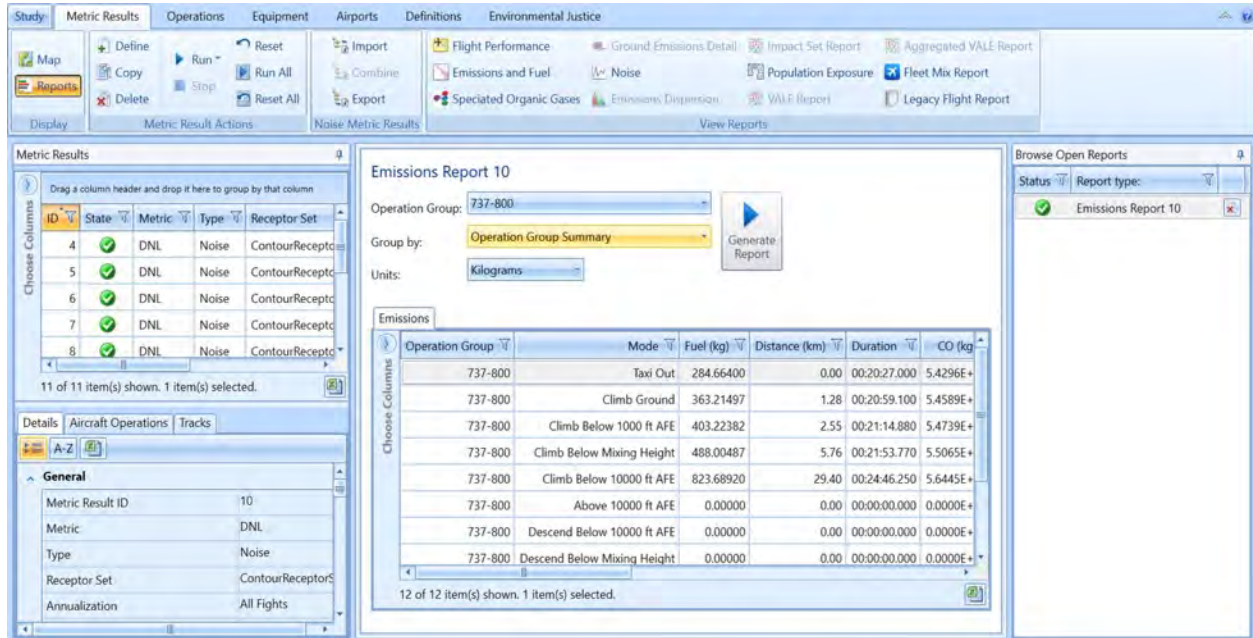


Fig. 2 Screenshot of AEDT software used to simulate conditions at Hartsfield-Jackson Atlanta International Airport (Georgia, U.S.A.)

Results

Using the AEDT software, simulations were developed for ten of the most impactful aircraft utilizing Hartsfield- Jackson during the year 2019: the three aircraft with the most flights (Boeing 737-800, Airbus A320-100/200, and the McDonnell Douglas DC9 Super80/MD81/82/83/88) and the seven aircraft at the airport using the most fuel per departure taxi-out (Airbus A380-800, variations of the Boeing 747, and variations of the Boeing 777).

Figure 3 shows the number of departures during 2019 of each type of aircraft considered. As can be seen, the Boeing 737-800 had the greatest number of departures from Hartsfield-Jackson with 1,281 or about 3.5 per day on average, with the smallest number of departures coming from the Airbus A380 at just 18, or one or two per month on average.

Figure 4 shows the calculated amount of fuel each of the considered aircraft consume per departure taxi-out. As can be seen, the A380 is by far the largest consumer of fuel per departure taxi-out at over 1,310 kg, or about 420 gallons. The Boeing 737-800 consumes the least fuel per departure taxi-out at just 285 kg, or about 94 gallons of fuel.

Figure 5 shows the calculated total amount of fuel of each considered aircraft consumed during

all departure taxi-outs in 2019. As can be seen, although its per-aircraft footprint may be considerably smaller, the Boeing 737-800 uses considerably higher amounts of total fuel in a given year than other considered aircraft simply because of its high number of flights.

Figure 6 shows the calculated amounts of various types of emissions produced by each considered aircraft per departure taxi-out. As can be seen, emissions generally tend to follow fuel-use (first row) with some exceptions. PM 2.5 levels, specifically mentioned in the U.N. Sustainable Development Goals 3.9 and 11.6 [1, 9, 10], are positively impacted in some instances more than would be expected if simply observing fuel use reductions. The Boeing 747-400 and 777-200ER/200LR/233LR exhibit this characteristic. Other aircraft, such as the Airbus A380-800, seem to have a smaller reduction in PM 2.5 levels than would be expected based on reduction in fuel use.

Discussion

Based on the simulations run using the AEDT software, the amount by which fuel use could be reduced by implementing the proposed idea appear to be significant. As seen in figure 7, an average reduction of approximately 10-12 percent of LTO fuel use could be achieved only by implementing the proposed idea for departure taxi-out.

While prices for jet-fuel are prone to fluctuation, using the current average price for jet fuel, for just the Boeing 737-800s departing Hartsfield-Jackson, using the described proposal to taxi-out these airplanes could have reduced costs by about 450,000 U.S. dollars in 2019 [36, 37].

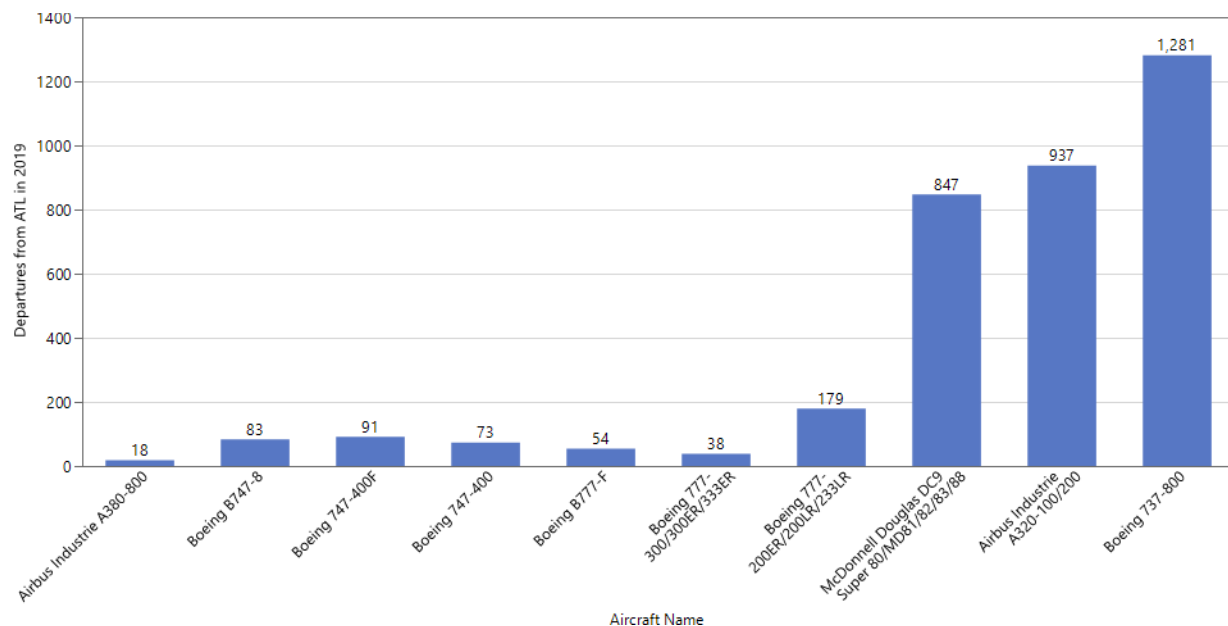


Fig. 3 Number of 2019 departures by aircraft type

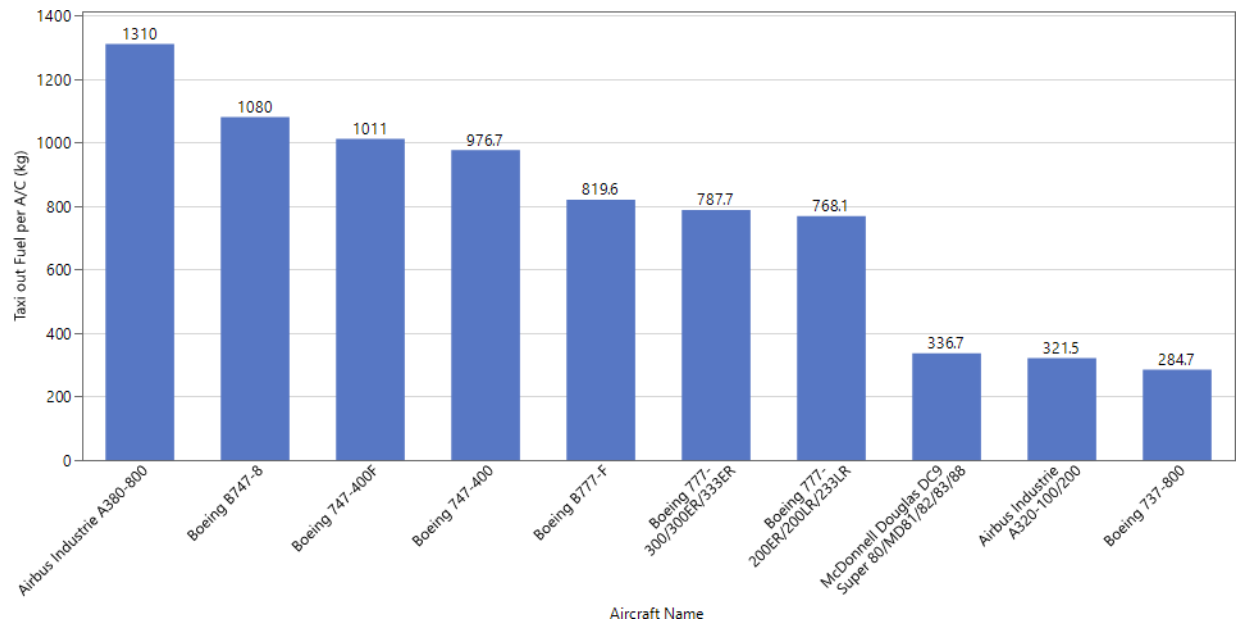


Fig. 4 Fuel used per aircraft for each departure taxi-out

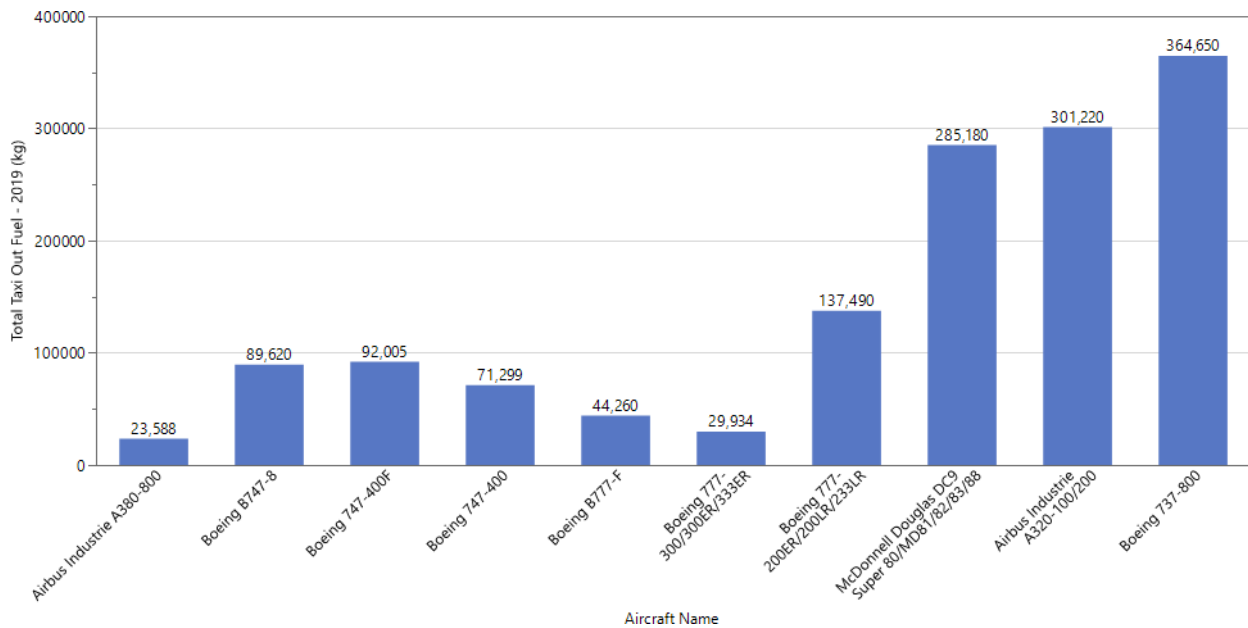


Fig. 5 Total amount of fuel used per aircraft during 2019 for departure taxi-outs

As shown in figure 6, emissions would also be significantly reduced. Taking CO₂ emissions as an example, each Airbus A380 departing Hartsfield-Jackson is estimated to emit about 4,130 kg of CO₂ just during the taxi-out phase of LTO. If all A380s departing Hartsfield-Jackson during 2019 were towed out using the described proposal, more than 74,000 kg of CO₂ emissions would be eliminated, equivalent to removing more than 16 automobiles from the road for a full year [38]. If instead all Boeing 737-800s departing Hartsfield-Jackson during 2019 were towed out as proposed, the equivalent number of cars removed from the road for a full year would increase to more than

250. PM 2.5 emissions, or the emission of suspended fine particulate matter, also reduced significantly.

This matters not only because overall air quality is improved, but also because of the fact that these emissions would be reduced while the aircraft is on the ground, during the time when the aircraft is closest to people, including airport workers on the tarmac, travellers and staff in the airport, and residents in areas close to the airport [18].

It should be noted that the reductions in fuel and emissions calculated above are conservative. They do *not* include taxi-in, supplementing or replacing APU power, or tarmac traffic flow optimization. Including any or all of those would markedly increase the level of positive impact.

Limitations

The simulations described above are limited in some ways that are important to acknowledge. For example, the software uses an average value for the time required for an aircraft to taxi from the terminal to the end of the runway (taxi-out). A more nuanced analysis would consider exact flight numbers, which terminal/runway combination was used, and other details.

Other software limitations include the inability to calculate round trips, making total trip fuel consumption difficult to estimate. Weather conditions and mixing height are also generalized within the AEDT software meaning that accuracy of pollution data and fuel used in LTO is affected.

Future Research

Several important areas of future research related to the proposed idea exist and are described below.

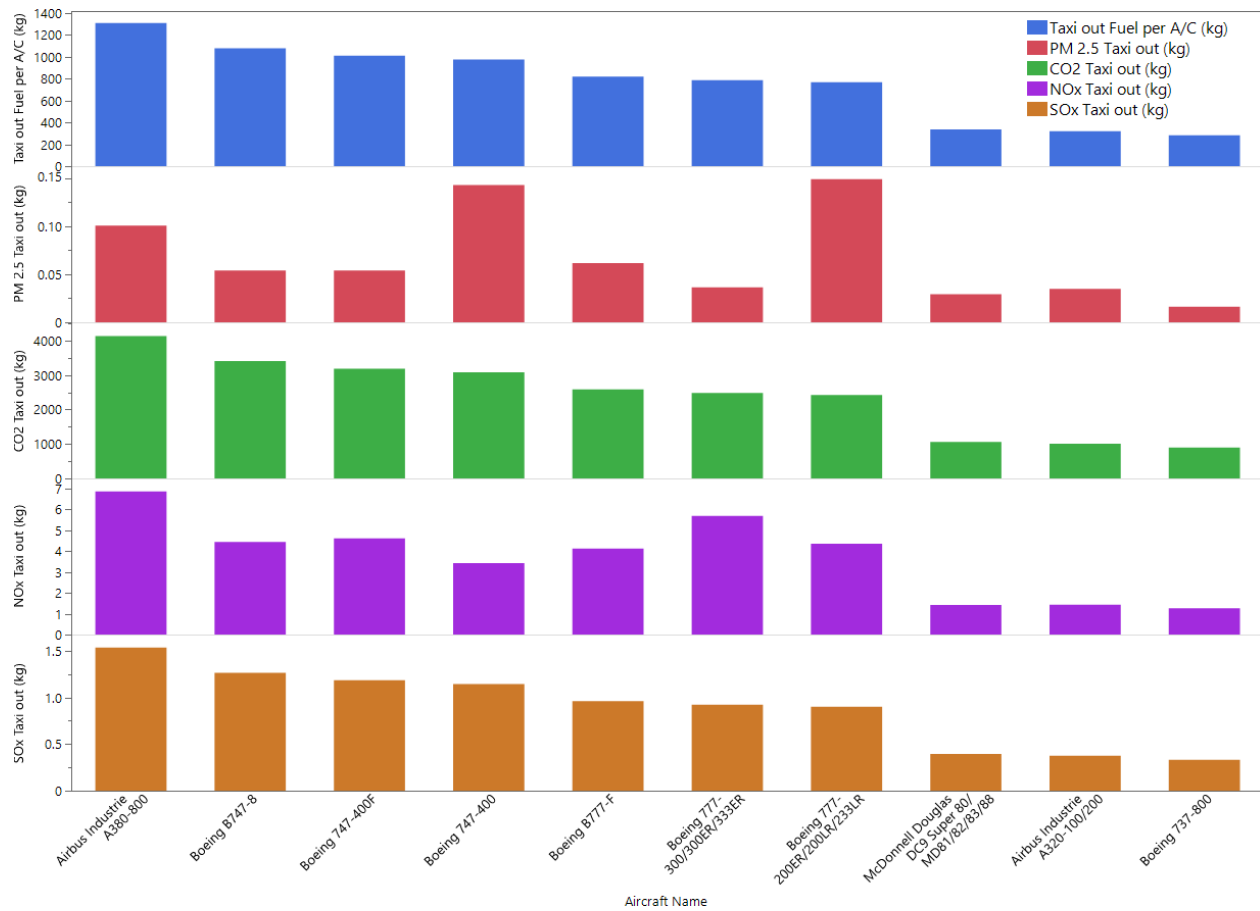


Fig. 6 Other Emissions. CO2 and SOx perfectly correlated with fuel mass. PM 2.5 and NOx were less correlated, but still showed significant improvement.

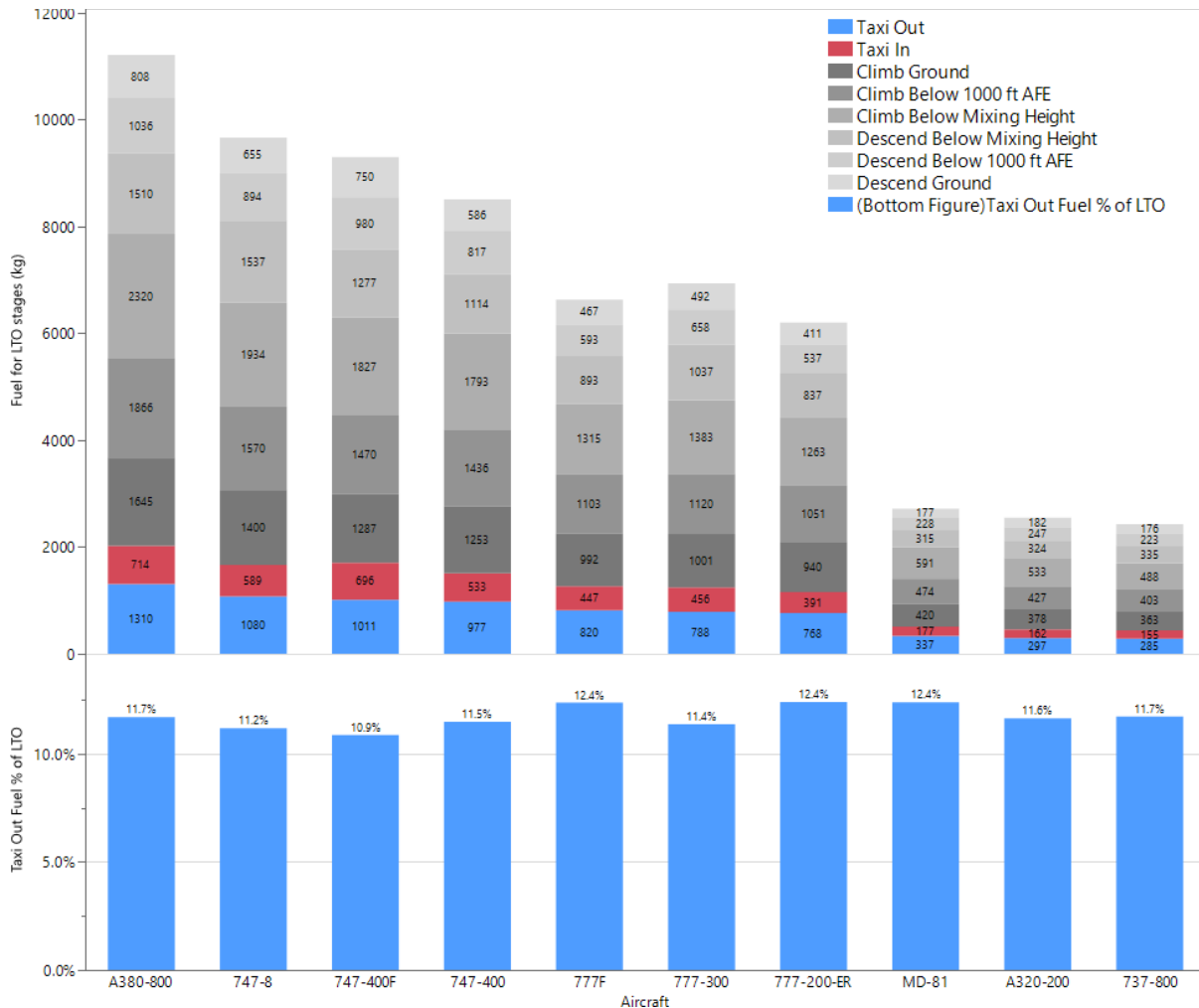


Fig. 7 (Top) Fuel usage for different phases of LTO. (Bottom) Percentage of LTO fuel use from the Taxi Out phase that could be reduced by implementing the proposed idea per aircraft considered. These percentages correspond to the proportion of the blue taxi-out phases of the aircraft in the top figure.

Taxi-In

It may be noted that the figures and analysis above only include the departure taxi-out portion of the LTO cycle. Since the tugs described could also be used to reduce the time aircraft engines are on during arrival, future research will include taxi-in data as well. This may present a more technically challenging proposition than taxi-out since traditionally aircraft do not come to a complete stop immediately after landing, but transition seamlessly to taxiing. That would indicate that either aircraft would need to come to a complete stop as soon as possible after landing to allow a tug to attach, or tugs would need to be able to attach to the aircraft while in motion. Each situation clearly has its own unique challenges that will need to be considered.

APU

The current analysis does not consider the possibility of supplementing or replacing power from

aircraft APUs during taxi-in/out with an umbilical from the proposed tugs. Replacing APU power with power from the tugs would further reduce the amount of fuel and emissions produced by aircraft on the ground. Supplying electrical power from the tug to the aircraft would require some form of connection, preferably an automatic one, and would necessitate some modification of hardware on the aircraft itself. This possibility will be considered in future research.

Noise Reduction

Reduction of fuel use and emissions are only two potential benefits of using a tug system like the one proposed in this paper. Noise from aircraft has been shown to have significant detrimental corollaries on various aspects of human and environmental health, negatively affecting everything from cardiovascular health to the academic performance of children attending schools in the vicinity of airports [39]. Future research will investigate the potential benefits implementation of a tug system such as the one described in this paper could have in reducing the negative effects of aviation noise, including by using the AEDT software's ability to model sound and noise dispersion at and around various U.S. airports.

Tarmac Traffic Flow Optimization

Implementation of semi-autonomous electric tugs does not exclude also applying techniques such as tarmac traffic flow optimization. Implementation of both would save even more fuel, and may even enhance the effectiveness of optimization schemes.

By providing pilots and/or controllers with the choice to have pilots steer their aircraft over the tarmac (powered by the tugs) or allow tugs to direct the planes (either at some chosen level of autonomy or via remote control) more advanced traffic optimization could be experimented with and implemented as airports, pilots, and other stakeholders see best.

Other Potential Uses

Semi-autonomous electric tug type vehicles may be well suited to fill other roles on the ground at airports. Potential areas for future investigation could include tasks such as picking up and transporting baggage trains, providing quick response to fires or other emergency situations or other roles where a variable level of autonomy and/or remote control would be a useful supplement to human activity.

Prototyping and Testing

To provide concrete evidence of the effectiveness of the proposed idea, scaled and eventually full-scale prototypes of the tug and other necessary systems will be developed. These prototypes will enable validation and refinement of the proposed design. Input from industry, government, and other stakeholders will be sought in the process of determining details such as what size of aircraft initial tug prototypes should be sized for.

Conclusion

Previous efforts to reduce aircraft fuel use and emissions in order to support SDGs 3.9 and 11.6 by considering the LTO cycle were reviewed and analyzed. A set of performance metrics regarding characteristics of a successful device for reducing LTO cycle fuel use and emissions was developed based on that review, and a new idea for a device with the required characteristics was proposed and described.

Using the FAA's AEDT software, simulations were created to assess the potential impact a device such as the one proposed could have at the U.S.'s busiest airport (Hartsfield-Jackson Atlanta International Airport). The simulations show that, even with the scope of the analysis conservatively limited to only departure taxi-outs, fuel use and emissions, including especially impactful PM 2.5 emissions, could be significantly reduced, along with potential economic, environmental, and other benefits. Areas for future research and development, including analyzing impact on airport noise levels and development of prototypes were briefly described.

Reduction of PM 2.5 and other emissions at airports will significantly support SDG 3.9 and 11.6. This matters because the air quality and health of airport workers, passengers, and those living and working in areas surrounding airports will improve significantly. Generally, implementation of the proposed device would also help to achieve various environmental, economic and health goals that would improve the lives of people across the globe.

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Monitoring and Predicting Future Eruptions of Mount Cameroon: A Requirement for Ensuring Sustainable Development in Communities within the Area (SDG11, SDG17)

Mabel Nechia Wantim, Nchini Livinus Wayih, and Samuel Ndonwi Ayonghe
(University of Buea, Cameroon)

Abstract

Over 500,000 people inhabit the flanks of Mount Cameroon (MC) composed of 2 cities, 3 towns and 63 villages. MC is one of the most active volcanoes in Africa. Hazards from its 1999 eruption (lava flows, earthquakes and volcanic ash) caused significant environmental and infrastructural damage and affected the wellbeing of this community. To attain SDG 11 (Targets 11.5 and Indicator 11.B.2), there is an urgent need to monitor hazards from this volcano. This entails building and maintaining partnerships towards the implementation of SDG 17 (Targets 17.3, 17.6 & 17.9). This study examines the extent to which recent North-South and South-South partnerships, through a USAID PERIPERI-U and a Swedish (SIDA) LIRA2030 grants have contributed towards the partial attainment of these goals, such as, in the development of the first Earthquake Building Code and Building Regulations in the area, and the construction and partial equipping of a Volcano Monitoring Laboratory. Funding from these partnerships has also been used for capacity building of students; research training of staff in Belgium, Algeria, and in the USA; organisation of workshops and focused group discussions on communities' perceptions of the eruptions of this mountain, how the hazards affect development in the area, and the coping strategies of the communities during eruptions. It is hoped that more partnerships will be established and used to provide clear messages for policy makers and stakeholders and equally ensure confidence building on the communities, aimed at ensuring the implementation of these Goals within this area and beyond by 2030.

Keywords: Mount Cameroon, volcano monitoring, perception, training, building code, partnership

Introduction

Volcanic eruptions are large scale natural processes which are sources of concerns for populations living on the flanks of active volcanoes. This is because volcanic hazards from a single eruption range from deadly earthquakes, lava flows, tephra and volcanic gases as has been observed for eruptions at Mount Cameroon (Suh et al., 2003; Wantim et al., 2011). During the past decade, an average of 60 volcanoes erupted each year, around 20 of which were erupting on any given day. Statistics as per the Smithsonian/USGS Weekly Volcanic Activity Report (May, 2021) showed that there were 47 ongoing eruptions of active volcanoes globally. Some of these, such as Erta Ale in Ethiopia, are persistently active.

Research in volcanic monitoring has progressed in recent decades through the use of models and laboratory experiments. However, such research has been limited to a few volcanoes located in industrialized countries (e.g. Mounts Etna (Italy), Mount St Helens and Kilauea (USA)). For example, the onset of 2018 Kilauea's eruption was successfully forecasted in weeks leading to the event by the Hawaiian Volcano Observatory (Neal et al., 2018). Over two-thirds of potentially active volcanoes in the world are poorly known and unmonitored (Simkin and Siebert, 1994).

A vast majority of these active volcanoes are found in developing countries that lack the equipment, skill, and manpower to monitor them. For example, the 22 May 2021 eruption of Mount Nyiragongo, in the Democratic Republic of Congo produced lava that destroyed approximately 1000 homes, killed ~ 32 people, and displaced over 450,000 people (IFRC, 2021; UNHCR, 2021). Regrettably, that eruption was not predicted due to the failure of effective monitoring from the Goma Volcano Observatory. Both constant and continuous monitoring of these volcanoes in order to avert such surprises on the communities who are exposed to their hazards is relevant.

In Africa, potentially hazardous volcanoes are mostly found along the East-African Rift System (EARS) and the Cameroon Volcanic Line (CVL; Fig. 1) (Ayonghe and Wantim, 2016). Three of these volcanoes: Ol Doinyo Lengai (Tanzania), Nyamulagira and Nyiragongo (DR Congo) all found along the EARS are presently erupting (GVP, 2022). The CVL on its part is a major tectonic feature in West-Central Africa that runs SW-NE following a major left-lateral fault system that extends for more than 2000 km, from Pagalu Island in the South Atlantic Ocean into West-Central Africa (Fitton, 1980; Fig. 1). The continental segment includes Mount Cameroon (MC) which is the largest and presently the most active volcano along this line (Fig. 2). A number of crater lakes are also present along the CVL. Some of these lakes exhibited disastrous outgassing three decades ago (e.g. Lakes Nyos and Monoun) killing people and livestock (Lockwood et al., 1988; Kusakabe et al., 2000).

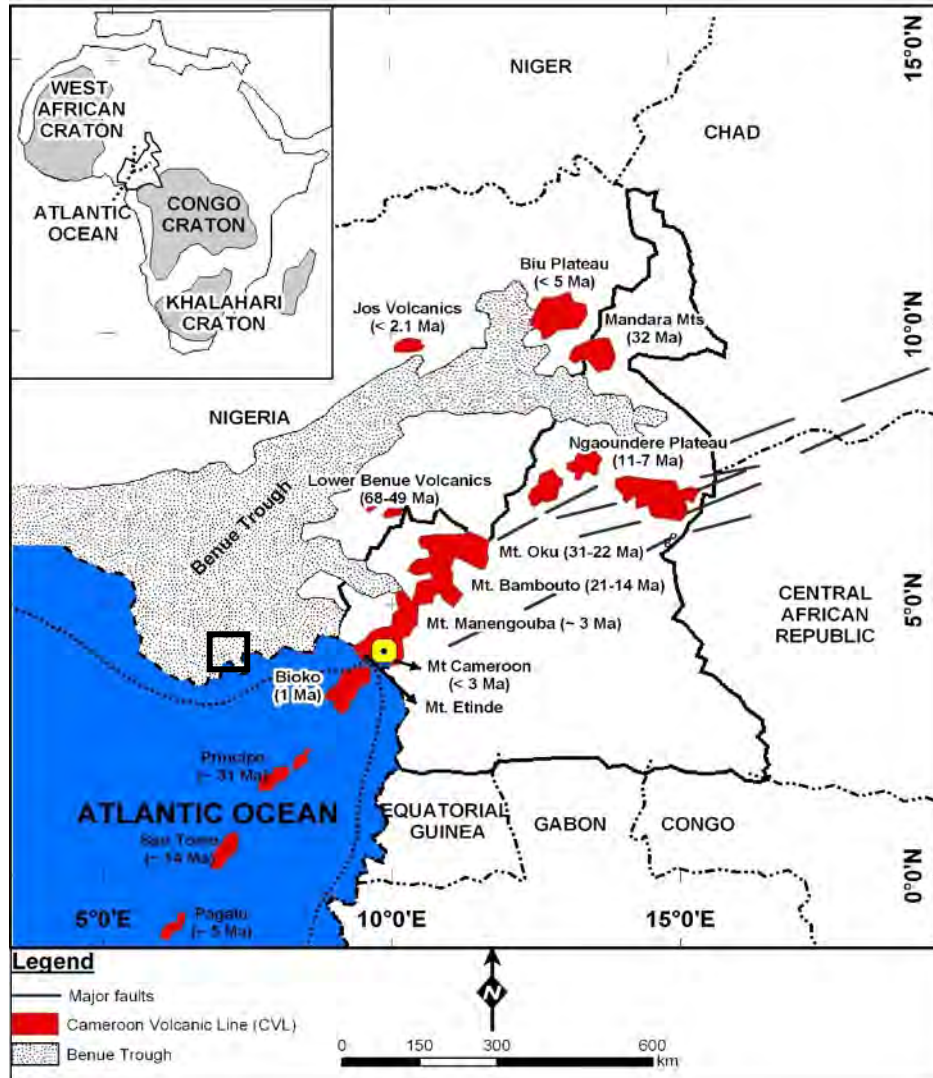


Fig.1. Sketch map of Cameroon showing Mount Cameroon (square) and the Cameroon Volcanic Line (CVL) modified after Marzoli et al. (2000); Inset the CVL and Cameroon within the African Continent (Wantim et al., 2011).

Description and Setting of the Study Area

Mount Cameroon (MC) is a steep elongated volcano (Fig. 2a), 4095 m high above sea level, characterized with over 340 cones, underlain by successions of overlapping lava flows (Suh et al., 2003; Mathieu et al., 2011; Wantim et al., 2013). MC is considered the most active volcano along the CVL having registered a total of 9 eruptions between 1800 and 1871 (1807, 1825, 1835, 1838, 1852, 1865, 1866, 1868, 1871) (Deruelle et al., 1987) and 7 eruptions between 1900 and 2000 (1909, 1922, 1954, 1959, 1982, 1999 and 2000) (Ruxton, 1922; Fitton et al., 1983; Suh et al., 2003; Njome et al., 2008; Wantim et al., 2011, 2013). The principal hazards from its eruptions are lava flows (Fig. 2b), which usually cause major disruptions in the socio-economic life and livelihood of the population living on and around the flanks. Lava flow from its 1999 eruption for example resulted in a humanitarian crisis which included: the evacuation of over 600 people from

the coastal village of Bakingili (Fig. 2b) which was situated along the path of the lava flow field. This lava also destroyed agricultural land and plantations which served as major sources of livelihood for the population. In addition, lava destroyed a major road infrastructure that linked the population in the SW and NW flank of the volcano (Wantim et al., 2018). Ash falls from this same eruption destroyed crops, polluted potable water sources, and caused major health concerns to the inhabitants living in the West flank. Earthquakes that accompanied the 1999 eruption also destroyed over 60 houses in the city of Buea, displacing approximately 250 people (Wantim et al., 2018).

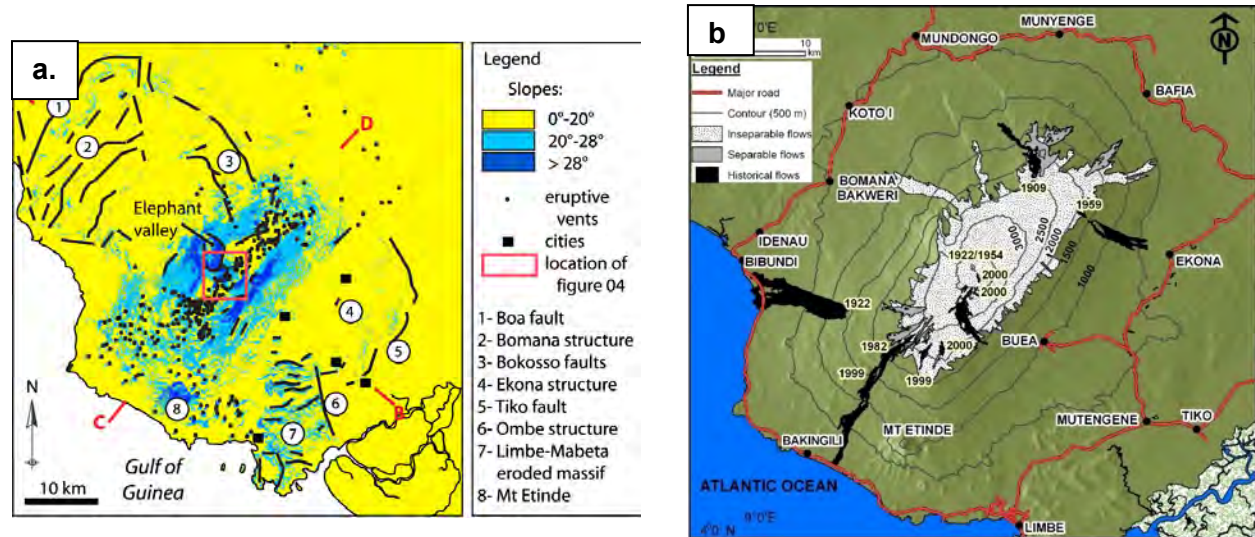


Fig.2. Digitised maps of Mount Cameroon showing a. its main geological entities, lineaments, eruptive vents and faults (Mathieu et al., 2011) and b. historical lava flows with some towns and villages (Wantim, 2011)

Even though a permanent seismic network of six stations was set up at the flanks of MC in 1984, following its 1982 eruption to monitor regional and distant earthquakes, unfortunately, the 1999 and 2000 eruptions were not predicted due to failure in detecting the micro and strong earthquakes which usually precede eruptions from this volcano. With the recent reactivation of activity along the CVL following the December, 2019 earthquake at Sao Tome (Fig. 1) characterized with a magnitude 5.5 which was widely felt across Central Africa with Cameroon inclusive, there is an urgent need to begin monitoring activities from this active volcano relevant for sustainable urbanization by 2030. This is because estimates made by Bonne et al. (2008) and Wantim et al. (2011) gave a return period of between 11 and 14 years for these eruptions. It is now over 21 years since its last eruption in June 2000.

Based on the existing documentation, eruptions from MC are most often accompanied by seismic earthquakes before, during and after the eruptions (Ubangoh et al., 1997; Ateba et al., 2009). The earthquakes start as swarms of tremors produced by magma as it rises through rocks towards the surface and then build up to strong earthquakes with intensities of between IV-VII on the Modified Mercalli Intensity scale. These eruptions are most often accompanied by the release of gases which include Sulphur-dioxide, increase temperature of gases from vents and of water bodies on the mountain. Even though volcanic eruptions are difficult to predict, but progress has

been made through volcanic surveillance in order to reduce the impact of its hazards on society (Brown et al., 2015). Monitoring these precursory parameters will therefore help predict future eruptions at MC, which host 2 cities, 3 towns, and over 63 villages at its flanks characterised by increasing population caused by the presence of several higher institutions of learning such as the University of Buea, companies and plantations.

Statement of Problem

In Africa, regardless of improvements in monitoring technologies, the rapid population growth where most active volcanoes are located, has ensured an increase in the vulnerability of the populations and their property to hazards from these volcanoes during the 21st Century. One of the focus of SDG 11 is to protect the poor and people in vulnerable situations from disasters by 2030. Improvements in eruption forecasting are accordingly critical for combating this situation, for reducing injury and loss of life and for minimizing the detrimental effects on local economies and on the fabric of society including developmental projects. However, basic information about the character of past volcanic activity is lacking for most of these active volcanoes on the continent, where priority is most often given to alleviating poverty and combating disease, and funding post disaster activities, rather than monitoring and mitigating adverse impacts of volcanic activity which will go a long way to ensure good health and well-being (SDG3) and build sustainable cities and communities (SDG11).

The population of major cities, towns and villages on the flanks of MC has significantly increased during the last 20 years. As per the census results of 2005 (BUCREP, 2010), approximately 350,000 people inhabited the major cities, towns and villages around MC. This number is believed to have doubled during the last decade. The population in the city of Buea at the time was ~ 130,000 people (BUCREP, 2010) being the most populous at the flanks of MC (Fig. 2b). This number increased to 300,000 people in the city of Buea alone by 2013 (BUCREP, 2013). This increase was initially linked to the presence of major higher institutions of learning in the area which has been on the rise since the creation of the University of Buea in 1993. However, population increase as from 2016 to present, is linked to the influx of internally displaced persons fleeing other parts of the South West and North West Regions of the country who are more affected by the on-going civil strife in Southern (Anglophone) Cameroon. This has led to the influx of people who have never experienced any of the eruptions from MC, lack total awareness of its hazards, and who in the event of such an occurrence, will face difficulties to cope with the resultant hazards, thus increasing the need for sensitization and monitoring.

In addition, located on the flanks of this volcano are important infrastructures of social, economic and administrative importance which are exposed to the hazards linked to eruptions of this volcano which need to be protected. These include: the Prime Minister's Lodge (serves as a monument), the Governor's Office, the University of Buea and other Higher Institutions of Learning, several primary, secondary and high schools, the Head Office of the Cameroon General Certificate of Education Board (GCE) Board, the Nigerian Consulate, several Ministerial Departments, the Municipal Council of Buea, several hospitals, hotels, and several structures housing important corporations and businesses. The *Société Nationale de Raffinerie* (SONARA)

located on the SW flank of this volcano is the only oil refinery in Cameroon. Economically, it is one of the country's most important sources of revenue with its production of refined fuel in 2010 estimated at about 70,000 barrels per day. Agro-agricultural complexes which include palm, rubber, banana, and tea, cover an estimated area of 435 km² and a majority of them are exposed to lava flow hazards as witnessed at Idenau in 1922 and at Bakingili in 1999.

The pertinence of this study is therefore based on the vulnerability of the population which has been growing exponentially during the past two decades. Increase population is synonymous to increase construction of major infrastructures (e.g. storey buildings) that do not comply with building regulations in the area.

To effectively attain the goal of SDG 11, which targets at significantly reducing the number of deaths and the number of people affected and substantially decreasing the direct economic losses caused by disasters which is relevant to build sustainable urbanization by the year 2030, there is thus an urgent need to provide inexpensive but effective techniques to monitor these volcanoes and assess their hazards.

The information to be provided from the laboratory will be a vital input for volcanic risk reduction, cost-benefit analyses, and prioritization of developmental programmes and its relevance and usefulness for early warning and disaster preparedness by all members of the communities living and working on the flanks of this mountain. There will be confidence building on the community who will know the existence and vital importance and usefulness of the activities of this Laboratory. The effective monitoring of this mountain in an attempt to reduce the impacts of its hazards on the community thereby ensuring sustainable development in the area therefore matters.

The cost saving advantage of the study will accordingly be based on the sensitisation of policy makers, stakeholders, and the local communities on the respect of building norms which can withstand the earthquakes, and the use of results from the ground-based monitoring approaches for possible prediction of future eruptions and to create awareness on coping strategies which are essential for developmental plans. Thus, the study will provide clear messages for policy makers and stakeholders, and useful information for disaster preparedness and environmental protection from the hazards which are associated with eruptions. It will be used to close the large research gap on vulnerability assessment by the academia in the country by ensuring the needs and aspirations of the communities.

It will provide a useful building guide, design and regulations, regarding volcanic hazards in this area where building decisions are presently taken based on assumed and unscientific parameters. Thus, infrastructure operators will be knowledgeable of likely impacts from volcanic hazards from this mountain. This will guarantee sustainable development in the cities, towns, and communities by 2030.

This study therefore sought to assess the role played by the USAID PERIPERI-U and LIRA 2030 partnerships in attaining SDG11 and 17 relevant to build resilient cities at the flanks of active volcanoes.

Objectives

Main Objective

Assess the role played by USAID PERIPERI-U and LIRA 2030 partnerships with the University of Buea to build resilient cities to volcanic risk at the flanks of Mount Cameroon.

Specific Objectives

1. Examine the role played by the USAID PERIPERI-U and LIRA 2030 partnerships in the design and development of the first seismic earthquake building code in the Mount Cameroon area.
2. Assess the role played by USAID PERIPERI-U and LIRA 2030 partnerships in the acquisition of the population's perception on volcanic risk at the flanks of MC.
3. Evaluate the contribution made by the USAID PERIPERI-U and LIRA 2030 partnerships in capacity building of staff and students towards volcano monitoring at MC.

Methodology

A Review of Partnerships and their Relevance towards the Implementation of the Goals

The methodology used in this study has been based on the two main partnerships below which were signed between North-South and South-South partners and hosted by the Disaster Risk Management Unit at the University of Buea.

1. A USAID sponsored Partners Enhancing Resilience to People Exposed to Risk- Universities (PERIPERI U) on Disaster Risk Management (DRM), signed in 2016 but ended abruptly in 2019, and
2. A SIDA sponsored Leading Integrated Research for Agenda 2030 (LIRA 2030) which lasted from 2017 to 2019.

The approach has involved a review of the partnerships above which during the past six years have been instrumental in the acquisition of funding, expertise exchange, technological advancement and infrastructural development which have all been useful towards monitoring the hazards from MC, for capacity building and for research and socio-economic development of the communities within the Mount Cameroon area.

Population Perception on Volcanic Risk Based on Focus Group Discussions with Communities

The perception of the population and the associated health risks that result from the resultant hazards from MC was obtained using focus group discussions organized through workshops held in the cities of Buea, Limbe and Batoke (Fig. 2b). These discussions which were held with a total of 50 persons in Buea, 35 in Limbe and 35 in Batoke in 2017, targeted key stakeholders from the scientific and non-scientific sectors that included: the Regional Governor, City and Municipal Mayors, Media, Health Personnel, Civil Defense, Red Cross, Urban Planning, Scientific Research, Civil Society (traditional rulers, clergy and quarter heads). The discussions at these workshops and related sessions examined the perception of the participants during the focus group discussion sessions, on the causes of eruptions of Mount Cameroon, the resultant health impacts on the population and the coping strategies used by the population to reduce the impacts.

These workshops served as platforms of awareness raising of the population to volcanic hazards and their consequences on property and health. They were principally sponsored by the Leading Integrated Research for Agenda 2030 (LIRA 2030) research grants. The LIRA 2030 Africa programme seeks to build capacity of early career scientists in Africa to undertake transdisciplinary research and to foster scientific contribution to the implementation of the Agenda 2030 for Sustainable Development. In our context, our project fostered contribution in the field of disaster risk management targeting SDG 11. It also fostered South-South partnership (SDG 17) as we worked in collaboration with partners from the Goma Volcano Observatory in the Democratic Republic of Congo where a similar study as at Mount Cameroon was carried out as an example of a South-South collaboration in the implementation of this goal.

Construction of a Volcano Monitoring Laboratory at the University of Buea Campus

The non-functional seismic observatory that was built and equipped in Ekona (Fig. 2a) found on the NE flank of MC in 1984, prompted the need for the construction and equipping of a new building to monitor activities from MC. Even though eruptions from this active volcano have so far not led to any direct fatality, there is an urgent need to monitor them due to the exponential population growth and increasing infrastructures during the past two decades in order to be able to predict future eruptions and avoid the types of catastrophes seen in eruptions worldwide (SDG 11). This is due to the fact that, there is no visible structure dedicated to using monitoring techniques aimed at predicting future eruptions of this active volcano, and the population is ill informed of the state of this active dome which actually produces swarms of micro earthquakes caused by magma movements at depth which, if properly recorded, could be used to predict imminent eruptions.

The work of monitoring activities from this volcano is to be carried out in collaboration with other relevant experts from the Departments of Physics, Geology, Chemistry and Sociology (FSMS), the Faculty of Engineering and Technology and the College of Technology. Other experts working with this team on assessing the vulnerability of people living on the flanks of active volcanoes of Africa are from Switzerland (University of Geneva), South Africa (Stellenbosch University),

Ethiopia, Belgium (Vrije Universiteit Brussels), Sweden (SIDA), Algeria, and the USA (USGS), (SDG17).

International Scientific Research Training on Volcano Monitoring

A series of collaborative scientific research training sessions on fundamentals of volcano monitoring using field and remote sensing techniques was carried out by the corresponding author as summarized in Table 1.

Table 1: Scientific Research Trainings on Volcano Monitoring

| Research Training | Institutions | Period | Objectives | Relevance |
|--|---|---|---|---|
| 1) Postdoctoral Research: "Investigating volcanic unrest at Mount Cameroon Volcano, West-Central Africa using Remote Sensing techniques." | Vrije Universiteit Brussels (VUB), Belgium | 01/09/2017 to 28/02/2019 | Improve volcanic risk assessment and management at MC by using radar and optical satellite images to: 1) Detect and understand periods of unrest by monitoring temperature and gas emission changes from multispectral satellite sensors in an attempt to understand periods of unrest at MC; and 2) Assess the capabilities of satellite imageries in documenting the spectral characteristics of volcanic surfaces (lava flows) and their temporal evolution after emplacement. | Enhance North-South, international cooperation on and access to science and technology (SDG 17) |
| 2) International training on Volcano Monitoring techniques (part of postdoc) | - Centre for the Study of Active Volcanoes(CSAV), University of Hawaii in Hilo, USA - USGS Cascades Volcano Observatory, Vancouver, Washington State | 27 th May to 21 st July, 2018 | - International Training designed to assist developing nations in attaining self-sufficiency in monitoring volcanoes. | Foster North-South partnership and promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries (SDG 17). |

In a broader perspective, the main purpose of research at VUB summarized in Table 1 can be used to improve the volcanic risk assessment and management at MC.

The method of study involved desktop study, short technical trainings, modelling and writing of publications. Technical training involved short trainings on the analysis of satellite images carried out in Belgium (Liege; the use of Sentinel data) and by the USGS, Hawaii, USA and lava flow modelling using the Q-LavHA model (see Mossoux et al. 2016 for more details on the model) . The research also involved the analysis of survey data collected in Cameroon regarding the impact of the 1999 eruption and associated earthquakes.

The training at Hawaii coincided with the 2018 eruption of the Kilauea Volcano there (Neal et al. 2018) that destroyed over 800 homes. The presence of an on-going eruption made it possible for the participants of the course (who were all from developing countries (Latin America, Philippines and Africa with active volcanoes) to observe and even practice first-hand how such disasters can be managed with sophisticated monitoring techniques such as drones and competent staff. Coincidentally, the other African participant attending the course came from the Goma Volcano Observatory, DRC with whom we were partnering (SDG17) for the LIRA project. Our presence at this training, emphasized the need to develop techniques to monitor these very active African volcanoes and limit the impact of their hazards in the community.

Creation of the First Disaster Risk Management (DRM) Post-graduate Programme in Central Africa

One of the objectives of the USAID sponsored PERIPERI U project was to establish a DRM postgraduate programme at UB. The aim of this action was to help build the capacity of young men and women to address the different risks (volcanic risk inclusive) that characterize the Mount Cameroon Region in particular and Cameroon in general. The Periperi U UBuea Consortium successfully launched and is presently running an MSc degree programme in Disaster Risk Management under the Unit of DRM in the Centre of Disaster Risk Management (CEDIM). The programme successfully took off in January 2019 (academic year of 2018/2019) with a total of 17 registered students for the first batch. Thirty percent (30 %) were full time workers working in the Ministry of Territorial Administration, Ministry of Environment and Nature Protection, Buea Municipal Council, Academic Office of the University of Buea, Non-governmental Organizations, Contractors and Consultants while 70% were full time scholars.

A professional HND programme on DRM will be taught online from October 2022 to mainly full-time workers in several Ministerial departments, Municipal councils, Non-Governmental Organizations, and other Institutions.

The Design of the Mount Cameroon Earthquake Building Code

The relevance of such a code for socio-economic and sustainable development of the area is evident. The realization of this code entailed developing South-South partnerships (SDG 17) with countries such as Algeria that already had an existing earthquake building code. This partnership was established through the Periperi U network of African Universities of which the University of Buea is part of. PERIPERI U is a partnership of African universities (South-South collaboration) that spans across the continent and is committed to building local disaster risk related capacity. Established in 2006, this partnership has grown to include twelve universities from Algiers to Antananarivo, with institutions in Algeria, Cameroon, Ethiopia, Ghana, Kenya, Madagascar, Mozambique, Nigeria, Senegal, South Africa, Tanzania and Uganda. The goal of PERIPERI U is in line with some of the targets of SDG 11 and 17 relevant to reduce disaster risks among African countries through improved national and local disaster risk management. The partners of PERIPERI U believe that this can be accomplished through building and embedding sustainable 'multi-tasking' capabilities in disaster risk and vulnerability reduction capacity building in the 12 selected Institutions of Higher Learning in Africa, consistent with the targets of SDG 11, SDG17, and with global disaster reduction priorities reflected in the 2015 Sendai Framework for Disaster Risk Reduction.

Results

Recent Partnerships and their Relevance for Sustainable Development (SDG11 and SDG17)

These partnerships were aimed at ensuring sustainable development in communities at the flanks of MC, which, from past disasters, are exposed to volcanic hazards such as lava flows and earthquakes which impact society and infrastructures. Modern societies are reliant on dependable functioning critical infrastructure and lifelines, which are vital for effective emergency response and recovery during volcanic eruptions (Grant, 2015). Hence, the partnerships were aimed at ensuring sustainability of cities and communities within these areas, where earthquakes have been of major concerns for policy makers and the communities, especially with regards to conducting developmental projects.

Two partnership agreements on SDG 11 which involved: monitoring and predicting future eruptions of Mount Cameroon and on the health impacts of volcanic and flood hazards around Mount Cameroon (Cameroon) and Mount Nyiragongo (Democratic Republic of Congo). These partnerships involved in a first phase a PERIPERI– U partnership agreement with the USAID on *Hazards and disasters associated with the eruptions of Mount Cameroon*. This project provided funding for: technological transfer, capacity building of the population through workshops and support towards the training of MSc and PhD students. In addition, short courses in GIS were offered to the staff and student population at the University of Buea Campus. It also enabled the design of an Earthquake Building Code for the Mount Cameroon area, infrastructural development and equipping of the Volcano Monitoring Laboratory, and the design of an MSc degree programme and a professional HND programme in Disaster Risk Management. The second

project was a Swedish partnership grant on Leading Integrated Research on Agenda 2030 (LIRA 2030) which provided funding which was used for workshops on urbanisation, on health and human wellbeing (SDG 3), food security (SDG 3) and the impacts of climate change on water resources (SDG 6 and 13).

The sensitising of the population on how to cope with future eruptions of this mountain therefore matters in order to ensure sustainable developments within these areas. A recently designed Earthquake Building Code and Building Regulations for the MC area was therefore necessary. The two partnerships above have been useful in these endeavours in equally facilitating the implementation of some targets of SDG3, SDG6, SDG9 and SDG13.

Significance of the Partnerships

The continuous monitoring aimed at predicting eruptions of MC and the associated hazards in an attempt to sensitise the population and prepare them for subsequent disasters will provide opportunities of sensitisation of the population and alerting them in the cases of eminent eruptions and capacity building of students on disaster risk management. Additionally, it is going to ensure that buildings at the flanks of MC are constructed respecting the standard Building Code and Regulations for this area. It will also provide information, which is relevant for investment confidence within the population, amongst other advantages.

The Design of the Mount Cameroon Earthquake Building Code and its Relevance for Sustainable Development

A technical trip was made to Algeria by members of the UB PERIPERI U consortium in February 2018. The aim of this trip was to discuss practical modalities of establishing joint research projects (SDG17) for monitoring and coping with the earthquakes generated during eruptions of MC and develop an earthquake building code for the area. To achieve this, partnerships, a Memorandum of Understanding (MoU) was established with the University of Science and Technology Houari Boumedienne and the Centre for Research in Astrology, Astrophysics and Geophysics (CRAAG) both in Algiers.

The main outcome of the visit included:

- 1) Members of the Periperi U UBuea team who visited Algiers worked together with the Head of the Division for Seismological Studies at CRAAG, to produce a draft MoU for joint research activities in seismology and Geophysics which was submitted to the Director of CRAAG and the Vice-Chancellor of UB for consideration and signature. This document included the acquisition and setting up of instrumentation for use in research projects and for the training of junior academic staff and students from relevant Faculties and Departments of the University (e.g. Geology, Physics, Environmental Science, Architecture (Faculty of Engineering and Technology)).
- 2) Experts at the University of Science and Technology Houari Boumedienne worked on recommendations for a building code that was presented to authorities within the Mount

Cameroon area who are responsible for issuing building permits and follow-up the construction of buildings. The building code will include approaches of reinforcing older buildings through seismic retrofitting in an attempt to make them more resistant to earthquakes.

Following the Algerian trip, the design of this code was realized through short courses and technical meetings held at the campus of UB as summarized on Table 2.

Table 2: Summary of Short Courses and Technical Meetings held to Design and Earthquake Building Code for the Mount Cameroon Area

| Events | Date | Participants | Purpose | Relevance |
|---|------------|--|---|---|
| Short Course: 'The design and enforcement of a building code for the earthquake prone Region of Mount Cameroon' | 25/06/2019 | 60 participants that included: - scientists, - structural engineers, - architects, -seismologists, - mayors; and - traditional rulers - administrators - Property owners (landlords) | - Sensitize the population on the: 1) causes and impacts of earthquakes and volcanic eruptions; 2) effects of earthquakes on buildings and related structures; 3) technical knowledge on the underlying principles needed for the design and construction of earthquake resistant structures; 4) usefulness of a building code for the municipalities situated at the flanks of MC. | - Enhance inclusive and sustainable urbanization and provide capacity for participation of all (SDG 11) |
| Technical meeting: "The design and enforcement of an earthquake building code and building regulations for the councils within the Mount Cameroon Area." Was achieved. After 3 technical meetings. | 29/08/2019 | 35 participants: - Scientists - Engineers - Architects - Administrators | To prepare a draft, finalize, and approve the designed building code before it is launched. | - Strengthening national and regional development planning (SDG 11) |

The Mount Cameroon Earthquake Building Code and Regulations (MOCEBICOR) is the first official building code developed in this area and in Cameroon in general, based on analysis of the intensities of historic earthquakes associated with eruptions of Mount Cameroon (Fig. 3). This code serves as a guide for the design of earthquake resistant structures and general rules for

building within the seven Councils around MC. This effort is based on the saying that "earthquakes don't kill people, buildings do". It was accordingly prepared based on the historic characteristics of the earthquakes that normally precede and accompany the eruptions of this active volcano and building regulations based on existing Presidential Decrees, Decisions and other Municipal Legislative Regulations on the subject. The code was accordingly adapted from other freely available building codes on the internet such as the established International Code Council (ICC), the Rwandan building code, the Algerian building code, amongst others. This was based on the known historic seismicity of Mount Cameroon (Fig. 3), which has been shown to have magnitudes of 4.7 on the Richter scale. The geology and soil types of the area and other parameters such as wind and rainfall patterns and altitudes of localities above sea level were also considered in the design of this code.

The building code has been subdivided into two main parts:

- Part I deals with the Earthquake building code proper, which entails engineering and architectural measures that have to be considered when building in the Mount Cameroon area.
- Part II emphasises on building regulations which are the norms and regulations that have been put in place by the government as pre-requisites for the construction of any building.

The launching of the earthquake building code and regulations successfully took place on the 17th of December, 2019. A donation of free copies of the book was made to the seven Councils which are located at the flanks of MC. The way forward after this event comprises of a series of sensitization workshops to be held with engineers and architects who will use desktop experiments and models to demonstrate to the population how to implement the code on the field. It is accordingly expected that the seven Councils within MC area and even beyond, will be bound to implement this code and the associated building regulations based on its effective dissemination and sensitization of the communities within the area.

The strict respect of the building parameters for various types of infrastructure within the areas specified in the building code is imperative if structural damage by earthquakes has to be prevented. This code is accordingly an essential and important tool for ensuring sustainable development within the area.

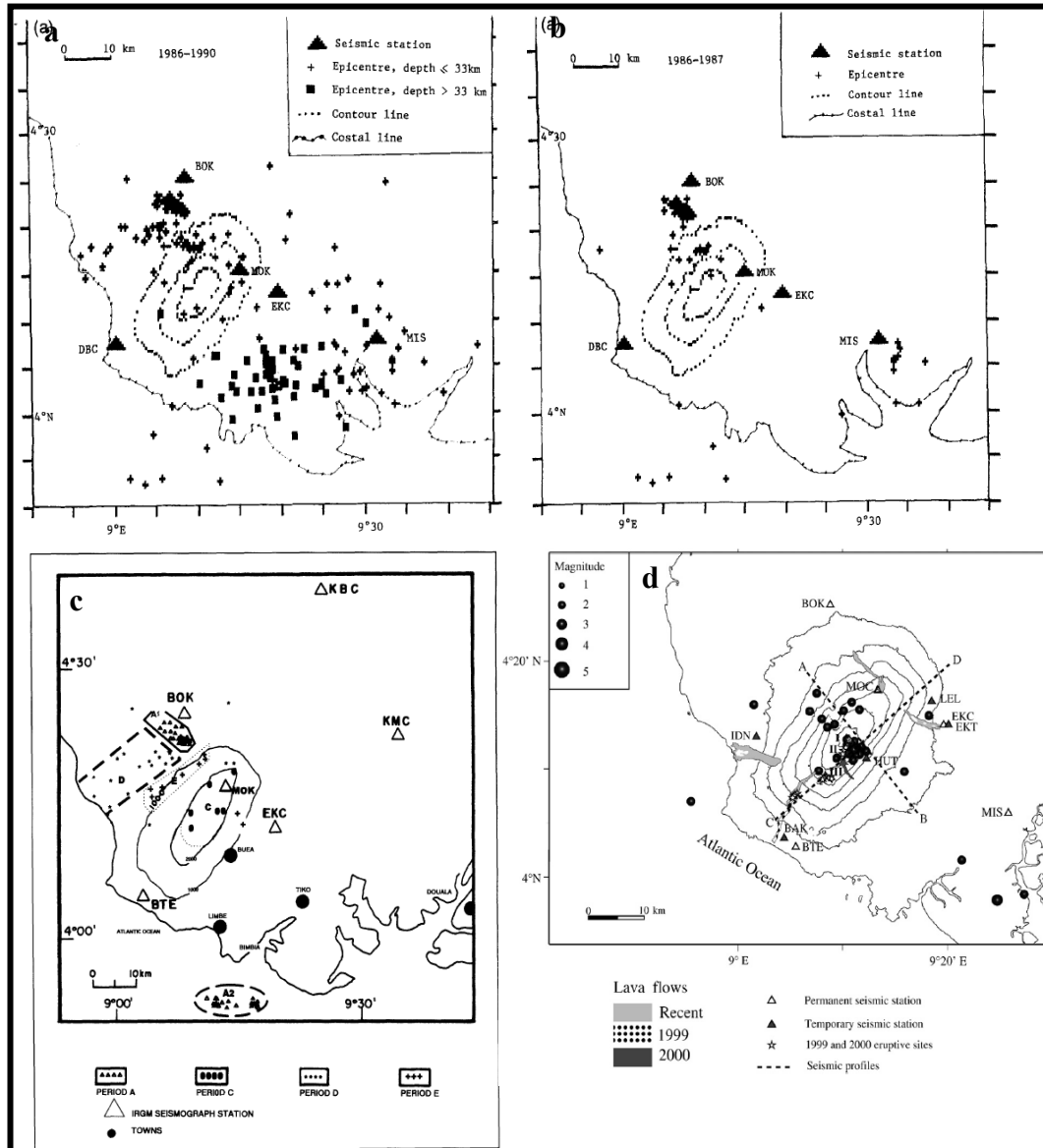


Figure 3. Graphs and maps showing the distribution of epicenters of seismicity at Mount Cameroon for the period a) 1985- 1992; where the dotted lines are contours beginning from 1000 m; ▲ = seismic station; + = depth of hypocentre less or equal to 33 km; ■ = depth greater than 33 km; b) epicentres of the 1986/1987 crustal seismic swarm (a & b are adapted from Ateba and Ntepe, 1997); c) Mapped epicenters of individual swarms in before and after 1989 (Ubangoh et al. 1997); d) seismicity map of Mount Cameroon and volcanic cones associated with the 1999 and 2000 eruptions. Error of epicenter location is 2 km. Also indicated are the sites of recent lava flows and seismic stations. EKT was the only permanent station working during that period, together with the temporary array.

Volcanic Risk Perception

Findings from the focus group discussion sessions held in Buea, Limbe and Batoke on volcanic hazards and their health implications revealed the following. Scientifically, the population perceived that eruptions from MC are triggered by magma and gas ascent. From the indigenous perspective the following causes were mentioned: most of the indigenes living along the flanks of MC believe when the gods of the mountain (“*effasso moto*”) are angry, or when a notable dies (in honour of the notable), they spit fire (lava) to their people. For this reason, these communities believe only pouring of libations will appease the gods of the mountain. Most indigenes believe they have strong spiritual ties with “*effassa moto*” who spits fire in the form of lava. The Bakweri indigenes believe that strange mysterious happenings usually take place prior to eruptions, which can be used as indicators of eruption prediction. These include: the death of a notable, trees shed their leaves, observable changes in the colour of plants from green to yellow, changes in animal (antelopes and rodents) usual habitats, longer dry season and strange behaviours of domestic animals (for example dogs bark for a longer time than normal). This used to be the most common way the indigenous people at the flanks of the mountain used to monitor and predict future eruptions.

For the health impacts, majority of it was channeled to volcanic ash which was said to cause the following: ocular problems (blurred vision and conjunctivitis), persons coughed blood when ingested, itching of skin (skin rashes) after taking bath with ash contaminated water, nose bleeding when inhaled in significant quantities, general breathing problems, which some believe later developed into asthma and long term impact of ash on vegetable and medicinal plants feared.

Traditional coping strategies cited against the adverse impact of ash included: consumption of palm oil, using palm oil to soothe itches on skin, staying indoors and avoidance of open water sources for bathing purpose since they have been contaminated with ash. However, some of the indigenous communities at the flanks of MC believe that the use of rituals and incantations in appeasing the gods served as a major strategy to mitigate previous MC eruptions. Others usually gather around a fire during eruptions, and use this as moments to discuss the next possible measures to take. The Bakweri indigenes have settled on the slopes and have interacted with the mountain for a very long time. These indigenes therefore have a wealth of indigenous knowledge, which should be exploited by scientists to help monitor this active volcano.

The UB Volcano Monitoring Laboratory

In 2018, the Volcano Monitoring Laboratory was constructed at the campus of the University of Buea with support from the University, the LIRA 2030 grant and the USAID funded PERIPERI U projects (SDG17). The laboratory is intended for monitoring of precursory activities along the CVL (Fig. 1) which include:

- 1) Gas Monitoring: collection of water from some selected springs/streams/rivers/craters lakes at the flanks of these volcanoes for water chemistry analyses monthly and/or quarterly;
- 2) Temperature Monitoring: use thermocouple to identify thermal anomalies from fumaroles and lava lakes monthly and/or quarterly and
- 3) Seismic monitoring: install a minimum of 6 seismometers at strategic positions at the flanks of these volcanoes to monitor seismicity in the area and locate epicenters of earthquakes prior to eruptions.

All this information is needed to be able to forecast eruptions from active volcanoes along this line and reduce its impact on the population. The laboratory is hosted by the Faculty of Science which has created budget heads for running its research laboratories used for the purchase of basic equipment, such as furniture and stationery. The laboratory has so far been equipped with computers, printers and some basic GIS softwares (Fig. 4) purchased with funds from the USAID funded PERIPERI U and LIRA 2030 grants.

However, proper monitoring has not begun at this laboratory. This process was halted after the construction of the laboratory due to the abrupt stop of USAID funds and the end of the LIRA 2030 project, both in 2019, leaving the laboratory unequipped to perform its functions. The laboratory is fully equipped with GIS facilities but not yet with instruments and equipment which can be used to monitor gaseous emissions, the earthquakes generated by rising magma prior to eruptions and the increase in temperature of water bodies and gas emissions from craters prior to eruption. These are important parameters which are used worldwide to predict eruptions of similar active volcanoes. The sustenance of this center will require constant activities being carried out in the field of disaster risk reduction and management. Thus, the establishment of more partnerships for the realization of these goals matters.



Fig. 4. UB Volcano laboratory in pictures showing a. the front view of the building; b. the secretariat and c. the computer room.

Postdoctoral Research Outcome on Capacity Building for Volcano Monitoring

To be able to detect and understand periods of unrest by monitoring temperature and gas emission changes from multispectral satellite sensors in an attempt to understand periods of unrest at MC, the process included the acquisition of satellite images for the period spanning 14 years from BIRA (Belgian Institute for Space Aeronomy, SDG17) needed to detect Sulphur dioxide (SO_2) gas emission. However, upon analyses of the acquired images at the time of research, emitted SO_2 from MC was negligible, which meant conditions were stable at the volcano.

In addition to this, more fundamental volcano monitoring techniques were acquired during the short training session at CSAV, University of Hawaii, Hilo (6 weeks) and at the USGS Cascades

Volcano Observatory, Vancouver, Washington State (2 weeks). The techniques taught ranged from field, laboratory, modelling and satellite imagery analyses. The field training emphasizes volcano monitoring methods, both data collection and interpretation, which are in use by the USGS. Besides learning to assess volcanic hazards, participants learned the interrelationships between scientists, governing officials, and the news media during volcanic crises. This course served as an introduction to a variety of volcano monitoring techniques, rather than detailed training. The session of this course that was attended fortunately coincided with the Mount Kilauea eruption of 2018 that gave us the opportunity to observe and learn first-hand how to manage hazards from active volcanoes.

Further research at VUB focused on improving the volcanic risk assessment of Mt Cameroon. The first set of results involved finishing a study on the “Forensic assessment of the 1999 Mount Cameroon(MC) eruption, West-Central Africa” that began in 2015 which was successfully published by the end of the research period (Wantim et al. 2018). The analysis conducted on the damage associated with the 1999 MC eruption used the FORIN (Forensic Investigations of Disasters) approach launched by Burton (IRD, 2010). This study aimed at extrapolating information on exposure patterns and unfolding a more articulated overview of vulnerability on the following aspects:

- i) systemic, related to the interlinkages among the different sectors that are affected in a region and in cities,
- ii) economic, related to the specific fragilities of local activities and the economy of the country, and
- iii) social, related to the social structure, and the coping capacity of organizations with responsibility in emergency management as well as the preparedness of different social groups.

This research constituted a first attempt to bridge the gap between different forensic approaches applied to volcanic eruption. A key component of the innovative FORIN method consists in the investigation of the environmental, social and economic consequences of the impacts of the eruption-related hazards (i.e., lava flows, tephra, gases and earthquakes) on people and on multiple sectors, such as infrastructure, economic activities including agriculture, residences and public services.

The second objective of the research targeted the assessment of lava flow risk around MC. It entailed investigating the potential environmental and socio-economic consequences of future lava flow emplacement on the communities living at the flanks of MC. Lava flow hazard was assessed using the Q-LAVHA (Quantum-Lava Hazard Assessment) model developed at the VUB (Mossoux et al., 2016). Q-LAVHA combines existing probabilistic (VORIS; Felpeto et al., 2001) and physical (FLOWGO: Harris and Rowland, 2001) models, with some modifications to refine lava flow simulation in terms of its spatial spread and final length (Mossoux et al., 2016). A major

component introduced in the lava flow hazard map used in this study that makes it different from the existing hazard maps from this same volcano is the use of varying effusion rates as input parameters (see Rowland et al., 2005). As observed in the 2018 Kilauea eruption (Neal et al., 2018), lava was extruded at higher effusion rates than previous eruptions from that volcano which was linked to changes in the magmatic plumbing system from the summit to the lower flanks. Mean effusion rates in the last century documented for MC eruptions varied from 5 to 50 m³s⁻¹ (Fitton et al., 1983; Suh et al., 2003; Njome et al., 2008).

Based on this, two scenarios were chosen:

- Scenario I represents the most probable scenario and is linked to documented effusion rates (5, 10, 30 and 50 m³s⁻¹) from MC eruptions.
- Scenario II takes into consideration eruptions at 100 and 500 m³s⁻¹ and is considered as the upper end member (see Fig. 5).

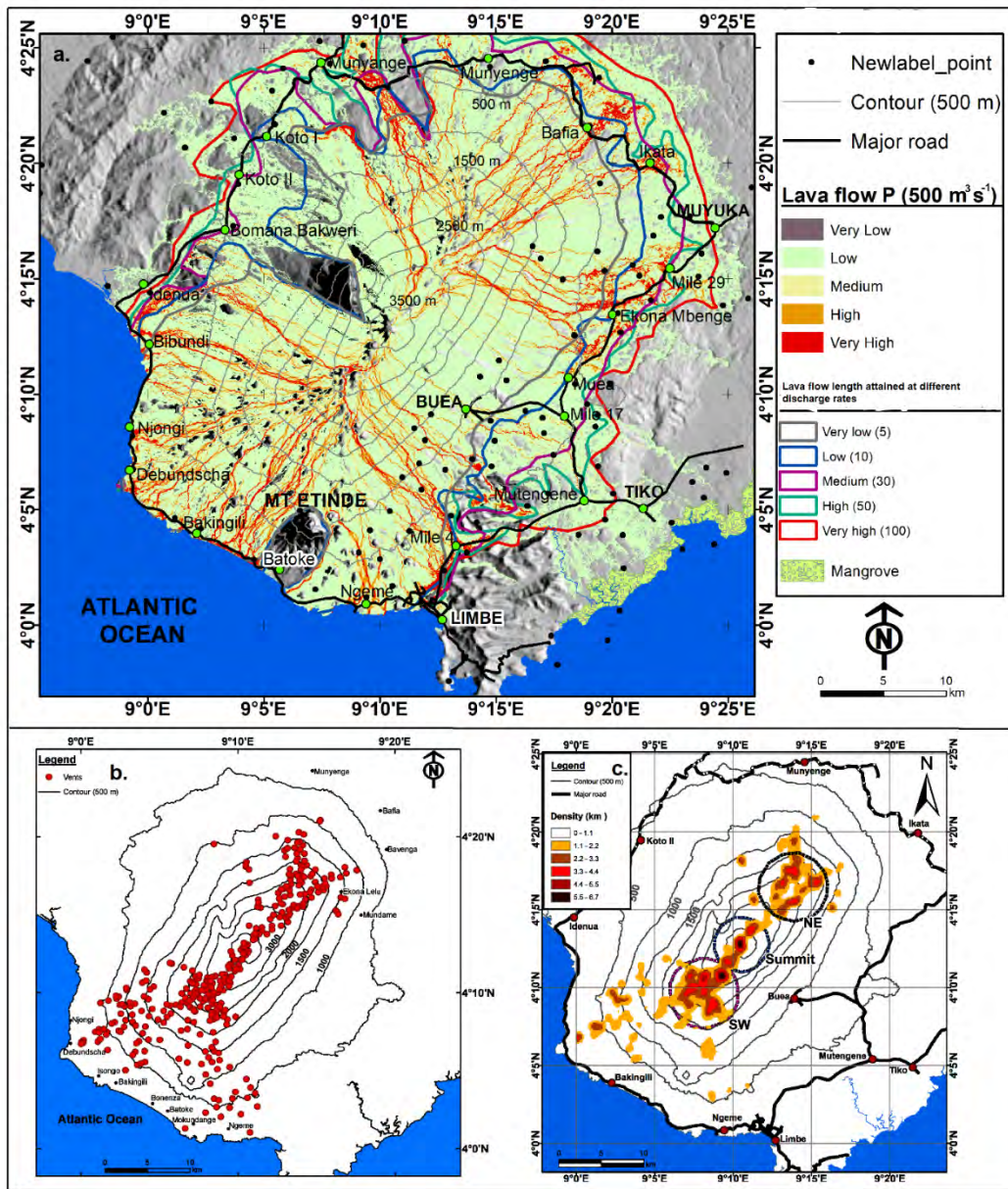


Figure 5: Maps showing: a. lava flow hazard at different eruption rates at MC generated using Q-LavHA model, b. alignments of over 300 vents along a NE-SW fracture network and c. kernel density map produced using a non-homogenous Poisson process that favours modelling of clustered random data with a search radius of 1000 m using all the vents to produce a PDF for lava flow simulations.

The produced lava flow map emphasised the SW, NE and SE habitats to be the most exposed to lava flow inundation taking all mapped vents (340) into account. Major linking roads at the flank of the volcano are susceptible to lava inundation. Lava flow hazard assessment was followed by risk assessment using landcover type and the built environment. MC landcover is depicted by the spatial distribution of natural vegetation (forest and savanna), plantations, agricultural land and built-up or settlement areas mapped from multi-spectral satellite sensors. Individual building infrastructures were systematically digitized from the Java Openstreet Map tool for the different

municipalities studied. A total of 45,800 buildings were mapped and analysed in this study: 17,043 houses in Buea, 19,722 houses in Limbe, 1558 houses in Idenua, 6008 houses in Muyuka and 1469 houses in Mbonge municipalities respectively.

Lava from summit vents has the highest impact on the forest and residential areas in the SE flank of the volcano. Built-up areas, farmland and plantations in the Limbe city and Idenua municipalities are at risk from lava inundation from eruptions with effusion rates as small as $5 \text{ m}^3\text{s}^{-1}$. Farming contributes to 80 % of the livelihood for the population living at the flanks of this volcano. The most affected landcover in terms of surface area is the forest which is host to timber, non-timber products and endemic flora and fauna species. However, its socio-economic significance when compared to agricultural land is negligible for the affected population. The safest municipality in terms of lava flow impact on building infrastructure is the Mbonge municipality. Here, buildings could only be impacted at effusion rates as high as $500 \text{ m}^3\text{s}^{-1}$. In general, the forest, farmland, agro-allied plantations, major linking roads, building infrastructure (commercial, administrative, social, residential) worth millions of US dollars may be impacted in the area.

Since few mitigation and preparedness actions can be taken to protect property from lava flows, the most reasonable solution is to evacuate and remove values from lava flow vulnerable areas. However, due to the sentimental ties attached by the individuals living in these zones, the cost invested in the existing valuables present and the fact that eruptions from MC mostly occur with a recurrence rate of ≥ 10 years interval, convincing these people to leave these hazardous zones is not realistic. The only solution for now is to educate the inhabitants in these high-hazard areas so that they are aware of the potential risks they face and get prepared to respond efficiently to future eruptions that would threaten property and human safety.

Such awareness raising actions took off in 2007 with the initiation of the Belgian sponsored VLIR project (Wantim, 2011) where workshops, training sessions and billboards were put up for the different hazards in the MC region. These efforts have increased through projects like the Periperi U and LIRA 2030.

This study is a continuation of such efforts and the results generated in this study would be transmitted as an awareness action to the different municipalities. Overall, even though lava flow was the hazard considered, looking at the 1999 eruption for example, MC eruptions usually result in multi-hazards with enchainned effects (Wantim et al., 2018) that warrants more in-depth study of each of the hazards to be able to properly assess risk from its eruptions.

Unit of Disaster Risk Management

After the creation of the DRM postgraduate programme, the University of Buea was recognized in 2019 as one of the global Centres of Excellence (CoE) on *Hazards and Disasters Research Institutes in Africa* by the Natural Hazards Institute of the University of Colorado at Boulder, USA, as a *Centre for Hazard Monitoring and Disaster Management (CEDIM) (Periperi U)* (<https://hazards.colorado.edu/resources/research-centers/africa>, based on a National Science

Foundation (NSF) grant to study such academic and research institutions globally. The created programme has so far defended over 30 MSc. theses and presently has a student population of over 40 people (first and second year). It is characterised with a multidisciplinary staff. This team, in collaboration with other experts, designed and launched the first Earthquake Building Code and Building Regulations in the country for the councils within MC. The team has also been actively involved in sensitization work on geological, technological and climate change risks, humanitarian work and consultancy projects. In 2021, the University of Buea granted a Unit for the affairs of this programme which began functioning in 2022. This unit is responsible for the monitoring of MC eruptions and managing of other related disasters in the region and Cameroon in general, which all have an influence on developmental endeavours.

Conclusion

This North-South and South-South partnerships established by the University of Buea between 2016 to 2019, through a USAID PERIPERI-U and a Swedish (SIDA) LIRA 2030 grants have enormously contributed towards the partial attainment of SDG 11 (Targets 11.5 and Indicator 11.B.2) in making the cities at the flanks of MC safe, resilient and sustainable. This is clearly illustrated in the role these partnerships played in the development of the first Earthquake Building Code and Building Regulations in the area. Once this code has been promulgated into law, it is accordingly expected that the seven Councils within the Mount Cameroon area and even beyond, will be bound to implement this code and the associated building regulations. The way forward after the establishment of this code into law, will comprise of a series of sensitization workshops to be held where the engineers and architects who were part of this project, will demonstrate to the population how to implement the code on the field using desktop simulations. This will constitute another approach of partnership of the University with its local community.

The construction and partial equipping of a Volcano Monitoring Laboratory at the campus of UB is also a major milestone achieved with the aid of the USAID PERIPERI-U and Swedish (SIDA) LIRA2030 partnerships. Even though real time volcano monitoring have not yet began at this laboratory, it presently serves as a centre for capacity building of postgraduate students in the Disaster Risk Management (DRM) programme, which is also a major fallout from the established partnerships. The creation of the DRM programme at UB, is the first initiative in the whole of the Economic Community of Central African States (ECCAS) which could not have been possible without these established partnerships. Because of the establishment of the DRM programme coordinated by the DRM Unit, staff of the unit have been involved in ECCAS workshops funded by the World Bank in building the capacity of major stakeholders in the ECCAS region on DRR and DRM relevant to build resilient and safe cities. It is therefore imperative to reinforce these partnerships and create more in order to ensure sustainable development approaches in the urban, rural and peri-urban sectors that comprise 2 cities, 3 towns and 63 villages situated on the flanks of this mountain.

Thus, the USAID PERIPERI-U and LIRA 2030 partnerships with the University contributed towards the implementation of the targets of both SDG 17 and SDG 11 for it has enabled the building of a sustainable urbanization around Mount Cameroon which will last until 2030 and

beyond. The acquired experience can then be transposed and/or extended to other cities, towns, and village communities within both developed and developing countries on the African continent, and globally which may be vulnerable to similar volcanic risks.

Future Perspectives

1. Sensitization and capacity building on the Earthquake Building Code and Building Regulations: Simplification of the document into non-professional terms so that construction workers will be able to adopt it in their building practices.
2. Equipping and building the Manpower at the Volcano Monitoring Laboratory: develop partnerships (North-South and South-South) to fund the purchase of seismometers, thermocouples, and gas detectors and also train the manpower needed.
3. Usefulness of Monitoring MC: The monitoring process will provide results, which will be used to inform policy makers and the communities about disaster preparedness/evacuation plans. Local partnerships such as those created after the 1999 eruption through grants/subventions from the government could be reinstated. New partnerships will be sought with other government officials, the seven municipalities around the volcano, the private sector, and Ministerial Delegations (Housing, Research, Town Planning, etc.) to ensure social change and sustainable development in the area by the year 2030. The success of such ventures and their sustenance during the next 8 years until 2030 matters because this will:
 - a. Enable infrastructure operators to be knowledgeable about likely impacts of earthquakes on buildings in the area,
 - b. Provide clear messages for policy makers for consideration in enacting building laws and regulations for the area based on the scientifically identified norms presented in the code.
 - c. Build the confidence of the communities and of prospective investors who may like to invest by setting up industries for example, since they will realise the existence of a scientifically monitoring of the hazards from this mountain.
 - d. These issues are pivotal for the implementation of SDG11, SDG17 and the other related SDGs in the area and even beyond.

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An Exploration of How Large Corporations Use Sustainable Development Goals and Standardized Reporting Structures within their Sustainability Strategies

Michael Bown, Clifton Farnsworth, Andrew South,
and Robert Sowby (Brigham Young University, Utah, United States)

Abstract

The purpose of the paper is to determine which of the UN Sustainable Development Goals (SDGs) are being used by the largest US corporations, and to assess the quality of this use. Similarly, we determine which of the most common standardized reporting structures these corporations use. The assessments are done using the websites and annual reports of the top 25 Fortune 100 companies. There are 17 SDGs and four widely used standardized sustainability reporting structures: Sustainability Accounting Standards Board (SASB), Global Reporting Initiative (GRI), Task Force on Climate-Related Financial Disclosures (TCFD), and Carbon Disclosure Project (CDP). Along with these reporting structures, we look at which companies subscribe to the two programs UN Global Compact (UNGC) and the Science-Based Targets Initiative (SBTi). All 17 SDGs are mentioned by at least two companies, and by up to 14 companies for the most popular SDG. Three of the top four companies in terms of SDG usage are in the “consumer discretionary” category. Beyond mere mention of SDGs, 52% of the companies show good evidence of their adoption of the SDGs. The six reporting structures and programs are well represented among the companies, with eight companies using all six, and five more using five of them. The paper contributes to the body of knowledge by showing in structured form to what extent the SDGs have meaningfully penetrated the largest US corporations, and to what degree these corporations are using standardized reporting structures for communicating sustainability information to their stakeholders.

Keywords: UN SDG; UN Global Compact; Sustainable Development Goals; Science-Based Targets Initiative; Fortune 100; Corporate Websites

Purpose and Introduction

The idea of sustainability in the sense of renewable resources use goes back centuries, at least to the time of Hannß Carl von Carlowitz, a late-17th/early 18th German who wrote about forestry and how to use trees without decimating forests (Grober, 1999). Carlowitz was a mining administrator in Saxony, and the silver mines in that state had depleted the old forests in the area by using the trees to smelt the mined ores. In the modern era, the term was broadened from the natural resource view in the UN report *Our Common Future* (UN, 1987) which defined sustainable development as meeting “the needs of the present without compromising the ability of future generations to meet their own needs”. Sustainable business practices as an opportunity started to take root during the 1990s and 2000s as businesses’ investors, customers, and consumers

started to expect that companies were not abusing the planet producing their products (Hoffman, 2018). Sustainability has thus become a strategic element of companies' plans. As such, the potential for "greenwashing" (misrepresenting sustainability efforts) has arisen because investor and consumer impressions are increasingly what drive business success in the market (Watson, 2016; Martin and Chasen, 2018). If a company's investors and consumers think a company is doing good things in sustainability, they will favor the company. If the impressions are mistaken because of how the company has positioned things in their public communications, this increased favor will be unjustified. Over the past decade or two several reporting structures (SASB, GRI, TCFD, etc.) have been developed to ensure that corporate sustainability efforts are communicated consistently (across companies) and accurately. These reporting structures help limit the potential for greenwashing.

Today, businesses communicate with their customers/consumers and to a great extent with their investors through their websites. Corporate "sustainability" websites (using various terms as synonyms or extensions of sustainability) have become large and increasingly complicated, particularly as sustainability has largely developed into "ESG" (Environmental, Social, Governance) for many corporations (Temmink and Flynn, 2021). It can be asked whether consumers in particular will really spend the time digging through the details of these sites and corporations' annual sustainability reports to understand the details of what companies are really doing in this area. "Buzzwords" can be used, for example, to give a certain impression on summary pages with the details only found buried in links to less readable pages or reports. As a result, it is possible for a company to drive investor or consumer behavior with incorrect claims. To counter this risk, the U.S. Security and Exchange Commission (SEC) announced in March 2021 the creation of a Climate and ESG Task Force in their Division of Enforcement (SEC, 2021). The purpose of this task force is to "identify ESG-related misconduct" because of "increasing investor focus and reliance on climate and ESG-related disclosure".

The purpose of this paper is to investigate the websites and annual reports of the U.S.'s largest corporations to see what they communicate about their sustainability efforts. While there are a number of elements on these websites that were investigated, this paper will focus solely on two of them: the use of the 17 United Nations Sustainable Development Goals (SDGs), and the use of the 6 main reporting structures and programs that were developed to ensure consistency and transparency of sustainability reporting. The reporting structures are Sustainability Accounting Standards Board (SASB), Global Reporting Initiative (GRI), Task Force on Climate-Related Financial Disclosures (TCFD), and Carbon Disclosure Project (CDP). The associated external programs are the UN Global Compact (UNGC) and the Science-Based Targets Initiative (SBTi).

Review of Relevant Literature

In 2015 the United Nations launched the 17 Sustainable Development Goals program in an effort create a framework of commonality for which individuals, communities, and nations can target sustainable solutions for the common good of all (UN, 2015). The United Nations Development Programme's (UNDP) Human Development Report 2020 shows the importance of sustainability

to the world (UNDP, 2020). The 17 SDGs can be seen in Figure 1 (as obtained from the SDGs website, www.un.org).

Figure 1: UN Sustainable Development Goals



The world's largest initiative for promoting corporate sustainability is the United Nations Global Compact (UNGC, 2015). Announced at the World Economic Forum in 1999, it was officially launched a year later in New York City. The principal purpose of the UN Global Compact is to encourage businesses to adopt sustainable policies that incorporate the ten principles of business activities and align actions with the UN sustainable goals (UNGC, n.d.a). According to the UNGC, "no matter how large or small, and regardless of their industry, all companies can contribute to the SDG's" (UNGC, n.d.a). They further provide a plea for companies to "do business responsibly" as well as working toward "solving societal challenges through business innovation and collaboration" (UNGC, n.d.a). The ten principles of the UN Global Compact focus on a principled approach to doing business through the company's value system. This means incorporating business practices that promote responsible corporate behavior with regard to human rights, labor, the environment, and dissuading corruption (UNGC, 2015). These practices include respecting and protecting human rights as well as ensuring non-violation of human right abuses; upholding the freedom of association and the right to collective bargaining, and eliminating forced and compulsory labor, child labor, and discrimination; supporting a precautionary approach to environmental challenges, promoting greater environmental responsibility, and encouraging the development of environmentally friendly technologies; and finally, businesses should work against corruption in all its forms (UNGC, 2015). In addition to the ten principles of business activities, the UNGC further indicates that for companies to be sustainable they must operate responsibly in alignment with these universal principles and take actions that support society. This can become part of a company's corporate culture if the company exhibits executive level commitment, regularly reports on their efforts, and applies these principles locally where they have a presence (UNGC, 2015).

To assist companies in effectively applying UNGC principles and recommendations, the UN Global Compact Management Model was created. This model is comprised of six management steps, including committing, assessing, defining, implementing, measuring, and communicating their sustainability efforts (UNGC, 2010). The model itself is intended to be circular and iterative, with no specific entry or end point within the six steps. In this manner, there is an implication that by following this ongoing circular management process, companies are able to continuously improve (UNGC, 2010). It is important to note that one of the key elements of the UNGC guidelines is communicating the company's strategies, regularly evaluating the effectiveness of their efforts, and ultimately reporting the company's level of effectiveness. These principles were a direct motivator in performing the research contained in this paper. A 2017 report contains an overview of how companies are implementing the ten principles, as well as the actions that are being taken to advance the SDGs (UNGC, 2017). This report indicates that after two years of effort, 75% of the participating companies say that they have some form of action directly related to the sustainable development goals. Table 1 shows a summary of the activities that companies self-reported targeting in the UNGC Progress Report, 2017 (UNGC, 2017). Although this table doesn't specifically indicate the quality of those efforts, it at least acknowledges some level of corporate action. It should be noted that companies that specifically work to apply the ten principles of the UN Global Compact inherently begin to align corporate strategies with the SDGs. Although this report indicates companies are indeed aligning their efforts with the SDGs, there is a gap in understanding their assessment, reporting, and communication efforts. This research was initiated to explore the transparency of the SDG alignment, communication, and reporting efforts of leading corporations.

Table 1: Ranked Order of Percent of Companies Targeting SDG with some Level of Corporate Action

| % Companies with Action | SDG |
|-------------------------|---|
| 49% | Goal 8: Good jobs and economic growth |
| 49% | Goal 3: Good health and well-being |
| 45% | Goal 5: Gender equality |
| 42% | Goal 4: Quality education |
| 40% | Goal 12: Responsible consumption |
| 39% | Goal 9: Innovation and infrastructure |
| 37% | Goal 13: Climate action |
| 35% | Goal 7: Clean energy |
| 32% | Goal 10: Reduced inequalities |
| 32% | Goal 6: Clean water and sanitation |
| 30% | Goal 11: Sustainable cities and communities |
| 29% | Goal 17: Partnership for the goals |
| 24% | Goal 1: No poverty |
| 23% | Goal 16: Peace and justice |
| 19% | Goal 2: Zero hunger |
| 18% | Goal 15: Life on land |
| 12% | Goal 14: Life below water |

There have been other studies that have investigated the relationship between corporate strategy and SDG alignment. One recent study indicated that corporate foundations should serve as partnership brokers, thus helping to more effectively achieve the SDGs within the business sector (Gehring, 2020). Jimenez, et al. (2021), on the other hand, concentrated on how focusing on corporate purpose can lead to more sustainable business practices. This occurs by eliminating the tension between maximizing profits and benefitting society, guiding the evolution of strategies, priorities, and decision making to incorporate long-term commitment to SDG alignment, and prioritizing SDG implementation at the management level. Mattera and Ruiz-Morales (2020) demonstrated that although a company might implement the UNGC management model, these actions did not specifically correlate to the perceptions or performance of the company. With regard to perception, Anwar and El-Bassiouny (2020), indicated that marketing remains an integral part in helping achieve a company's sustainability efforts. This supports the notion that communication and transparency are an important element within a company's sustainability strategy.

Barrese, et al. (2020) explored the motivations behind US companies joining the UN Global Compact. They indicate that two early theories emerged: one where critics argue that with a low barrier to entry and no enforcement or compliance it attracted companies seeking to enhance their reputations; the other where advocates indicate companies join seeking learning and improvement with regard to their corporate social responsibility (CSR) efforts. The Barrese, et al. (2020) study tested the Haack, et al. (2021) CSR model, supporting the idea that companies can adopt these types of strategies "ceremonially under conditions of opacity" and over time evolve to "substantive adoption" as their transparency increases. This research validated the notion that effective transparency is a significant contributor to effective adoption and alignment of sustainability strategies. Küçükgül, et al. (2022) further indicate that companies must have effective measurement and communication criteria for aligning their corporate sustainability and SDG strategies. Another recent study by Izzo, et al. (2020) highlights some of the challenges that are faced with reporting on SDG achievement within Italy. They indicate that awareness of SDGs is high within the business community, and that most highly traded Italian companies have introduced SDG alignment strategies and reporting within their business practices. However, there is a lack of information regarding the exact nature of the implementation requirements, and a lack of definition regarding key performance indicators for measuring the goals. Since this study was conducted solely on leading Italian companies, our research seeks to provide a similar look at leading global companies. Ultimately, the effective implementation of the SDGs in the corporate world depends on partnerships and engagements of local communities spanning a broad array of stakeholders. Through proper sustainability leadership, corporations effectively aligning with the SDGs can provide substantial solutions to some of the world's environmental, social, and economical problems (Filho et al., 2020). In summary, based on the gaps in understanding provided within this literature review, our research takes a fundamental look at how large multinational corporations are doing with regard to the transparency, assessment, and communication efforts, and their overall SDG alignment.

Methodology

This is cross-sectional study and status review of the sustainability-relevant information provided by large corporations on their websites and in their annual reports. This includes evaluating the transparency of this information. The websites of the top 25 companies in the Fortune 100 (F100) ranking were reviewed for “sustainability” content. In the analysis the companies were grouped into industries following the MSCI Global Industry Classification Standard (GICS), as reported by Bloomberg. One of the companies is a holding company composed of many smaller companies and does not have a sustainability program as such for the parent company. This company was nevertheless included in the rankings. As a good-faith effort to not personally “call out” the companies, only the company F100 rankings were included in the tables, not the company names.

The text “[company name] sustainability” was typed into the Google search engine using Google Chrome, and the web pages that were shown were investigated in detail, following all relevant links to other sites, pages, and reports, and reading the appropriate parts of the documents. Since each company’s website is uniquely structured, it was not possible to follow the same steps for each company, however the sites were thoroughly investigated. That said, the process was generally as follows. 1) Evidence was sought of a large sustainability goal at some future date, generally from 2030 to 2050, as well as milestones on the way to this major goal. 2) Does the company have a senior manager or executive responsible for sustainability? 3) The quality of the website’s sustainability content and the company’s annual “sustainability report” was reviewed. 4) The topics of this paper were investigated: the SDGs and reporting structures the companies use.

We define four categories to assess the quality of use of the United Nation’s 17 Sustainable Development Goals. For Category 1, the company uses some of the SDGs and gives detailed, comprehensive information on how the SDGs guide the company’s decisions (we refer to this as “strong evidence”). For Category 2, the company uses some of the SDGs but only gives high-level information about how they are being used (we refer to this as “weak evidence”). For Category 3, there is perfunctory mention of the SDGs but no evidence that they are being used in any real way. For Category 4, there is no mention of the SDGs. If a company states that they are using all 17 SDGs, but does not provide any detail, it is not counted in the tally of SDG usage, although the company is ranked as Category 3. By not counting such companies’ mention of SDGs in the tally, we ensure that it only includes meaningful usage. The logic behind this is that it is not realistic for a company to genuinely be involved in a meaningful way with all 17 SDGs. This was supported by the fact that the companies that gave strong detail on how they were using the SDGs had identified a subset of them to focus on. No company that claimed they were using all 17 SDGs had any information on how they were using them. Whether a company used a few of the SDGs or a lot (but not all) of them was not ranked. If a company had selected a subset of the SDGs to focus on, this was evidence that they were being used seriously. It therefore didn’t matter to our investigation whether that number was large or small. If a company had said they were using all 17 SDGs and gave details, they would have ranked in with the others that used a subset of them, but none did give details if they claimed 17. Table 2 summarizes the four categories for SDG usage.

Table 2: Ranking Categories for Quality of Mention of SDGs

| Quality of Mention of SDGs | | |
|-----------------------------------|-----------------|---|
| Category | Label | Meaning |
| 1 | Strong Evidence | There is detailed, comprehensive information given about their SDG usage |
| 2 | Weak Evidence | The information given on SDG usage is high level and lacking specificity |
| 3 | Vague Mention | SDGs are just mentioned without anything specific or meaningful about their usage |
| 4 | No Mention | No reference to SDGs was to be found |

There are a number of other reporting structures and external programs that companies use to strengthen their sustainability programs. The reporting structures most frequently used are: SASB, GRI, TCFD, and CDP (SASB, n.d.; GRI, n.d.; TCFD, n.d.; CDP, n.d.). SASB is the Sustainability Accounting Standards Board, founded to drive consistent reporting of ESG (Environmental, Social, Governance) data that is financially relevant to investors. GRI is the Global Reporting Initiative, which provides reporting standards on companies' impacts on sustainable development (whereas SASB is an accounting focus on financial materiality). SASB and GRI can be seen as complementary. TCFD is the Task Force on Climate-Related Financial Disclosures, founded to define a climate-related disclosure structure for companies to use with their stakeholders. CDP, or the Carbon Disclosure Project, helps organizations disclose their environmental impact. CDP is similar the somewhat older GRI, but originally intended to focus on companies rather than countries. It now works with regions and governments too. The UNGC and SBTi are programs that help companies focus on sustainability (UNGC, n.d.b; SBTi, n.d.). UNGC is the United Nations Global Compact, a non-binding agreement to encourage organizations to use sustainable policies. SBTi is the Science-Based Targets Initiative, which is a joint effort by the UNGC, CDP, and several other organizations to encourage and help companies set emission targets that are broadly consistent with climate science, and specifically with the Paris Agreement. There are a number of other such programs that companies use, but they are not mentioned frequently enough to include here.

Findings

For the purposes of this conference paper, we focus on the UN SDGs and the reporting structures and external programs. Analysis of the other elements briefly mentioned under Methods will be done in a future paper.

UN Sustainable Development Goals (SDGs)

All 17 SDGs are mentioned by at least two of the companies. The most frequently mentioned SDG is 13 (Climate Action) with 14 companies mentioning it, followed by SDG 8 (Decent Work and Economic Growth) which is mentioned by 13 companies. There is a tie for the third-most mentioned SDG with 3 (Good Health and Well-Being) and 5 (Gender Equality) each being mentioned by eleven companies. SDG 14 (Life Below Water) is only mentioned by two companies. Table 3 shows the distribution of the SDGs across the companies with totals per SDG and per company. The table is sorted by number of SDGs used. The companies that mentioned

all 17 SDGs without giving details are shown as not using any of them because their mention, without evidence, is unrealistic. No company mentioned all 17 SDGs while giving details, which strengthens the idea that mentioning all 17 is unrealistic and can therefore be seen as greenwashing. The highest number of SDGs a company used convincingly was twelve (just one company used twelve of them). There were eleven SDGs used convincingly by two companies, while a third company used eleven SDGs with only weak evidence. The first three companies with convincing usage were all in the Consumer Discretionary category. The fourth company which nominally tied for second in usage, but with weak evidence, was in the Healthcare category. Ten of the companies either only vaguely mention the SDGs or do not mention them at all. (These are ranked as 3 and 4 under Quality of Use in Table 3). These ten companies are in six of the GICS categories, with “Healthcare” having three representatives among the ten. The results of SDG alignment and use mirror the results found in the earlier UN study (UNGC, 2017), but tend to demonstrate less transparency and communication within their reporting structures, an element that has been identified as important in truly making change.

Table 3: SDG use Ranked by Numbers per Company

| F100 | Industry Group | Quality of Use | United Nations Sustainable Development Goals (by company use) | | | | | | | | | | | | | | | | | Company Totals |
|------------|------------------------|----------------|---|---|----|---|----|---|---|----|---|----|----|----|----|----|----|----|----|----------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | |
| 22 | Consumer Discretionary | 1 | | | X | X | X | | X | X | X | | X | X | X | | X | X | X | 12 |
| 18 | Consumer Discretionary | 1 | | | X | | X | X | X | X | X | X | X | X | X | | X | | | 11 |
| 21 | Consumer Discretionary | 1 | | | X | X | X | X | X | X | X | X | X | X | X | X | | | | 11 |
| 24 | Healthcare | 2 | X | X | X | | X | | | X | | X | X | X | X | | | X | X | 11 |
| 1 | Consumer Staples | 1 | | X | | | X | | X | X | | | X | X | X | X | X | | | 9 |
| 11 | Communication Services | 1 | | | X | X | X | | | X | X | | X | | X | | | X | X | 9 |
| 19 | Financials | 1 | X | | X | X | X | X | X | X | X | | | X | | | | | | 9 |
| 4 | Healthcare | 1 | | X | X | X | X | | | X | | | | X | X | | X | | | 8 |
| 10 | Energy | 1 | X | | X | X | X | | X | X | | | | X | X | | | | | 8 |
| 12 | Consumer Staples | 1 | | | | | | X | | X | | X | | X | X | X | X | | | 7 |
| 13 | Healthcare | 1 | | X | X | | X | X | | X | | X | | | X | | | | | 7 |
| 20 | Communication Services | 1 | | | | X | | | X | X | X | | | | X | | X | X | | 7 |
| 23 | Healthcare | 2 | X | X | X | | X | | | | | X | X | | X | | | | | 7 |
| 15 | Technology | 1 | | | | X | | | | X | | | | | X | | | X | | 4 |
| 7 | Healthcare | 1 | | | X | | | | | | | X | | | X | | | | | 3 |
| 2 | Consumer Discretionary | 3 | | | | | | | | | | | | | | | | | | 0 |
| 3 | Technology | 4 | | | | | | | | | | | | | | | | | | 0 |
| 5 | Healthcare | 4 | | | | | | | | | | | | | | | | | | 0 |
| 6 | Financials | 4 | | | | | | | | | | | | | | | | | | 0 |
| 8 | Healthcare | 3 | | | | | | | | | | | | | | | | | | 0 |
| 9 | Communication Services | 4 | | | | | | | | | | | | | | | | | | 0 |
| 14 | Healthcare | 4 | | | | | | | | | | | | | | | | | | 0 |
| 16 | Consumer Staples | 3 | | | | | | | | | | | | | | | | | | 0 |
| 17 | Consumer Staples | 4 | | | | | | | | | | | | | | | | | | 0 |
| 25 | Financials | 4 | | | | | | | | | | | | | | | | | | 0 |
| SDG Totals | | Totals | 4 | 5 | 11 | 8 | 11 | 5 | 7 | 13 | 6 | 7 | 7 | 9 | 14 | 2 | 6 | 5 | 3 | |

Beyond the top three convincing users all being in the Consumer Discretionary category, there is no obvious pattern in the use of the SDGs among the GICS groups. Table 4 shows the usage sorted by Fortune 100 order. The apparent bunching at the bottom of the table is due to the four top users being in that area.

Table 4: SDG Use Ranked by Fortune 100 Order

| | | United Nations Sustainable Development Goals (by Fortune 100 order) | | | | | | | | | | | | | | | | | | |
|------------|------------------------|---|---|---|----|---|----|---|---|----|---|----|----|----|----|----|----|----|----|----------------|
| F100 | Industry Group | Quality of Use | | | | | | | | | | | | | | | | | | Company Totals |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | |
| 1 | Consumer Staples | 1 | | X | | | X | | X | X | | | X | X | X | X | | | | 9 |
| 2 | Consumer Discretionary | 3 | | | | | | | | | | | | | | | | | | 0 |
| 3 | Technology | 4 | | | | | | | | | | | | | | | | | | 0 |
| 4 | Healthcare | 1 | | X | X | X | X | | | X | | | | X | X | | X | | | 8 |
| 5 | Healthcare | 4 | | | | | | | | | | | | | | | | | | 0 |
| 6 | Financials | 4 | | | | | | | | | | | | | | | | | | 0 |
| 7 | Healthcare | 1 | | | X | | | | | | | X | | | X | | | | | 3 |
| 8 | Healthcare | 3 | | | | | | | | | | | | | | | | | | 0 |
| 9 | Communication Services | 4 | | | | | | | | | | | | | | | | | | 0 |
| 10 | Energy | 1 | X | | X | X | X | | X | X | | | | X | X | | | | | 8 |
| 11 | Communication Services | 1 | | | X | X | X | | | X | X | | X | | X | | | X | X | 9 |
| 12 | Consumer Staples | 1 | | | | | | X | | X | | X | | X | X | X | X | | | 7 |
| 13 | Healthcare | 1 | | X | X | | X | X | | X | | X | | | X | | | | | 7 |
| 14 | Healthcare | 4 | | | | | | | | | | | | | | | | | | 0 |
| 15 | Technology | 1 | | | | X | | | | X | | | | | X | | | X | | 4 |
| 16 | Consumer Staples | 3 | | | | | | | | | | | | | | | | | | 0 |
| 17 | Consumer Staples | 4 | | | | | | | | | | | | | | | | | | 0 |
| 18 | Consumer Discretionary | 1 | | | X | | X | X | X | X | X | X | X | X | X | | X | | | 11 |
| 19 | Financials | 1 | X | | X | X | X | X | X | X | X | | | X | | | | | | 9 |
| 20 | Communication Services | 1 | | | | X | | | | X | X | X | | | X | | X | X | | 7 |
| 21 | Consumer Discretionary | 1 | | | X | X | X | X | X | X | X | X | X | X | X | | | | | 11 |
| 22 | Consumer Discretionary | 1 | | | X | X | X | | X | X | X | | X | X | X | | X | X | X | 12 |
| 23 | Healthcare | 2 | X | X | X | | X | | | | | X | X | | X | | | | | 7 |
| 24 | Healthcare | 2 | X | X | X | | X | | | X | | X | X | X | X | | | X | X | 11 |
| 25 | Financials | 4 | | | | | | | | | | | | | | | | | | 0 |
| SDG Totals | | Totals | 4 | 5 | 11 | 8 | 11 | 5 | 7 | 13 | 6 | 7 | 7 | 9 | 14 | 2 | 6 | 5 | 3 | |

Most (52%) of the companies subscribe to a subset of the 17 SDGs and give meaningful evidence that they are really driving the company's sustainability strategy. Examples of what companies in this category are doing are:

- Donating unsold but still fresh food to food banks and charities, and if it is no longer edible, to organizations who produce animal feed, or compost it (SDGs 2, 12)
- Moving to 100% cage-free eggs supply (SDG 12)
- Operating facilities with ultra-low GWP refrigerants (SDG 13)
- Moving to third-party certified sustainable seafood sources (SDG 14)
- Becoming the largest corporate purchaser of renewable energy in 2020 (SDG 7)
- Significant reductions in Scope 1 and 2 emissions against a baseline within the decade (SDG 13)
- Partnering with UNICEF to provide digital learning platforms in eleven third-world countries (SDG 4)

- Helped 45 million people gain critical digital skills needed in today's economy (SDG 8)
- Developed an open-source software toolkit to allow external verification of election tallies (SDG 16)
- Operating rooftop solar farms on a large number of retail stores (SDG 7)
- Donating significant amounts to community organizations working to reduce social equity or to veterans causes (SDGs 10, 11)
- Cut electrical use by nearly half in their stores over the last decade (SDG 13)
- Reduced "carbon intensity" (company carbon emissions per data carried in company networks) by more than half in three years
- Running engineering-based courses for nearly 3500 school children at 65 schools in the UK (SDG 4)
- Purchasing billions of dollars per year of goods and services from minority- and women-owned businesses (SDG 8)
- Run more than 100 sites with true zero waste to landfill status (SDG 12)
- Partnering with environmental organizations to protect and conserve watersheds and ecosystems in South America (SDGs 6, 13, 15)

There are many more examples. A small group (8%) use a subset of the SDGs but do not give convincing evidence that they are being used in a real way. This does not mean they are not being used, but rather that the websites do not reflect this. To the extent they are not being used meaningfully, this could count as greenwashing. Another small group (12%) only mention the SDGs vaguely. The companies that mentioned all 17 SDGs were all in this category because they did not give evidence that they are being used. This category should be seen as greenwashing. Finally, 28% do not mention the SDGs at all. Figure 2 shows the split into the four categories.

Figure 2: Quality of Mention of SDGs

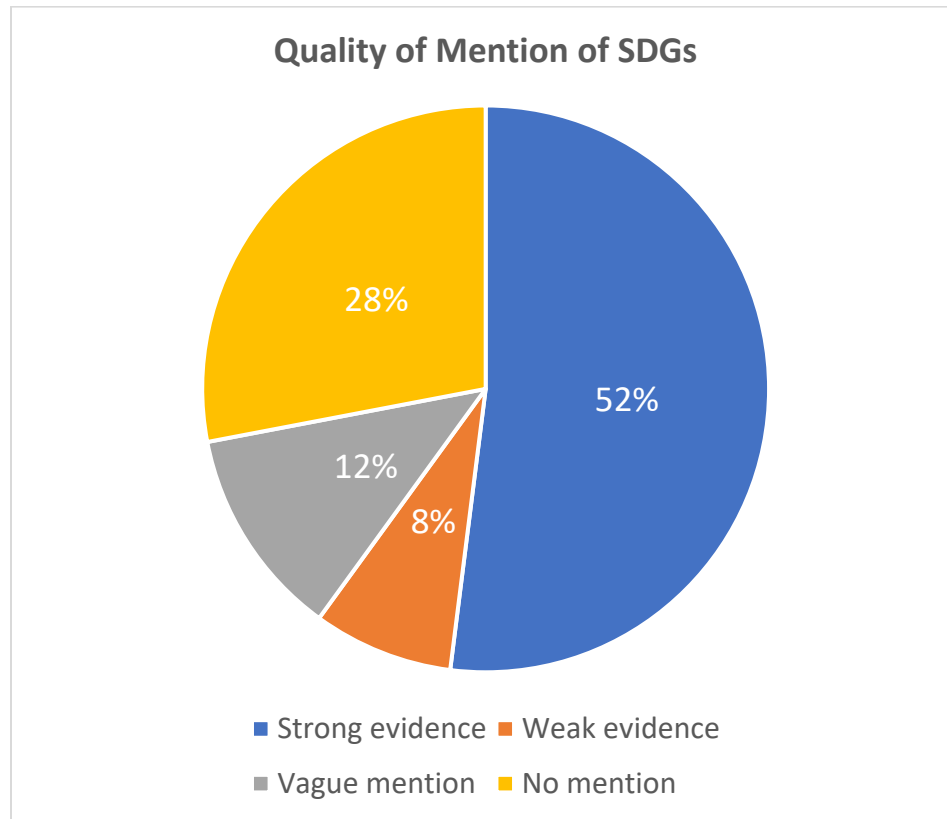


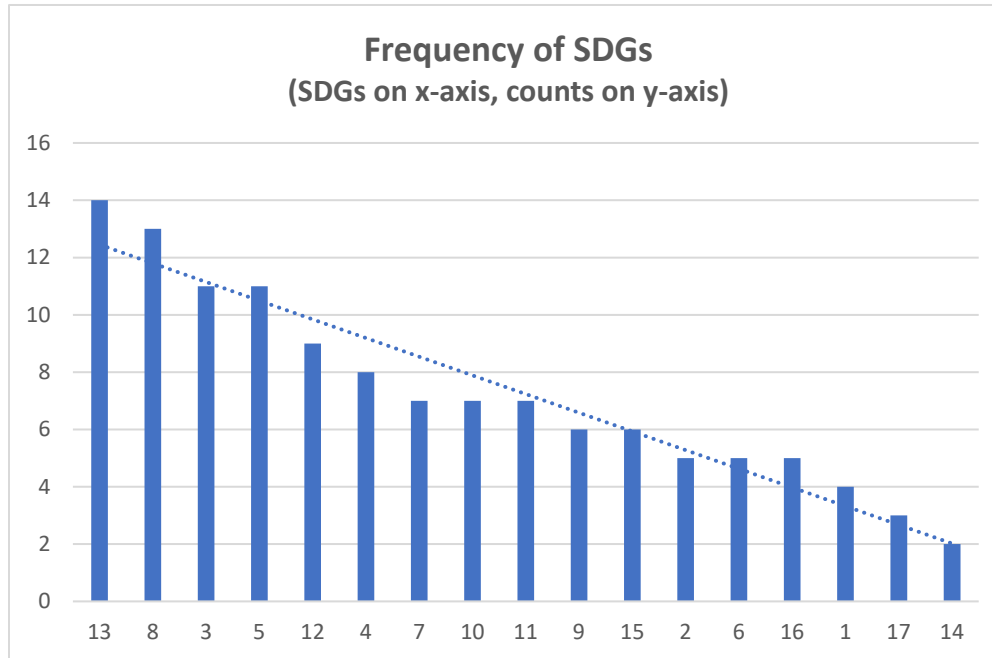
Figure 3: Frequency of Use of SDGs

Figure 3 shows the frequency of use of the SDGs, sorted from most frequently used to least. In a strange observation, the decrease in usage from the most to least popular is reasonably linear, although it is not clear what this implies.

It is useful to consider why some SDGs are being used by companies more than others. We note that the least frequently used are normally not within the scope of a business, but rather more government domains. For example, those in the lowest half dozen are 2 Zero Hunger, 6 Clean Water and Sanitation, 16 Peace, Justice, and Strong Institutions, 1 No Poverty, 17 Partnerships for the Goals, and 14 Life Below Water, which are to a great extent not typically direct corporate concerns. There could be exceptions though, for example companies that fish the oceans for the seafood they sell. Nevertheless, these half-dozen SDGs will generally be the concern of governments around the world. On the other hand, the most frequently used SDGs include 13 Climate Action, 8 Decent Work and Economic Growth, 3 Good Health and Well-Being, 5 Gender Equality, and 12 Responsible Consumption and Production. All of these are clearly related to companies, which have large carbon footprints (e.g., from energy use), hire people and need to deal with gender equality (e.g., in the context of pay and promotions), quality of jobs, the well-being of employees who might not be getting as much exercise or are not eating as well as they should. Companies that produce goods would naturally be concerned about consumption. It seems unsurprising that SDG 13 is the most common concern for companies, given their carbon footprint due to historical levels of energy use.

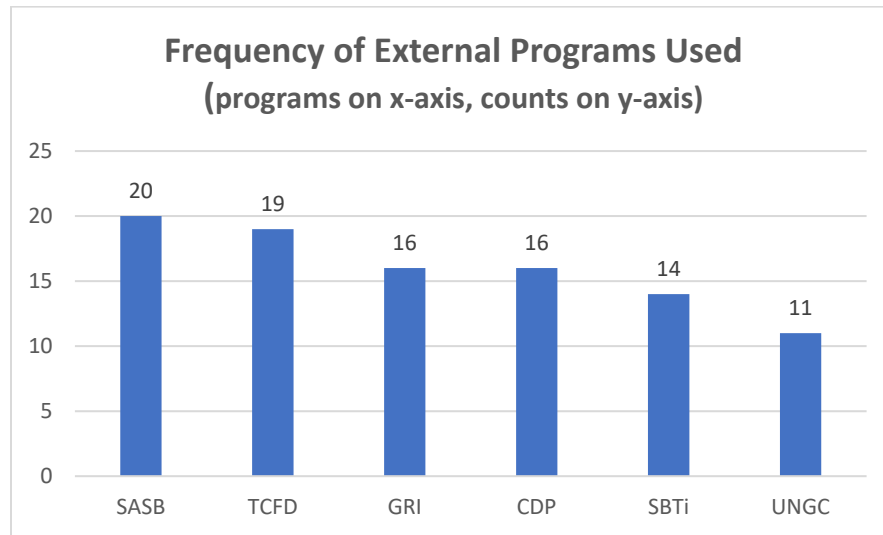
Reporting Structures and External Programs

Table 5 shows the distribution of the use of the main reporting structures and external sustainability programs. The table is sorted by the number of these programs/structures used. Eight of the 25 companies use all six, with a further five companies using five of the six. Figure 4 shows the most popular reporting structures (SASB) and next most popular (TCFD) have 20 and 19 companies using them, respectively. This isn't surprising given both focus on financial

reporting – TCFD from the climate perspective, SASB from the broader ESG perspective. These are both immediately relevant to today's corporations. GRI's focus is on the even broader sustainable development perspective which often goes beyond corporations' natural field of view. That said, both GRI and CDP (focusing on disclosure of carbon footprint) were both used by 16 companies, so not far behind the other two. The SBTi and UNGC had 14 and 11 companies using them. These programs are meant to motivate sustainability thought and the use of objectively defensible targets for sustainability-relevant actions and goals. As such, one might expect at least the UNGC to be on the periphery of a company's focus, especially if the company is already well focused on sustainability. The SBTi program should stay relevant as companies continue to set new targets in the future. Nevertheless, just over half the companies mention it. Only two companies don't use any of the six, with five companies using just 1-2 of them. This represents just over a quarter of the companies. For those that only use SASB (two of the five in the 1-2 category), it could conceivably be because they feel the broader ESG focus of SASB makes the narrower climate focus of TCFD redundant, as climate is part of ESG too. One of the two companies that don't use any of these is a holding company that does not have a specific sustainability site at the corporate level. It is possible that this company's subsidiaries do use some of them, but their websites were not investigated as they are further down in the F100.

Table 5: Use of Programs and Reporting Structures, Grouped from Most to Least

| Sustainability External Programs/Reporting Structures (by company use) | | | | | | | | |
|---|-----------------------------|-------------|------------|-------------|------------|-------------|-------------|------------|
| F100 | MSCI GICS (Industry) | SASB | GRI | TCFD | CDP | UNGC | SBTi | Sum |
| 4 | Healthcare | X | X | X | X | X | X | 6 |
| 7 | Healthcare | X | X | X | X | X | X | 6 |
| 11 | Communication Services | X | X | X | X | X | X | 6 |
| 15 | Technology | X | X | X | X | X | X | 6 |
| 20 | Communication Services | X | X | X | X | X | X | 6 |
| 21 | Consumer Discretionary | X | X | X | X | X | X | 6 |
| 22 | Consumer Discretionary | X | X | X | X | X | X | 6 |
| 23 | Healthcare | X | X | X | X | X | X | 6 |
| 1 | Consumer Staples | X | X | X | X | | X | 5 |
| 8 | Healthcare | X | X | X | X | | X | 5 |
| 13 | Healthcare | X | X | X | X | X | | 5 |
| 16 | Consumer Staples | X | X | X | X | X | | 5 |
| 18 | Consumer Discretionary | X | X | X | X | | X | 5 |
| 14 | Healthcare | X | X | X | | | X | 4 |
| 17 | Consumer Staples | X | X | X | X | | | 4 |
| 2 | Consumer Discretionary | X | | X | | | X | 3 |
| 19 | Financials | X | X | X | | | | 3 |
| 24 | Healthcare | X | | X | | X | | 3 |
| 3 | Technology | | | X | | | X | 2 |
| 5 | Healthcare | | | | X | | | 1 |
| 9 | Communication Services | | | | X | | | 1 |
| 12 | Consumer Staples | X | | | | | | 1 |
| 25 | Financials | X | | | | | | 1 |
| 6 | Financials | | | | | | | 0 |
| 10 | Energy | | | | | | | 0 |
| Totals | | 20 | 16 | 19 | 16 | 11 | 14 | |

Figure 4: Totals of Use per Reporting Structure and Program

Value of the Paper: Conclusions and Implications

In 2017 companies self-reported their use of the UN Sustainable Development Goals. This study, which is a neutral inspection of companies' websites, shows that the use of the SDGs is inconsistent among the top 25 Fortune 100 companies. Ten of companies (40%) do not talk about the SDGs at all or are so vague about them that their mention could be seen as greenwashing. Most of the rest of the companies (just above 50% of the 25) appear to take the SDGs seriously and give detailed and credible evidence of this on their websites. There is significant variation in the popularity of the SDGs and the numbers of the SDGs used by the companies that do use them seriously. This suggests that the companies that do use them seriously have put quality thought into which ones they will focus on, rather than just following some sort of trend (potentially within their industry group). There is not an obvious pattern in industry groups. Overall, it cannot be said that the higher the Fortune 100 ranking (the lower F100 numbers), the better the usage of the SDGs. If anything, the usage gets stronger in the (roughly) last third of the companies (the higher F100 numbers).

For the reporting structures and external programs the picture is different. There is more consistency in the use of the four reporting structures (SASB, TCFD, GRI, CDP), with 60-80% of the companies using them, and roughly 40-60% of the companies using the two external programs (UNGC, SBTi). There are just a handful of companies that use a low number of these six programs/structures (0-2 of them), with just over half the companies using essentially all of them (5-6 of them).

While individual companies can have various motivations for connecting their strategies to the SDGs, it is clear that investors (and even consumers now) increasingly require this of companies. As more companies meaningfully adopt the SDGs into their cultures, those companies who remain unconnected to the SDGs will likely stand out for this more visibly with today's internet-

savvy investors and consumers. For this reason alone, companies who are not using the SDGs in a meaningful way should consider changing this. Beyond this public and investor relations motivation, adopting the SDGs into company culture is the right thing to do, as confirmed by scientific consensus and the UNDP Human Development Report 2020 (UNDP, 2020).

Limitations

This assessment is based only on the information made public on the company websites. It is possible that companies are doing more but have not communicated it effectively on their sites. However, given the increasing need for public transparency, and strong recommendations regarding documentation and communication of corporate sustainability efforts, it is likely that companies that are doing well are reporting their efforts.

Additionally, most of the assessments made in the study are categorical and therefore necessarily subjective. Since one person made the assessments, it is felt that they were consistent across the companies. The process used was the same for each company, and the company materials were thoroughly reviewed. That said, the two topics assessed in detail in this paper did have countable variables (numbers of SDGs and numbers of programs/structures mentioned), although the quality scoring of SDG usage has potential subjectivity in it.

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Logiques Neopa Trimoniales et de Gouvernance par la Ruse Dans la Gestion Durable des Forêts au Cameroun

Hilary Ngouabo Dassi

(International Relations Institute of Cameroon, Cameroon)

Resume

Au Cameroun, le bois d'œuvre légal et durable est présent à 25% contre 75% de celui informel sur le marché domestique à cause de la permanence d'un système de prédation des ressources forestières entretenu par les acteurs en présence. Ceci va des hauts commis de l'Etat, passant par les agents en charge du contrôle de l'activité forestière, jusqu'aux petits opérateurs économiques engagés dans la production du bois d'œuvre à destination du marché intérieur. Ce système est un frein pour l'atteinte des ODD 12 et 15 au Cameroun, respectivement liés à la production et la consommation durable, et la protection des écosystèmes forestiers. Pour cas d'espèce, l'Etat à travers les marchés publics est le principal consommateur du bois d'œuvre illégal avec une commande environnant 13000 m³ par an. Cette réalité peut être comprise comme une dissonance entre les engagements contractés par le pays à l'échelle internationale en faveur d'une gestion durable des forêts et les efforts contradictoires menés au niveau national, permettant à ce dernier de jouir des prérogatives des Etats responsables tout en hébergeant et consolidant des systèmes irresponsables entretenus par des acteurs qui agissent dans l'ombre pour leurs propres intérêts.

Mots clés: Gouvernance par la ruse, Néo patrimonialisation, Bien public mondial, Gestion durable des forêts, Achat bois responsable, Prédation.

Introduction

Le Cameroun est un pays d'Afrique centrale dont les forêts font partie du vaste massif forestier du bassin du Congo, deuxième poumon mondial (Molino et al., 2011), il est situé entre la latitude de 2° et celle de 13° nord du golfe de Guinée au Lac Tchad. Avec une superficie de 475 000 km², le pays a à son actif un couvert forestier estimé à 23 045 053 millions d'hectares soit 19 952 744 d'hectares de Domaine Forestier Permanent (DFP) et 3 092 309 millions d'hectares de Domaine Forestier Non Permanent (DFNP). Les chiffres sont clairs, au Cameroun, le secteur forestier est un potentiel de développement dont jouit ce pays sous développé. Avec 456, 9 milliards de FCFA soit 780,4 millions USD, la part de l'activité forestière contrôlée et documentée par l'Etat du Cameroun occupe 30% de l'économie nationale et 4% du Produit Intérieur Brut (PIB (Ngeh et al., 2016). Il faut dire que, le pays comme tous ceux des tropiques, a fait face et continu de faire face à l'œil vigilant des ONG de protection de l'environnement, qui veillent à ce que l'exploitation de cet or vert à destination d'un marché de consommation tant national qu'international ne soit pas dans la violation des normes nationales et internationales qui régissent l'exploitation des biens

publics mondiaux que représentent les forêts (Inge Kaul, 2002). Pour mieux comprendre cette réalité, il est nécessaire de remonter à la genèse de la certification forestière.

En effet, la certification forestière est née au début des années 1990, suite à l'appel au sabotage du bois tropical par des associations de défense de la nature à l'instar de Greenpeace, WWF et Les amis de la Terre (Smouts, 2001). Ce bois originaire d'une exploitation forestière illégale, définit comme : « le fait d'exploiter ces ressources sans la possession des titres et autorisations requis ou appropriés » (Manhonghol, 2016), permettait de rendre coupable de dégradation et de déforestation, les industries d'exploitations forestières présentent dans les Etats des tropiques. En 1992 accompagnées de certains producteurs de bois, ces ONGE conçurent le Forest Stewardship Council (FSC). C'est un instrument de marché privé, permettant à un tiers parti indépendant, de vérifier que le bois commercialisé soit issu d'une forêt gérée durablement. La certification forestière FSC s'est répandue dans la zone tropicale, en occurrence au Cameroun. Cependant, l'exploitation forestière illégale a perduré et continue de perdurer. Pour satisfaire les exigences de la demande en bois de ses nationaux, la commission de l'Union Européenne (UE), a adopté le *Forest Law Enforcement, Governance and Trade* (FLEGT) en mai 2003, accompagné des Accords de Partenariats Volontaires (APV), à caractère publics et contraignants.

Conscient de l'enjeu d'une exploitation forestière régulée, le Cameroun signe l'Accord de Partenariat Volontaire (APV) du plan d'action FLEGT de l'UE le 06 octobre 2010, dans le but d' : « affirmer sa volonté de renforcer le contrôle de son espace forestier tout en garantissant un débouché pour ses exportations de bois à destination du marché européen » (Cameroun-UE, 2010). En effet, l'Accord Volontaire de Partenariat FLEGT (APV) est un accord international de type bilatéral et contraignant signé entre l'Union européenne et un Etat de la zone tropicale exportateur de bois, afin d'améliorer la gouvernance forestière dans ce pays et de veiller à ce que l'essentiel du bois provenant de ce pays à destination de l'UE soit vérifié et attesté comme légal au moyen d'une autorisation « FLEGT ». Cet accord, est considéré comme un fédérateur d'effort de mise en œuvre de l'ensemble des normes applicables au secteur forestier au Ministère des Forêts et de la Faune (MINFOF) du Cameroun. D'après la Sous-directrice de la Promotion du Bois, « *l'APV-FLEGT ne vient pas avec de nouvelles normes, il s'agit d'un accord qui accompagne la mise en application des normes existantes dans le pays* ». L'APV se présente comme une preuve de la volonté du Cameroun d'être acteur d'un commerce écoresponsable du bois (Soh Fogno, 2018). Par ailleurs, il faut souligner que dans ce même Accord de type contraignant, le Cameroun a tenu à ce que le respect des normes de production et de consommation soit pris en compte sur son marché intérieur ou domestique, ceci est mentionné à l'article 9 dudit Accord. Cependant, 12 ans après l'entrée en vigueur de cette norme aux enjeux cruciaux pour l'écologie mondiale, et le développement social et économique du Cameroun, aucune autorisation FLEGT n'a été jusqu'ici accordée à un bois voué à l'exportation vers l'UE et l'Asie, tandis que sur le marché domestique, 75 % du bois retrouvé sur les comptoirs de vente sont d'origine illégale ou informelle (Lescuyer et al., 2016). L'échec actuel de la mise en œuvre d'un tel Accord se comprend par le fait que l'Accord de partenariat a été signé entre le Cameroun et l'Union sur la base d'un déséquilibre lors des négociations (Andong S et al., 2020), (Soh Fogno, 2018). En effet, la partie européenne avait des projets de textes bien préparés, tandis que la partie camerounaise était passive, l'orientation à donner à l'Accord a été à majorité donnée par

les experts de la Commission de l'UE. Vraisemblablement, il apparaît du point de vue de la partie camerounaise que ce type d'accord visait pour l'UE à asseoir une emprise sur le bois issu du Cameroun. Par ailleurs, le Cameroun a pu signer ce type d'accord commercial, afin de maintenir un client privilégié ainsi que ses relations d'amitiés avec l'UE. Or les faits rattrapent la réalité diplomatique à plus d'un point. S'il faut parler des éléments sur lesquels la mise en œuvre de l'Accord piétine, la construction d'un système de traçabilité du bois au moyen d'un logiciel appelé Système Informatisé de Gestion des Informations Forestières de 2^{ème} génération (SIGIF II) est un exemple palpable. Le chemin est encore long pour y parvenir, au regard du déficit de compétence des agents du MINFOF et des pratiques de corruption en cours dans le secteur d'activité (Mahonghol, 2016). Le 01 avril 2021, le Cameroun a lancé ledit logiciel suite aux demandes de comptes des bailleurs de fonds européens notamment de la KFW et l'UE et a annoncé sa mise en œuvre effective à partir de l'année 2022. Cependant, la version du livrable rendue par la partie camerounaise a connu la contestation des partenaires européens. L'UE a déclaré ce jour-là : « *Les certificats émis par le SIGIF 2 ne pourront pas être reconnus ou validés dans le cadre du Règlement bois de l'Union européenne, et un accès direct et prioritaire au marché européen. Ces certificats ne pourront donc pas être émis avant qu'un autre instrument ne soit mis en place ou bien qu'une refonte intégrale de l'outil soit effectuée, sur la base d'une étude benchmark conduite avec le ministère de l'économie...* » (Investir au Cameroun, 2021). En outre, des préoccupations liées au marché intérieur ou domestique, le constat de la consommation du bois d'origine illégal par l'Etat du Cameroun lui-même dans le cadre de ses marchés publics à hauteur de 13000 m³ par an, a permis de relever que la volonté politique en vue du respect de la mise en œuvre de l'APV-FLEGT est encore complexe. En effet, une analyse des Dossiers d'Appels d'Offres du Journal des Marchés Publics publié par l'Agence de Régulation des Marchés Publics entre juillet 2015 et juin 2016 a permis de constater que, sur 1029 appels d'offres incluant des travaux utilisant du bois d'œuvre, aucuns n'intégrait d'exigences quant à la promotion et l'utilisation du bois légal (Lescuyer et al., 2016). L'Etat du Cameroun semble ainsi faillir à son devoir d'exemplarité en termes de consommation de produits respectant les exigences de légalité.

Le présent article tente de mettre en lumière les logiques soutenant une gouvernance contreproductive du secteur forestier au Cameroun mettant en mal toute tentative pérenne de gestion durable de ses forêts.

Methodologie

Dans la mesure où cette étude questionne les logiques donc les choix des acteurs parties prenantes à la gouvernance forestière au Cameroun, elle opère selon une méthode principalement qualitative (Grawitz, 1990), (Ghiglione et Matalon, 1998). A l'effet de comprendre au sens Max Weber, les motivations et les intérêts individuels des acteurs de l'activité d'exploitation forestière au Cameroun. Il s'agit donc ici d'avoir une posture interprétative. L'approche mobilisée ici se concentre sur les objectifs des acteurs ; leurs intérêts et leurs modes d'action vis-à-vis du fonctionnement de l'activité de production et de commercialisation du bois issu des forêts camerounaises. Les techniques de collecte des données mobilisées ici sont au nombre de trois, il s'agit premièrement de l'analyse documentaire (Loubet Des Bayles, 2000), qui

porte sur des articles, rapports d'évaluation, rapport d'études et ouvrages traitant de la gouvernance forestière au Cameroun. Un accent particulier est mis d'une part sur les travaux portant sur l'Accord de Partenariat Volontaire pour l'application des réglementations forestières, gouvernance et échanges commerciaux (APV- FLEGT), (Montouroy, 2014), (Soh Fogno, 2018), (Andong et al., 2020) et d'autre part sur ceux portant sur la certification forestière dans l'écopolitique internationale (Smouts, 2001), (Wyplosz, 2002), (Wicht, 2006), (Le Prestre 2005), (Tozzi et al., 2011), (Bigombe Logo ; 2004).

Deuxièmement, il s'agit de l'entretien de type semi-directif, qui peut être défini comme : « un procédé d'investigation scientifique, utilisant un processus de communication verbale, pour recueillir des informations, en relation avec le but fixé » (Grawitz, 1990), « l'entretien semi-directif repose sur un schéma d'entretien qui peut se traduire par une grille de thèmes. Ces thèmes se caractérisent par une « ambiguïté » restreinte de telle sorte que l'interviewé ait la possibilité d'interpréter le sujet à partir de son propre cadre de référence sans toutefois sortir du thème introduisant la discussion » (Ghiglione et al., 1998). Il a été mené auprès de trois types d'acteurs. Trois (03) acteurs administratifs du ministère en charge des forêts. Sept (07) acteurs de la société civile ou des partenaires techniques qui travaillent en collaboration avec l'Etat et les producteurs du bois sur la régularisation du marché intérieur du bois. Enfin, (03) acteurs membres de l'interprofession du bois au Cameroun.

La troisième technique de collecte de données a été l'observation directe qui consiste pour le chercheur à être témoin de la réalité qu'il étudie sans toutefois l'influencer en y prenant part (Quivy et Campenhoudt, 1995). Cela s'est fait par la participation à des ateliers et à des forums sur la situation du bois légal au Cameroun entre 2018 et 2021.

La taille de l'échantillon composant les interviewés a été déterminée par le principe de saturation, définit comme : « *saturation means that no additional data are being found whereby the sociologist can develop properties of the category. As he sees similar instance over and over again, the researcher becomes empirically confident that a category is saturated* » (Glaser et al., 1973).

La grille d'entretien élaborée et utilisée avec les acteurs, comportait les trois questions suivantes: Comment comprendre la présence dominante du bois d'origine illégale sur le marché intérieur camerounais? Qu'est ce qui explique les lenteurs dans la mise en œuvre des normes applicables à la régularisation du secteur forestier? Comment fonctionne le marché intérieur du bois au Cameroun?

Des théories ont permis d'expliquer la logique de gouvernance par la ruse et celle des pratiques néo-patrimoniales qui sont les deux causes des effets de l'entretien d'une exploitation illégale des forêts. Le néo institutionnalisme dans son versant du choix rationnel, postule que les individus sont « les atomes de la société, qu'ils ont des objectifs ou préférences clairs et qu'ils cherchent à déterminer le meilleur moyen pour parvenir à ces fins ». Le contexte institutionnel influence les choix des acteurs et le fait d'y être immergé permet à ceux-ci de développer de nouvelles manières de faire qui leur permettent de servir leurs intérêts (Olstrom, 1999). La théorie de la

dependencia (Samir A, 1988) a également été utilisée pour expliquer les liens économiques existant entre les pays du Nord, développés, et les pays comme le Cameroun qui possèdent des forêts et qui sont sous-développés. A la lumière de ce prisme idéal, il est possible de constater que l'APV-FLEGT en particulier et les autres systèmes de certifications forestières privés de la légalité à savoir : PCI/OAB/OIBT, Origine Légale du Bois OLB par Bureau Veritas et le *Verification of Legal Origin/ Compliance* (VLO/VLC) de Rainforest Alliance, en général contribuent à la production du bois légal au Cameroun dans le but premier de rendre cette matière première consommable par les industries des pays développés. Par cette économie extravertie du bois légal, le marché intérieur de bois camerounais est en défaillance car les acteurs locaux ne peuvent être approvisionnés en bois légal que si la demande extérieure est comblée : ce qui est peu envisageable (Cerruti, 2011).

Le traitement des données issues des entretiens et des lectures s'est fait au moyen de l'analyse de contenu, qui est une technique qui permet de rendre compte des informations transmises par un interviewé, de la manière la plus fidèle et dénuée de toute subjectivité (Berelson, 1952). Cette technique a été mobilisée dans son approche sémantique, qui consiste à rechercher les « idées clés » qui, regroupées, permettent de décoder le message transmis.

Resultats

Des entretiens menés auprès des acteurs de l'activité forestière au Cameroun, un certain nombre de thématiques se dégagent.

La Résilience d'un Système Juridique Prédateur des Ressources Forestières

Le constat est clair, depuis la ratification du Cameroun à l'APV-FLEGT en 2011 il existe une espèce de résilience du système juridique prédateur des ressources renforçant ainsi les pratiques d'illégalité dans le secteur de l'exploitation forestière. De prime abord, le constat est que la lutte contre l'exploitation forestière illégale est vécue comme une problématique périphérique. En effet, ces dernières vingt-sept années, le Cameroun a conçu et adopté des politiques forestières dont les buts sont de promouvoir la gestion durable de ses ressources forestières, participer à l'augmentation du produit intérieur brut et réduire la pauvreté en milieu rural. L'appui des bailleurs de fonds internationaux, a permis l'élaboration des lois à l'effet d'améliorer les moyens de gestion forestière. C'est ainsi que 78% des concessions forestières du pays possèdent des plans d'aménagement. Cependant, ces politiques sont toutes orientées vers l'activité de production industrielle du bois, destinée à l'alimentation des marchés extérieurs. La signature de l'APV-FLEGT pour l'ensemble des parties prenantes officielles aux activités du secteur forestier était semblable à l'organisation du secteur. Or durant la longue période de négociation de cet accord allant de 2007 à 2010, il n'a semblé judicieux pour aucun des acteurs majeurs à l'instar du MINFOF, des Organisations de la Société Civile (OSC), de l'UE du secteur privé et des partenaires au développement, de se pencher amplement sur la question de l'approvisionnement du marché intérieur.

A la base, la loi portant sur le régime des forêts évoque de manière implicite le fait que l'approvisionnement du marché local soit fait par les Forêts Communautaires (FC) et les Permis d'Exploitation du Bois d'Œuvre (PEBO). Cependant la réalité est tout autre. Le marché intérieur se voit délaissé et en proie à toute forme de débrouillardise. En ce qui concerne les FC, la gestion de ces espaces a connu une immission des forces vives de l'économie, s'accaparant ainsi de la gestion de ces espaces boisés pourtant sous la charge des communautés par la mise en œuvre des plans simplifiés d'aménagement. Dès lors, 80% du bois issu des forêts communautaires est actuellement retrouvé dans les ports pour exportations. Le marché local étant peu ou pas compétitif. Par ailleurs, les travaux conjoints de l'Observateur Indépendant et du MINFOF en 2007 dévoilent la complexité des procédures d'acquisition et d'exploitation de ceux-ci par de petits opérateurs, ouvrant ainsi la voie aux activités illicites.

S'agissant des PEBO ils ont été suspendus depuis plus de sept (07) ans. La difficulté majeure de ce moyen d'approvisionnement dédié à la base aux petits opérateurs est qu'il connaît comme pour les FC une complexité d'ordre procédurale. En effet, pour la soumission à un PEBO, un agrément autorisé par le Chef de l'Etat est essentiel. Or cela n'est pas à la portée de la cible initiale de ce permis. In fine, ce sont des grands exploitants qui postulaient pour l'obtention de ces permis. De fait, il est possible de s'interroger sur la réelle nature de la responsabilité écologique de l'Etat du Cameroun. Les faits relevant de la production et de la consommation du bois issus d'une gestion durable des forêts sur son propre territoire ainsi qu'à l'extérieur restent une réalité insaisissable. En effet, la volonté du Cameroun d'être acteur de la gestion durable des ressources naturelles pour une amélioration du bien-être de ses populations ne se fait pas ressentir lorsqu'on observe les pratiques officielles et officieuses en place. Au plan officiel, les lourdeurs administratives et la complexité des procédures démontrent d'une volonté de refoulement de toute initiative d'engagement vers la légalité à petite échelle. Le système de taxation valable pour l'activité est le même tant pour les exportateurs que pour ceux qui désirent alimenter le marché intérieur. Tout se passe comme si le cadre juridique existant en la matière est inaccessible voir inadapté à dessein, de manière à ce qu'uniquement l'activité d'exploitation pour l'exportation perdure. A titre d'illustration, la grille de légalité étant le principal moyen de vérification de la légalité d'un produit bois au Cameroun, est un élément de la loi qui ne prend pas en considération la vérification de la légalité du bois présent dans les dépôts camerounais ou dans les secteurs prenant en compte l'approvisionnement au niveau local, comme l'indique le Tableau 1 ci-dessous. Tout se passe comme si le marché local avec toutes ses caractéristiques et catégories a été « oublié ». La lettre circulaire n°0677/LC/ MINEF/DF/ CFC du 23 février 2001 portant interdiction de l'exploitation industrielle dans les Forêts Communautaires est ouvertement bafouée car le bois des FC alimente en majorité le marché extérieur.

Tableau 1: Principes et Critères de Légalité Selon l'APV-FLEGT

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| <p>Principe 1 : Accès, droits d'utilisation et régime foncier</p> <p>Critère 1.1 L'entreprise est légalement enregistrée auprès des autorités administratives concernées.</p> |
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| <p>Critère 1.2 L'utilisation, l'accès et les droits fonciers sont soumis à des préconditions établies par les législations et réglementations.</p> <p>Critère 1.3 Une preuve claire de l'utilisation, de l'accès des terres et/ou des forêts et des droits fonciers doit être apportée, conformément aux législations et réglementations</p> <p>Criteria 1.4 Use, access and tenure rights are subject to stated conditions within the laws and regulations</p> |
| <p>Principe 2 : Réglementations sur la récolte</p> <p>Critère 2.1 Plan d'aménagement des forêts en accord avec les politiques, lignes directrices et exigences réglementaires gouvernementales, approuvé par les autorités compétentes</p> <p>Critère 2.2 Autorisation de récolte/bois avec des conditions établies, en accord avec les politiques, lignes directrices et exigences réglementaires gouvernementales, approuvé par les autorités compétentes.</p> <p>Critère 2.3 L'entreprise exécute les opérations de récolte en accord avec le système sylvicole légalement prescrit et les réglementations concernées</p> |
| <p>Principe 3 : Transport des grumes et des produits-bois</p> <p>Critère 3.1 Une preuve claire des documents et des licences pour les entreprises et transporteurs impliqués dans le transport de produits-bois doit être apportée en accord avec les législations et réglementations.</p> <p>Critère 3.2 Une preuve claire des documents et marquages correspondant des produits bois pour le transport doit être apportée par les entreprises et transporteurs, en accord avec les législations et réglementations.</p> |
| <p>Principe 4 : Réglementations sur la transformation</p> <p>Critère 4.1 Une preuve claire des documents et licences pour les entreprises impliquées dans la transformation du bois doit être apportée en accord avec les législations et réglementations.</p> <p>Critère 4.2 Les entreprises de transformation du bois sont soumises aux conditions fixées dans les législations et réglementations.</p> |
| <p>Principe 5 : Réglementations sur l'import et l'export</p> <p>Critère 5.1 Une preuve claire des licences/permis des entreprises impliquées dans l'import et l'export doit être apportée en accord avec les législations et réglementations.</p> <p>Critère 5.2 Une preuve claire des documents officiels des produits-bois pour l'import et l'export doit être apportée par les entreprises et transporteurs, en accord avec les législations et réglementations.</p> <p>Critère 5.3 Les entreprises d'importation et d'exportation de produits-bois sont soumises à des conditions fixées dans les législations et réglementations.</p> |
| <p>Principe 6 : Réglementation environnementale</p> <p>Critère 6.1 L'État/les entreprises réalisent des évaluations d'impact environnemental ou autres évaluations exigées par les législations et réglementations.</p> <p>Critère 6.2 L'État/les entreprises prennent des mesures d'atténuation sur les paramètres environnementaux négatifs en accord avec les législations et réglementations.</p> |
| <p>Principe 7 : Réglementations sur la conservation</p> <p>Critère 7.1 L'État/les entreprises réalisent des évaluations sur la conservation, en accord avec les législations et réglementations.</p> |

Critère 7.2 L'État/les entreprises prennent des mesures d'atténuation sur les valeurs de conservation négatives en accord avec les législations et réglementations.

Principe 8 : Régulation sociale

Critère 8.1 Les entreprises maintiennent ou renforcent le bien-être socioéconomique des communautés locales/populations autochtones en accord avec les législations et réglementations.

Critère 8.2 Les entreprises maintiennent ou renforcent le bien-être socioéconomique des communautés locales/populations autochtones en accord avec les législations et réglementations.

Critère 8.3. Les entreprises reconnaissent les droits légaux ou coutumiers des peuples autochtones/locaux, en accord avec les législations et réglementations.

Critère 8.4 Les entreprises respectent les législations et réglementations relatives au bien-être de leurs employés et travailleurs.

Principe 9 : Impôts, taxes et redevances

Critère 9.1 Les entreprises remplissent leurs déclarations fiscales en accord avec leur activité professionnelle réelle.

Critère 9.2 Une preuve claire des impôts, taxes et redevances payés dans les temps doit être apportée par l'entreprise, en accord avec les législations et réglementations.

Source : Mahonghol et al., 2016

De fait, le marché international du bois il faut le dire, retient à lui tout seul, toute l'attention du secteur d'exploitation du bois au Cameroun. Les réalités liées à cette filière économique prennent tout leur sens à cette échelle des échanges. Le dictat du marché international c'est-à-dire ses règles du jeu, leur configuration, mettent en difficulté la production du bois pour le marché intérieur camerounais. Cet état des faits s'observe à travers la monopolisation de la ressource bois légal, cela renvoie à soutenir que l'essentiel du bois légal produit au Cameroun est destiné à l'exportation. La production nationale industrielle est presque entièrement exportée, soit sous forme de grumes soit comme produits transformés (débités, placages, contreplaqués et une portion très marginale sous forme de parquet).

Le Développement de L'économie Informelle Autour du Bois

L'économie informelle en générale désigne : « l'ensemble des activités productrices de biens et des services qui échappent au regard ou à la régulation de l'Etat. ». (Echaudemaison, 2017) Elle comprend plusieurs composantes parmi lesquelles celles qui ont une connotation de légalité tandis que d'autres relèvent de l'illégal. Dans le cadre de cette étude, l'intérêt est porté sur l'économie informelle de type illégale encore appelée économie « souterraine », « parallèle » ou « clandestine ». Elle rassemble trois principales formes d'activités : une illégale du fait de sa pratique, l'autre illégale dans la forme de sa pratique mais aussi répréhensible du fait de son contenu et de ses effets ; la dernière est produite par des activités de types criminelles. Pour faire état de cette économie rattachée au secteur forestier, la légitimation du commerce clandestin du bois et le développement d'un marché de monopole du bois illégal peuvent être développés.

Le commerce clandestin du bois illégal sur le marché intérieur camerounais connaît un véritable succès dans la mesure où ce marché est approvisionné à plus de 70% de bois illégal. Ce bois dans sa production et sa commercialisation échappe aux règles économiques, environnementales et sociales et à l'intervention de l'Etat telle que prévue par les textes. Le commerce d'un tel produit est dit légitimé lorsqu'il est possible de constater sa présence en majorité dans les dépôts de vente, ceci aux vues et aux sues de tous et de l'Etat en premier lieu. Il faut dire que c'est la tolérance administrative qui est à l'origine de cette légitimation. Pour la recherche d'une certaine forme de cohésion sociale, l'Etat « permettrait » que les camerounais de bourses moyennes puissent évoluer dans une activité lucrative leurs permettant de subvenir à leurs besoins et aux utilisateurs du bois, d'en consommer à un coût économiquement supportable. La preuve ultime de ce processus d'accommodation au bois produit en dehors du cadre normatif prédéfini, est le fait que l'Etat dans le cadre de ses marchés publics en consomme.

Pour ce qui est du développement d'un marché de concurrence imparfaite du bois, il faut dire que c'est la résultante de la première. La concurrence en économie est une compétition entre des entreprises ayant des objectifs et recherchant des avantages similaires. Elle se dit imparfaite du moment où l'un des acteurs ou un groupe d'acteurs est capable de fixer un prix, une quantité ou une qualité, ceci engendre nécessairement des marchés de type monopolistique ou oligopolistique (Echaudemaison, 2017). En effet, le fait que le marché intérieur du bois soit abandonné à la merci des producteurs artisanaux fait en sorte que le produit bois légal même de qualité supérieur s'y dilue. Le marché est façonné au rythme de l'activité informelle et les prix sont définis par ses acteurs. Le marché intérieur du bois approvisionné en bois illégal se comporte comme si la ressource était homologuée. La marge des prix est connue et maîtrisée que l'on se trouve d'un dépôt de vente X à un dépôt de vente Y d'une même zone géographique. Le commerce du bois illégal fausse ainsi le jeu de la libre concurrence par rapport au commerce du bois produit et commercialiser légalement.

Le Développement de L'Etat Néo-patrimonial

L'Etat néo-patrimonial est un concept dû au socio-politiste Jean François Médard (Médard, 1991) pour qualifier le mode de gestion patrimoniale spécifique aux Etats africains contemporains. Le patrimonialisme, développé à la base par le sociologue allemand Max Weber, est un idéal type de domination traditionnelle fondé sur l'absence de distinction entre les biens publics et ceux privés. Le patrimonialisme de Max Weber se caractérise par une gestion despotique et personnelle allée à l'importance des normes traditionnelles et correspond à un stade avancé de la logique de domination patriarcale (Bach et al., 2011). Dans ce cas de figure, la gestion des affaires de l'Etat est semblable au cas où « le chef organise son pouvoir politique comme l'exercice de sa gestion domestique ». Les biens de l'Etat sont gérés comme une « propriété privée », ce système se caractérise par l'accaparement par des agents, des ressources publiques pour leur bien personnel. Les pratiques de corruption, de détournements des fonds, d'abus de pouvoir et de privatisation des ressources et des postes de « pouvoirs » en sont des manifestations. Il s'agit donc ici de systèmes de pouvoirs bureaucratiques tels qu'ils se présentent dans les sociétés modernes actuelles. Cette manière de faire, et de penser est observable dans le secteur forestier au Cameroun. Ce phénomène s'observe à travers d'une part, le renforcement

des bénéfices économiques des acteurs de l'illégalité, d'autre part le renforcement de la parafiscalité.

En ce qui concerne le premier point d'observation, les travaux menés par le CIFOR sur Le marché domestique du sciage artisanal au Cameroun permettent de constater que le commerce du bois vendu sur le marché intérieur et issu d'une exploitation informelle, est une activité employant une bonne partie de la main d'œuvre camerounaise. En zones urbaines, il s'agit d'environ 4000 emplois directs du fait de la vente des sciages d'origine informelle tandis que ce sont environ 40 000 personnes actives qui œuvrent fréquemment dans le secteur en zones rurales (Cerruti, 2011). Il en est ainsi parce que cette activité est extrêmement lucrative. Le Tableau 2 ci-dessous affiche les estimations des chiffres d'affaires et des profits générés en une année.

Tableau 2: Estimation des Chiffres D'affaires et Profits en un an

| | | Total annuel (Million FCFA) | Par m ³ |
|---|--------------------|--------------------------------|--------------------|
| Amont de la filière (zone d'intervention) | Chiffre d'affaires | 42 698 | 64 498 |
| | Profit | 6310 | 9531 |
| Aval de la filière (zone urbaine) | Chiffre d'affaires | 54632 | 82526 |
| | Profit | 9297 | 14 042 |

Source : Cerruti, 2011

Il faut dire que cette activité illégale est plus qu'avantageuse pour les populations de la zone rurale, ceci a augmenté leur niveau de vie et a permis l'amélioration de leurs conditions d'existence ne serait-ce que dans le court et moyen terme. Les populations locales, vendant leurs arbres selon les règles coutumières. Ces populations gagnent plus de l'exploitation forestière que lorsqu'elle est faite sous forme de mise en concession de leurs parcelles de terrain ou encore sous forme de FC. Les populations perçoivent directement le revenu de la vente d'arbre plutôt que sous forme de redevance. Certes la loi forestière, approuve les droits d'usage coutumiers, toutefois, ceci va à l'encontre de la réglementation sur deux principaux aspects : d'abord, l'Etat est l'unique gestionnaire légal de la terre et des ressources associées ensuite, les produits issus de la pratique des droits traditionnels ne sont pas voués au commerce.

S'agissant du second volet, le secteur de l'exploitation forestière informelle s'avère être un moyen d'enrichissement personnel pour les agents des eaux et forêts et autres agents administratifs. En effet, ceci perdure à cause d'un réseau de paiements solide exigés par les agents de l'administration afin de blanchir le bois vendu sur les marchés intérieur, le CIFOR estime ces entrées à environ 7 milliards de F.CFA soit 11 612 223.00 USD par an. En effet, les agents des eaux et forêts usent de leur position de pouvoir pour obtenir la rente forestière. En prélevant ainsi de manière illégale des dus censés revenir à l'Etat, ils s'enrichissent en appauvrissant l'Etat. Cette attitude néo-patrimoniale entraîne une contreperformance économique. En échange d'un pot de vin, ces agents font passer du bois acheté auprès d'un villageois sous le label de Forêt Communautaire et délivre la Lettre de voiture (autorisation de transport du bois sur le territoire)

au contrevenant. La légalité d'un bois présent sur le marché intérieur camerounais est difficilement prouvable. Seul le bois issu des exploitations industrielles peut avoir le mérite d'être taxé de légal ou d'origine « connue ».

Selon les données du MINFOF, environ 13 % du prix de vente du bois d'œuvre résulte des paiements aux autorités publiques présentes soit au lieu de l'exploitation, soit installées sur les axes de transport du bois, soit présentes sur les points de vente. La faiblesse des mécanismes publics de contrôle de la légalité du bois participe de la pérennité du secteur d'exploitation forestière illégale.

En dehors des sommes délivrées aux représentants des autorités des communes, les petits exploitants prévoient des « frais de route » afin de pouvoir s'introduire dans les marchés urbains. Ces acquittements sont la part belle des agents de contrôle et ne constituent pas une recette publique. Ils concernent toutes les administrations qui ont des postes de contrôle installés sur la route. Ce système de prélèvement informel dans les villages est complété par un dispositif de blanchiment des sciages informels, dès qu'ils sont au niveau des dépôts. Généralement, pour légaliser le bois d'œuvre coupé illégalement, les agents administratifs les font saisir et procèdent à une vente aux enchères à celui qui l'a préalablement coupé contre un « droit d'abattage ». Aucune trace de ce processus n'existe et l'argent issu de cette vente n'est pas enregistré au niveau de l'Etat.

Ce type de comportement réfractaire au développement économique de l'Etat existe selon la présente analyse pour deux principales raisons. Premièrement, le système de sanction négative n'est pas appliqué de manière significative auquel cas de pareils écarts à la norme ne seraient établis officieusement tout en étant reconnus et acceptés de tous. Deuxièmement, le salaire des agents de contrôles, inférieur à leurs charges les rend vulnérables et les poussent à se verser dans une logique néo patrimoniale. Trois groupes d'acteurs se partagent les bénéfices de cette activité, comme l'indique le Tableau 3 ci-dessous.

Tableau 3: Bénéficiaires de L'activité D'exploitation Forestière Informelle

| Acteurs bénéficiaires | Sources de revenus | Montant (million FCFA) |
|--|---|------------------------|
| Populations rurale | Salaire Vente des arbres Profit sur la vente du bois scié aux commerçants Urbains | 20 011 |
| Populations urbaines | Salaire Location du dépôt Profit sur la vente du bois aux consommateurs finaux | 11 545 |
| Représentants des différentes autorités administratives ou | Paiements informels à l'échelle de la commune, en | 7 061 |

| | | |
|----------------------|-----------------------------------|----|
| communales | route et dans les marchés urbains | |
| Autorités communales | Impôt libérateur | 49 |

Source : Cerruti, 2011

La Domination du Marché Intérieur du Bois Camerounais

Aux vues de ce qui a été dit supra, le marché intérieur du bois est dominé par le dictat du marché international, il est tout à fait impréparé à la mouvance de l'achat « durable ». Le marché intérieur du bois tel qu'il se développe depuis plusieurs années est en contradiction avec le système de production et de commercialisation du bois prévu dans le cadre de l'APV-FLEGT. Ce système de production a échoué au Cameroun dans la mesure où les acteurs en présence ne parviennent pas à se faire aux règles du jeu de la légalité et de durabilité. En effet, lorsqu'on observe l'économie parallèle qui s'est créée autour du bois et la manière dont elle se meut, on comprend que soit les règles du jeu préétablies par le gouvernement camerounais à la lumière des exigences internationales sont inadéquates c'est-à-dire ne correspondent pas à la cible, soit elles sont mal élaborées c'est-à-dire, elles sont importantes mais nécessitent d'être réaménager. Dans la pratique, il apparaît que le marché intérieur n'a pas domestiqué les règles du jeu de la certification forestière ou de l'exploitation forestière à lui imposer. Il a été résilient et demeure « ghettoïsé ».

Pour les petits exploitants, il est difficile de respecter ne serait-ce que la réalisation d'une Etude d'Impact Environnemental et Social (EIES) exigée par la loi afin obtenir un certificat de conformité au plan environnemental. Ceci étant, même certains gros exploitants se limitent à obtenir le certificat de conformité environnemental et ne mettent pas en œuvre le Plan de Gestion Environnemental et Social (PGES). Que dire de l'ensemble des exigences de légalité contenues dans la grille présentée dans le Tableau 1. En outre, la certification forestière outil majeur de la gestion durable des forêts et « imposée » en zone tropicale depuis 1993, est un outil de marché qui permet d'attester qu'un bois a été produit conformément au respect d'un certain nombre de standards. Il a ceci de particulier qu'il permet à ce qu'un consommateur lambda accepte volontairement de payer plus cher pour un produit bois légal plutôt qu'un autre moins coûteux qui ne l'est pas. C'est un fait, le bois légal est plus coûteux qu'un bois qui ne l'est pas (Bigombé logo, 2004). En effet, l'achat durable est une pratique plus récurrente dans les pays du Nord que dans ceux du Sud. En consentant à payer plus cher pour du bois légal, les consommateurs participent à leurs échelles à la gestion durable des forêts. Ceci revient à considérer que l'existence de tels consommateurs, formant un marché important est une condition à remplir pour justifier d'une production considérablement grande. Partant de ce postulat, le bois légal n'a pas encore sa place au Cameroun car, selon une étude menée par le CIFOR, plus de 50% de la population camerounaise n'est pas encore prête à payer plus cher pour du bois légal (Belinga, 2019). Le cas des Forêts Communautaires (FC) qui ont vocation à alimenter le marché intérieur par exemple peut être saisi pour servir d'illustration. Les FC qui sont exploitées de manière durable, avec une industrie de pointe, alimentent le marché international car le marché intérieur n'est pas compétitif. Toutefois, le pourcentage restant défini dans cette étude dit être disposé à acheter du bois légal s'il y a augmentation de son revenu mensuel. À l'heure actuelle, tel qu'il est

défini, le bois légal est un luxe pour la majorité. Il est à 80% plus coûteux que celui actuellement vendu sur le marché. Le Tableau 4 ci-dessous fait état de la différence de prix entre un bois d'œuvre issu de l'exploitation informelle/artisanale et celui issu de l'exploitation industrielle.

Tableau 4: Prix de Vente des Produits les Plus Utilisés par Espèce

| Produits | Espèces | Prix issus du sciage artisanal FCFA/m ³ | Prix issus de l'industrie FCFA/m ³ |
|----------|----------------|---|--|
| Planche | Ayous/Obeche | 17.000 | 92.000 |
| | Iroko | 33.500 | 145.000 |
| coffrage | Ayous/Obeche | 15.700 | 92.000 |
| | Fromager/Ceiba | 13.800 | 67.000 |

Source : Eba'a Atyi et al

L'Accoutumance Paradoxe et Contreproductive de L'Etat du Cameroun à la Norme Internationale D'utilisation du Bois Légal : De la Gouvernance par la Ruse

L'Accoutumance paradoxale et contreproductive de l'Etat du Cameroun à la norme internationale d'utilisation du bois légal renvoie à dire que le gouvernement du Cameroun jusqu'ici soutient la norme de production et d'utilisation du bois légal, comme la corde soutiendrait le pendu. On pourrait penser que l'Etat feint de mettre en œuvre le « nécessaire » pour une gestion durable de ses forêts et une consommation de produits bois durables puisque le statut quo perdure. Cette accoutumance s'observe au travers de la validation tacite de deux registres d'exploitation et de commercialisation du bois et de la dialectique de l'Etat prédateur et protecteur des ressources forestières.

Une revue de la littérature sur la question de l'exploitation et de la commercialisation du bois au Cameroun permet de relever deux principaux types d'activités. L'une est dite formelle et l'autre informelle. Ces deux registres relèvent selon la présente analyse de la langue de bois pour faire état d'une part d'une activité légale et d'autre part d'une activité illégale. La langue de bois en ce qui concerne l'exploitation illégale du bois, est utilisée par les acteurs en présence en l'occurrence le MINFOF et ses partenaires techniques et financiers à l'effet de signifier que la pratique en elle-même n'est pas illégale et qu'elle est juste à « récupérer » c'est-à-dire à intégrer dans un système formel. Cependant, pour un Etat comme le Cameroun qui brille par son adhésion à plusieurs normes internationales pour les questions de développement durable, procéder à une tolérance administrative sur plus de dix années depuis la signature de l'APV-FLEGT relève plus d'une caution que d'une tolérance administrative (Ongolo, 2017).

Le processus de révision de la loi forestière à titre d'illustration a démarré par la décision du 02 septembre 2008 créant le groupe de travail composé de divers acteurs chargé du suivi des travaux de révision des textes de la loi forestière du 20 janvier 1994 et de ses décrets d'application quatorze (14) années plus tard ; cela n'est toujours pas effectif. La loi de 1994 ne prend que peu

ou pas en considération de l'encadrement du marché intérieur. Pourtant, la demande en bois au plan national est supérieure à celle au plan international. Le marché intérieur est au plan quantitatif plus important que celui de l'export (FERN, 2013).

Plusieurs initiatives ont été développées pendant le processus de révision. Par exemple, la réforme vise à faciliter l'accès à la ressource en bois au camerounais moyen, il est question, d'ôter les barrières permettant aux petits titres d'exercer aisément et alimenter le marché intérieur. En ce qui concerne les PEBO, la nouvelle loi en cours de révision a élargué le dispositif d'agrément et prône la décentralisation de la gestion de ces titres, au niveau régional. En outre une innovation a été émise dans ce cas avec l'apparition des agréments d'exploitants artisanaux. Cependant, cette loi est toujours à la primature. Le principal problème serait celui d'un aménagement inclusif du territoire. Des conflits existent entre le MINMIDT et le MINFOF, le MINADER et le MINFOF, les lois de ces différents ministères doivent être examinées à l'Assemblée Nationale ensembles car les titres se superposent (titres miniers sur des titres forestiers) compromettant ainsi les plans d'aménagements sectoriels. Le plan directeur/cadre global d'aménagement est donc attendu depuis plusieurs années et le bout du tunnel ne semble pas être visible. En attendant, le marché intérieur se débrouille par ses propres moyens.

Les experts interrogés lors de cette étude s'accordent sur le fait que la version finale de l'amendement de cette loi existe depuis 2012. Elle est en attente de signature depuis dix (10) années, cependant rien n'évolue. Une analogie peut être faite avec le code foncier et celui rurale. Le cas de la signature du code minier, et de sa promulgation peut s'expliquer par la sécurisation des investisseurs potentiels du secteur minier durant la période de crise (2015) que ce secteur a connu. Les investisseurs s'étant écartés, on pourrait comprendre que la promulgation de la loi était à vocation incitative. Le statu quo existant en ce qui concerne le secteur forestier résulte de notre analyse d'une inertie structurelle délibérée (Hannan et al., 1984) avec à la base des acteurs disposant d'importants capitaux (Bourdieu, 1987) (politiques, économiques, intellectuels, culturels et culturels) à même d'influencer ou de dicter les règles du jeu (l'économie politique de l'exploitation forestière au Cameroun). Il s'agit ici des principaux gagnants de la situation ambiante.

Un autre phénomène est celui du marché intérieur approvisionné par des titres falsifiés et faux. A titre d'illustration, des acteurs procèdent par l'obtention des surfaces à exploiter pour de l'agriculture auprès du MINADER. Ils font valoir cette autorisation au niveau du MINFOF et obtiennent contre une enveloppe fallacieuse une autorisation de récupération du bois. C'est ainsi que le bois présent sur cet espace est exploité, ce bois est illégal et est acheminé sur le marché. Le secteur forestier s'avère ainsi être une source d'enrichissement véritable. Le système d'illégalité construit dans ce cadre permet de comprendre qu'une partie des acteurs qui y opèrent orientent leurs efforts dans ce sens afin de s'accaparer lorsque c'est possible d'un quelconque gain.

Le secteur forestier camerounais apparaît à cet effet comme en proie à de l'anomie. Du grec *anomia*, qui signifie absence de loi, anomie au sens du sociologue français Emile Durkheim, fait référence à une désorganisation sociale résultant de l'absence de normes communes dans une

société. C'est une situation dans laquelle, les normes sociales sont déformées au point où les individus ne savent plus comment orienter leurs conduites. Cette situation caractérise à un moment donné le marché intérieur du bois au Cameroun. Le cas des dépôts de bois qui sont reconnus pour la vente du sciage illégal mais qui paient chaque mois une taxe de 15. 000 FCFA à l'Etat est problématique. Le cas des agents des eaux et forêts qui sont censés faire appliquer la loi (par le contrôle de l'activité d'exploitation) mais qui induisent ceux qui voudraient intégrer l'activité d'exploitation forestière à la corruption. En outre le cas des PEBO élaboré à la base pour les petits exploitants sont entièrement détenus par les gros exploitants du fait de leur capacité à obtenir un agrément. Le cas des Forêts Communautaires qui sont soumises à la même taxe que les UFA et qui par conséquent exportent leurs bois, or, devraient alimenter le marché intérieur est problématique. Toutes ces situations démontrent de l'urgence de régulariser ce secteur.

Conclusion

En définitive, le chemin vers les achats durables au Cameroun est encore long et sinueux. Cette étude a pu relever que, l'activité forestière au Cameroun vise premièrement des avantages économiques. Il sert les intérêts des élites qui ont investies dans les concessions forestières, ainsi que des petits opérateurs qui avec la complicité des services de contrôles homologués, mènent une activité informelle. La consommation du bois légal et durable sur le marché local est biaisée car le cadre juridique et les institutions en charge de la régulation du secteur ont été façonnés à l'image du marché d'exportation du bois, abandonnant le marché local à un destin d'illégalité. La logique de gouvernance par la ruse s'est observé par le fait que le Cameroun prenne des engagements auprès de la communauté internationale et s'organise au plan national de manière officieuse, à faire perdurer un système prédateur des ressources (Darbon, 1990). Cette prédation s'est faite observer à travers des pratiques dites néo patrimoniales qui consiste s'arroger et gérer les biens publics comme s'il s'agissait de bien privés. Le fait qu'aucune autorisation FLEGT n'a encore été accordée à un bois voué à l'export, prouve que les efforts n'ont pas été engagés dans le sens de la légalité. L'atteinte des ODD 12 et ODD 15 reste tributaire de diverses sphères de décisions et de compétences. Jusqu'ici le prix de la légalité coûte cher pour les acteurs en présence c'est pour cela qu'ils ne s'y engagent pas. En Afrique comme ailleurs, une socialisation des acteurs et des institutions à la donne de la durabilité demeure le socle de la transition recherchée. Un effort de sensibilisation et de persévérance s'impose dans l'ensemble de la communauté internationale.

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International Quality Pressures and Banned Pesticides in Peruvian Quinoa

Angie Higuchi (Universidad del Pacifico, Peru), Franklin Ibáñez (Universidad Nacional Mayor de San Marcos, Peru), Schwalb Maria Matilde (Universidad del Pacifico, Peru), and Roger Merino (Universidad del Pacifico, Peru)

Abstract

Purpose: The objective of this article is twofold: 1) evaluate the relationship between international pressures and the national prioritization of quinoa as a key export commodity, and the consequent diminishing of cultivation and crops quality, with health and ecological risks that ends affecting the Peruvian national population, and 2) analyze if internationally banned pesticides are present in the quinoa that Peruvian are consuming.

Design/methodology/approach: The first objective was achieved by data analysis of Peruvian quinoa exports and production levels. To reach the second objective, the study relied on a lab trial over four brands of packed quinoa purchased in supermarkets from metropolitan Lima on April 2020, January and November 2021 (during and after state authorities prohibited the use of Methamidophos).

Findings: The study finds a strong correlation between the increase of the international demand for quinoa and the decrease of the quality of land-use and the products associated to the intensive use of pesticides. The research also found that even if companies stopped using Methamidophos after the ban, they used other toxic pesticides prohibited internationally, risking the food security of Peruvian consumers.

Originality/value of the paper: To our best of knowledge, this is the first study that analyze the effect of the use of banned pesticides on Peruvian quinoa through the pressures to meet the international demand.

Keywords: Quinoa, Peru, pesticides, food safety, environment, metamidophos

Introduction

The increase in food production is considered key to addressing the lack of availability of new agricultural land worldwide and the demand derived from population growth and its per capita consumption (Carvalho, 2017; Gomes et al., 2020). In fact, according to the UN, by 2050 will be over 9 billion people (UN, 2019). The Sustainable Development Goal 12 (SDG12) “responsible consumption and production” is about decoupling economic growth from environmental degradation, increasing resource efficiency and promoting sustainable lifestyles (UN, 2022). Concretely, the target 12.4 by the UN definition says that: “By 2020, achieve the environmentally

sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment” (SDG-tracker, 2022). It is well known that pesticides assist in maximizing food production by allowing the intensive use of available land. However, it is also associated with ecological and health risks (Gomes et al., 2020; WHO, 2016).

Regarding health risks, pesticides can have dissimilar effects at different doses, depending on how much a person has been exposed and the route by which the exposure occurred (intake, inhalation, injection) (WHO, 2016); for instance, it heavily affects workers who have direct contact with those substances by applying them manually when spraying it on foot (Carvalho, 2017). In addition, excessive use and incorrect selection of pesticides cause a high number of residues in the food being consumed (Gomes et al., 2020). These residues can remain in plant tissues (e.g. fruits) and, in the long run, especially those that have fluorinated or chlorinated substances, cause problems to human health such as cancer, depression, immune or nervous system, and infertility (Gomes et al., 2020; WHO, 2016).

Quinoa (*Chenopodium quinoa wild*) has been particularly exposed to pesticides to increase its productivity. It is an ancestral food grain original from the Andean region of South America (IICA, 2015; Mujica et al., 2001; MINAGRI, 2017). The importance of quinoa comes from the time of the Incas at the end of the 16th century (Peralta, 2009), becoming the food diet basis of Andean peoples for more than 5000 years (MINAGRI, 2017). This Golden grain is the only food that provides almost all the essential amino acids for human consumption, such as lysine, threonine, and methionine (FAO, 2013; Jacobsen, 2000; MINAGRI, 2017). Because of its nutritional properties, the values and traditions associated with its production, and the wide range of food preparation (Furche et al., 2015), quinoa has gained worldwide popularity and growing demand in international markets (Bastantes-Morales et al., 2019; IICA, 2015; FAO, 2013). In 2013, United Nations declared the year to be the International year of quinoa (IYQ), stating that quinoa was an ally in the fight against hunger and food insecurity (MINAGRI, 2017).

The worldwide showcase for the promotion of this Andean grain generated a rapid increase in its international demand (Bastantes-Morales et al., 2019; MINAGRI, 2017), especially from the United States, which represented 34% of Peruvian exports in 2016 (Trade Map, 2021). This same year Peruvian quinoa production represented 53% of the world's total production (FAOSTAT, 2019); no other food in Peru had have shown such high production growth (Bedoya-Perales et al., 2018). To meet this demand, the Peruvian government fostered institutional changes in the quinoa production chain (MINAGRI, 2015). As a result, the harvested area has been expanded towards Coastal areas that require the intensive use of pesticides, which diminished the quality of quinoa exports. Quality official controls of the United States, for instance, did not allow the entry of containers with Peruvian quinoa due to the products exceeded the maximum limits (MRL) of pesticide residues allowed in that country. As a consequence, 200 tons of quinoa were rejected from the United States in 2014 (Mercado, 2018).

Little has been said about the role of international pressures on specific commodities (such as quinoa) in land-use change and in promoting the intensive use of pesticides to meet the global growing demand. Furthermore, food contamination is worrisome, and the Peruvian population has no real knowledge of the problems associated with the daily ingested consumption of these products. Thus, the objective of this article is twofold: 1) evaluate the relationship between international pressures and the national prioritization of quinoa as a key export commodity, and the consequent diminishing of cultivation and crops quality, with health and ecological risks that ends affecting the Peruvian national population, and 2) analyze if internationally banned pesticides are present in the quinoa that Peruvian are consuming. The first objective was achieved by data analysis of Peruvian quinoa exports and production levels. This study found a strong correlation between international pressures to export quinoa and the expansion of the agricultural frontier towards areas that need the intensive use of pesticides. The analysis shows that those tons of quinoa unable to meet international standards are redirected to the national market although some of these products contain prohibited international pesticides' substances or exceed national and international maximum limits. To reach the second objective, the study relied on a laboratory trial over four brands of packed quinoa purchased in supermarkets from metropolitan Lima. In particular, lab results show that highly toxic pesticides such as methamidophos were found in 2020, before the legal ban of the substance. Even though it was removed from products offered in the national market in 2021, other toxic substances were found to exceed the maximum limits of residues present in the Peruvian domestic quinoa.

The article is organized as follows: The second section outlines the literature review. The third section presents the methodology. The fourth section describes the results and the fifth the discussion points addressing the ethical impacts of the use of pesticides for quinoa. Finally, the last section includes the main conclusions and policy recommendations derived from the main findings of this study are presented in the fourth section.

Literature Review

Pesticides Risks on Health

Scientific studies (WHO, 2016; PAN, 2021) classified the potential health effects of pesticides in carcinogenic, neurotoxic and teratogenic (can cause damage to a fetus). This type of classification, called "hazard identification," is the first step of "risk assessment" (WHO, 2016). Pesticides belonging to chemical groups such as organophosphates, pyrethroids and carbamates, may produce symptoms of acute intoxication such as weakness, vomiting, seizures to chronic problems involving delayed neurological effects, liver damage and chromosomal changes. Organophosphates and carbamates act on the central nervous system (PAN, 2021). The main effects on human health by pesticide type are shown in Table 1. It must be noted that in a product with agrochemicals, even if it is washed or boiled, chemicals remain and eventually cause damage by its accumulation in the body (Delgado-Zegarra et al., 2018).

Table 1: Pesticides' Main Effects in Human Health

| Pesticide type | WHO classification | Usage | Effects |
|-----------------------|------------------------------|--|---|
| Cypermethrin | II= Moderately hazardous | A synthetic pyrethroid used for the control of ectoparasites which infest cattle, sheep, poultry and some companion animals (FAO, n.d.). | Very toxic to aquatic life. The substance can be absorbed into the body by inhalation of its aerosol and by ingestion. Some inhalation symptoms are burning sensation, dizziness, shortness of breath. Some skin symptoms are burning and tingling sensation, itching and redness. Some ingestion symptoms are convulsions, abdominal pain (National Center for Biotechnology Information, 2021a). The US EPA has classified cypermethrin as a possible human carcinogen (group C) because there is limited evidence that it causes cancer in animals (NPIC, 1998). |
| Chlorpyrifos | II= Moderately hazardous, | An insecticide and has been widely used in homes and on farms. On the farm, it is used to control ticks on cattle and as a spray to control crop pests (National Center for Biotechnology Information, 2021b). | Upon direct exposure to Chlorpyrifos: Toxic if swallowed and very toxic to aquatic life. It has damaging effects on the human nervous system (PAN, 2021). The substance can be absorbed into the body by inhalation, through the skin and by ingestion (National Center for Biotechnology Information, 2021b). Short-term symptoms of low-dose exposure may include headaches, agitation, inability to concentrate, weakness, tiredness, nausea, diarrhea and blurred vision. Chlorpyrifos is linked to a number of serious longer term health impacts: adverse effects on neurodevelopment, reduced birth size, endocrine disruption, lung and prostate cancer (PAN, 2021) |
| Methamidophos | Ib = Highly hazardous | An insecticide/acaricide used to control a broad spectrum of insects in cotton, potato, and tomato crops (the latter for special local needs only) (U.S. EPA, 2002). | Methamidophos also is one of the most acutely toxic organophosphate pesticides (U.S. EPA, 2002; Lee, et al., 1996). Methamidophos can cause cholinesterase inhibition in humans; that is, it can overstimulate the nervous system causing nausea, dizziness, confusion, and at very high exposures (e.g., accidents or major spills), respiratory paralysis and death (U.S. EPA, 2002). The substance can be |

| | | | |
|--------------------------|-----------------------------|---|--|
| | | | absorbed into the body by inhalation, through the skin and by ingestion (National Center for Biotechnology Information, 2021c). Some inhalation symptoms: dizziness, pupillary constriction, muscle cramp, excessive salivation, sweating, laboured breathing, weakness, abdominal cramps, convulsions, unconsciousness (National Center for Biotechnology Information, 2021c). |
| Pendimethalin | II= Moderately hazardous | A herbicide (agrochemical) used to control most annual grasses and many annual broad-leaved weeds. | Very toxic to aquatic life and may cause an allergic skin reaction. In studies using laboratory animals, pendimethalin generally has been shown to be of low acute toxicity. It is slightly toxic by the oral and eye route. Causes thyroid follicular cell adenomas in male and female rats and has been classified as a Group C, a possible human carcinogen (U.S.EPA, 1992) There is no information related to humans yet. |
| Pirimiphos-methyl | III = slightly hazardous | A post-harvest insecticide used on stored corn and sorghum grain and seed, incorporated into cattle ear tags, and used for the fogging treatment of iris bulbs. It is used to control various insects (U.S. EPA, 2008). | Can cause cholinesterase inhibition in humans; that is, it can overstimulate the nervous system causing nausea, dizziness, confusion, and at very high exposures (e.g., accidents or major spills), respiratory paralysis and death (U.S. EPA, 2008). Effects: nervous system disturbances. Chronic (Cumulative) Toxicity: long-term organ toxicity other than nervous, respiratory, hematologic or reproductive (National Center for Biotechnology Information, 2021d). |

Source: World Health Organization, 2020

Own Elaboration

Among those unallowed pesticides is the Methamidophos, which is catalogued as a highly hazardous pesticide (Ib) by the WHO (2020). Metamidophos belongs to the organophosphate group considered highly toxic for birds, water fleas and bees. Likewise, it is detrimental to aquatic life (Dextra international, 2020). FAO (2020) states that “methamidophos is highly toxic by all routes of exposure”. In 2009 all uses in the United States were voluntarily canceled (U.S. EPA,

2009). Methamidophos has been banned to be used in any food in the whole Peruvian territory by the Norm 0022-2020-MINAGRI-SENASA-DIAIA after November 30th 2020 (Dextra international, 2020). As its seventh meeting, held in Geneva in 2015, the conference of the parties agreed to list methamidophos in Annex III of the Rotterdam Convention and adopted the decision guidance document with the effect that this group of chemicals became subject to the prior informed consent (PIC) procedure (UNEP-FAO-RP, 2015). Methamidophos is also mentioned as an active ingredient named in the international conventions in the list of banned pesticides. These international conventions include the Stockholm Convention, the Rotterdam Convention and the Montreal Protocol (UTZ, 2015).

International Standards/National Flexibility and Monoculture

The Food and Agriculture Organization (FAO) defined food security as the condition “...*when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*” (FAO, 1996b). Increases in agricultural production are thus necessary to ensure food availability, but this is only part of the larger concept of food security. The safety component of food security requires a balance between the benefits of pesticide use and its environmental and health risks (Bonner and Alavanja, 2017). Pesticides regulation is meant to express this balance by prohibiting highly harming pesticides for human health and establishing Maximum Residue Limit (MRL) to define the legally accepted concentration level for pesticide residues in food (expressed in mg/kg). The MRL values depend on the active substances (the active component against pests/plant diseases) (European commission, 2020), varying according to the active principle, the intended culture (Handford et al., 2015; Gomes et al., 2020), and the approach of the regulatory agency in each country.

The literature agreed that although some global efforts exist to harmonize pesticide MRLs (such as the Codex Alimentarius; the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and Environment; the WHO Core Assessment Group on Pesticide Residues), these limits remain variable at national levels (Gomes et al., 2020; and also: Hamilton, Yoshida, Wolterink, & Solecki 2017; Yamada, 2017; Yeung, Kerr, Coomber, Lantz, & McConnell 2017 in Zikankuba et al., 2019). Although some developing countries require compliance with international standards on pesticides (Delgado-Zegarra et al., 2018) and national regulatory agencies have implemented programs to monitor the presence of these compounds in agricultural products, national regulations are often complex, contested at the judiciary, or out of phase. It is also argued that most developing nations have not enacted as drastic regulations on pesticides as developed ones (Handford et al., 2015), and that they lack expertise, regulatory oversight, commitment, funds, and readiness to enforce legislation on pesticide residues (Handford et al., 2015; Zikankuba et al., 2019; Bonner and Alavanja, 2017). In these contexts, business often dominates regulation because of weak state institutions and a lack of financial and political independence (Jansen, 2017; Pelaez et al., 2013).

The practical divergences in pesticide legislation and application cause serious problems in international trade. Industrial nations prohibit some hazardous pesticides, which prevent food

imports from countries that have not developed comprehensive pesticide regulations or enforcement mechanisms, causing barriers to trade, cost to producers and increasing food prices. Thus, it is common to reject crops that contain pesticide residue above the maximum limit established by the MRL of the destination country (Delgado-Zegarra et al., 2018).

In order to satisfy the growing demand for quinoa around the world, high volumes are required causing damage to the environment. Less has been said about the role of international pressures on specific commodities (such as quinoa) in land-use change and in indirectly promoting the intensive use of pesticides to meet the global growing demand. Bedoya-Perales et al., (2018) mentioned that as Peruvian quinoa has gained prominence worldwide, the intensification of its production raised concerns on soil degradation (for instance due to hazardous pesticides usage) and the absence of compromise of the socio-ecological bases of the agrosystem. In the last two decades, some farmers have encouraged planting quinoa in larger extensions and in the form of monoculture (Bastantes-Morales et al., 2019). Under this situation, the lack of rest and crop rotation would lead to the degradation of the soils with losses of the organic matter of the superficial layer and as a final consequence of monoculture pests such as birds, insects, rodents and various diseases are perpetuated over time causing significant yield losses. Bedoya-Perales et al. (2018; p. 6) based their study on the typology proposed by Lambin and Meyfroidt (2011) in order to explain three effects of the quinoa expansion in Peru and its implication in land use:

“First, displacement is related to the migration of activities from one place to another in a manner that brings about land-use changes in new locations. The second phenomenon, rebound, relates land-use changes with the measures taken to increase the efficiency of production, whether by the use of technology or an increase in the number of companies. Finally, the third phenomenon, the cascade effect, is a chain of events caused by a disturbance that affects the land system as a result of the substitution of areas for the production of other crops in specific agro-ecological conditions or land conversion, thus leading to additional environmental effects that are not immediately measurable”.

Food contamination is worrisome, and the Peruvian population has no real knowledge of the problems associated with the consumption of these products that are ingested daily (Delgado-Zegarra et al., 2018). The use of highly toxic pesticides in a lack of regulation and enforcement in developing countries context, is displaced more generally, under poor national institutional conditions.

Methodology

This research involved two research methods. One was the documentary analysis of official and secondary data regarding the quinoa exports and Peruvian production levels provided by Trade Map and the Peruvian Ministry of Agriculture. The aim of this analysis was to evaluate the relationship between international pressures and the national prioritization of quinoa as a key export commodity, and the consequent diminishing of cultivation and crops quality, with health and ecological risks that end affecting the Peruvian national population.

The second research method was a laboratory analysis to analyze if internationally banned pesticides are present in the quinoa that Peruvians are consuming. Four different brands of packed quinoa (one organic certified and three non-organic) were purchased in different supermarkets from metropolitan Lima in three different moments: On April 29th 2020, January 26th 2021 and November 12th 2021. The first moment was during the transition of the methamidophos law and the second and the third ones were after the day limit established by the Peruvian law (November 30th 2020), the time when all the products that contain the hazardous pesticide had to be removed from the Peruvian market. One of the commercial brands is a white-label (this is pre-filled quinoa that the supermarket can order from certain factories rather than formulated on their own. The original logo and brand are removed from the product and instead uses the supermarket's own label) and two of them are popular brands commercialized in Peru. The latter will be named Brand A and Brand B respectively. The last bag is an organic quinoa brand. The four bags were analyzed the same day as purchased by Merieux NutriSciences laboratory under the commissioning and the supervision of the authors in a prestigious laboratory dedicated to food testing in Lima, Perú, which has a global presence in Europe, North America, Asia, Middle East, Africa and Latin America. The sample was analyzed through two procedures: a multi-residue by liquid chromatology coupled to tandem mass spectrometry and gas chromatography coupled to mass spectrometry procedure.

Results

The Impact of International Trade on Peruvian Quinoa

Quinoa was revaluated from the beginning of the present century (MINAGRI, 2017) due to the growing demand in developed countries (McDonell, 2020). This change is related to consumption patterns trends that favor food associated with special characteristics, such as meeting healthy nutritional and functional features (McDonell, 2020; Bedoya-Perales et al., 2018), food safety or being an expression of historical and cultural traditions (McDonell, 2020; FAO-ALADI, 2014). Peru, Bolivia and Ecuador are the main countries that originally produce quinoa, concentrating 80% of the total world production (Bastantes-Morales et al., 2019; FAOSTAT, 2019; FAO-ALADI, 2014).

The UN declaration of the international year of quinoa in 2013 was the beginning of a period of unprecedented growth in Peruvian quinoa exports (McDonell, 2020). In 2014, Peru became the world's leading quinoa exporter with 36.6 thousand tons, displacing Bolivia to the second position with 29.5 thousand tons. Bedoya-Perales et al. (2018) argue that between 2008 and 2014 the quinoa volume export increased approximately 18 times while its price doubled. In 2010, quinoa production exceeded 40 thousand tons, while in 2012 it surpassed 44.2 thousand tons, being possible to export 10 thousand tons since that time (MINAGRI, 2017). Rural farmers who had long produced quinoa increased their production to take advantage of high prices. Thus, space that was previously dedicated to diverse potatoes or legumes was replaced by quinoa (McDonell, 2020). According to Trade Map (2021) data, Table 2, in 2013 the variation of Peruvian quinoa exports in tons compared to the previous year was 156% while in 2014 that variation was 147%. Additionally, between 2012 and 2016, the value of quinoa exports increased by 190% and in tons

by 216%. These international quinoa price spikes create concern about the welfare of rural households in the Andean region (Gamboa et al., 2020a; Gamboa et al., 2020b). Consumers (farmers are consumers and producers of quinoa at the same time) were negatively affected by a higher price and substituted highly nutritious quinoa for other less nutritious food (Gamboa et al., 2020a; McDonell, 2020).

Table 2: Main Export Markets of Peruvian Quinoa "*Chenopodium quinoa*" (in Tons)

| Importers | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| United States | 7,107 | 10,053 | 18,291 | 18,091 | 13,889 | 18,939 | 17,017 | 16,108 | 16,053 |
| Canada | 592 | 1,621 | 3,824 | 3,305 | 3,148 | 4,291 | 4,073 | 3,484 | 4,430 |
| France | 93 | 652 | 1,128 | 1,629 | 2,333 | 2,115 | 2,732 | 2,729 | 1,952 |
| The Netherlands | 210 | 650 | 2,168 | 3,104 | 4,575 | 3,432 | 2,792 | 2,543 | 3,863 |
| UK | 202 | 1,083 | 1,911 | 2,811 | 3,511 | 2,827 | 2,880 | 2,448 | 1,815 |
| Italy | 251 | 403 | 1,313 | 2,147 | 3,299 | 3,546 | 2,491 | 2,194 | 2,915 |
| Spain | 30 | 33 | 284 | 464 | 2,616 | 2,449 | 2,052 | 2,120 | 2,081 |
| Brazil | 229 | 477 | 900 | 846 | 1,045 | 1,329 | 1,940 | 1,594 | 1,370 |
| Chile | 85 | 32 | 223 | 433 | 645 | 1,112 | 1,541 | 1,528 | 2,061 |
| Belgium | 42 | | 195 | 355 | 255 | 787 | 720 | 1,499 | 951 |
| Other countries | 21 | 26 | 42 | 49 | 60 | 52 | 57 | 59 | 75 |

Source: Trade Map (2021).

The concentration of the Peruvian quinoa volume exported to the world between 1995 and 2014 was on average 60% (Bedoya-Perales et al., 2018). According to MINAGRI (2017), in 2016 the total volume exported by Peru, reached 44.3 thousand tons, with quinoa ranking first in terms of non-traditional products exports worldwide. However, the same year, the FOB value decreased 27%, from US\$ 143.55 million in 2015 to US\$ 103.16 million in 2016 (Mercado and Ubillus, 2017). Specifically, in the United States market, quinoa consumption has grown strongly, being considered a superfood in the main consumption states (McDonell, 2020). It is found in a variety of foods and drinks as pre-cooked food, snacks, bars, functional drinks, cereals, liqueurs, baby food, hygiene products, whole grain diets and vegan diets (MINCETUR, 2019). In the last five years, 64% of Americans have increased their consumption of whole grains. Between 2012-2016 the United States represented 49% of the whole Peruvian quinoa export although it decreased to 34.5% between 2016-2018.

In 2014 United States returned 200 tons of Peruvian quinoa because it exceeded the allowed quantity of pests in the crop, especially in coastal cultivations (Mercado, 2018). In fact, Peruvian coastal farmers were accused of using not allowed chemicals to combat the mildew plague (El Comercio, 2014). A study of Danielsen et al. (2003) had already shown that when quinoa is grown

in areas outside of traditional growing regions, the crop is exposed to a variety of diseases, being the most common mildew. Mildew is a parasite, generated by a microorganism called “*Peronospora farinosa*”, which causes up to 90% of losses in the production yield of quinoa, causing leaf defoliation, pale blisters, and even plant death (SENASA, 2017a). The MRLs of pesticides used for the control of Mildew, such as azoxystrobin and propiconazole, were approved in 2015 by the United States (MINAGRI, 2015). Nonetheless, the drop in quinoa prices and the news about the rejection of quinoa from Peru by the USA, made farmers abandon the cultivation of quinoa in the second semester of 2015 (Latorre, 2017). The rejected containers were resold in other international markets in which pesticides parameters were lower or were returned to the supplier (FAO, 2016).

Quinoa Territory Expansion and Decrease in Food Quality

Historically, the Altiplano shared by Peru and Bolivia possesses the best conditions for cultivation with dry and saline soils between 2,500 and 4,000 masl (Aguilar and Jacobsen 2003). Culturally, the traditional agriculture of quinoa in the Andes is characterized by the abatement of mineral fertilizers and pesticides, and rather the emphasis of cultural control of weeds, crop rotation, intercropping, and multiple cropping among others (Latorre, 2017). The expansion of quinoa to new areas, i.e. Peruvian desert coast, has been done to increase production. This involves a shift in the production system: from a traditional sustainable production of quinoa in Andes regions to intensive conventional agriculture in desert areas.

To achieve the record quinoa harvest between 2013 and 2014, the expansion rate of the acreage accelerated in all traditional producing regions (Gamboa et al., 2020b) with a range of 8% in Puno (located in the Peruvian altiplano- highlands- and the best quinoa cultivation place) and 481% in Arequipa respectively (Table 3). The Arequipa region stands out, which is located in the coastal region of Peru, yields reached 4086 kg/ha (MINAGRI, 2021). But the magnitude of the importance of this region is even greater if we consider that this expansion means a 1922% increase in the total agricultural area devoted to the cultivation of quinoa in 2014 compared to 2010, as shown in Table 3. This extraordinary expansion meant that while in 2008 the agricultural area represented approximately 1% of national production. A growing trend can be seen from 25600 ha in 2001 to 68037 ha in 2014, with an average annual growth rate of 8.5% (IICA, 2015). It is clear that the quinoa boom has caused two phenomena: An expansion in the acreage of new regions quinoa agricultural areas and current ones (Bedoya-Perales et al., 2018).

Table 3. Peruvian Harvested Area of Quinoa (in Hectares) (2010-2019)

| Year | Arequipa | Costa total* | Puno | Sierra Total** | Total Nacional |
|------|----------|--------------|--------|----------------|----------------|
| 2010 | 422 | 1,023 | 26,342 | 34,287 | 35,313 |
| 2011 | 498 | 1,053 | 27,337 | 34,419 | 35,475 |
| 2012 | 594 | 1,343 | 27,445 | 37,152 | 38,498 |

| | | | | | |
|------|-------|--------|--------|--------|--------|
| 2013 | 1,395 | 2,837 | 29,886 | 42,015 | 44,868 |
| 2014 | 8,109 | 15,627 | 32,261 | 52,502 | 68,140 |
| 2015 | 6,116 | 10,565 | 34,167 | 58,718 | 69,303 |
| 2016 | 1,831 | 4,828 | 35,694 | 59,335 | 64,223 |
| 2017 | 966 | 3,100 | 35,269 | 58,616 | 61,721 |
| 2018 | 1,144 | 2,907 | 35,916 | 61,585 | 64,491 |
| 2019 | 2,118 | 4,176 | 36,092 | 60,683 | 64,859 |
| 2020 | 2,380 | 4,047 | 35,951 | 63,604 | 67,651 |

Source: MINAGRI (2021).

*Departamentos considered as part of the total coast region: Ancash, Arequipa, Ica, La Libertad, Lambayeque, Lima, Moquegua, Piura and Tacna

** Departamentos considered as part of the total Highlands region: Apurímac, Ayacucho, Cajamarca, Cuzco, Huancavelica, Huánuco, Junín, Pasco and, Puno

Table 4 shows that between 2014 and 2015 the yields increased nearly 6 times more than in the year of quinoa in 2013. Latorre (2017: 51-52) explains this evidence saying that “During 2013 to 2015 there was an overuse of pesticides, as the phytosanitary managements indicate. Thus, the over-application and application of pesticides left high residues. First, the production of quinoa was intensive from 2013 to half 2015. This could have led to an exponential presence of insect pests. It is claimed by some farmers that the presence of chinch bugs could be noticed as they could form clouds over quinoa fields (Farmer Percy H. pers. comm., interviewed by Latorre).”

Table 4. Peruvian National Quinoa Production (Tons) (2010-2019)

| Año | Arequipa | Costa region* | Puno | Highlands region** | National level | Highlands participation |
|------|----------|---------------|--------|--------------------|----------------|-------------------------|
| 2010 | 650 | 1,291 | 31,951 | 39,784 | 41,079 | 96.8% |
| 2011 | 1,013 | 1,625 | 32,740 | 39,553 | 41,182 | 96.0% |
| 2012 | 1,683 | 2,638 | 30,179 | 41,572 | 44,213 | 94.0% |
| 2013 | 5,326 | 7,897 | 29,331 | 44,215 | 52,130 | 84.8% |
| 2014 | 33,193 | 49,293 | 36,158 | 65,417 | 114,725 | 57.0% |
| 2015 | 22,379 | 31,080 | 38,221 | 74,559 | 105,666 | 70.6% |

| | | | | | | |
|------|-------|--------|--------|--------|---------|-------|
| 2016 | 6,206 | 10,644 | 35,166 | 68,562 | 79,269 | 86.5% |
| 2017 | 3,104 | 6,670 | 39,610 | 71,980 | 78,657 | 91.5% |
| 2018 | 3,942 | 6,576 | 38,858 | 79,335 | 85,913 | 92.3% |
| 2019 | 8,461 | 11,500 | 39,539 | 77,913 | 89,414 | 87.1% |
| 2020 | 8,644 | 11,071 | 39,618 | 89,025 | 100,096 | 88.9% |

Source: MINAGRI (2021)

Internal consumption of quinoa was also promoted by the national government, resulting in increasing of 129% in the period from 2000 to 2014, from 1.10 kg/per person to 2.54 kg/per person (Bedoya-Perales et al., 2018; MINAGRI, 2015). In 2013, 85.4% of households declared that they consume quinoa in the two largest urban areas, Lima (the Peruvian capital) and Callao (Andina, 2013) whereas in the past quinoa was mainly consumed in rural areas. However, the quality of the quinoa for national consumption is questionable given that those exports that are rejected abroad for not meeting safety regulations are relocated for national consumption (Delgado-Zegarra et al., 2018). International pressures to make quinoa a key export commodity have influenced the enlargement of the agricultural frontier into non-proper areas for natural agriculture, and the consequent abuse of pesticides to ensure intensive production of the grain. The decrease in the quality and safety of crops makes them unable to meet international standards and end up being redirected to national consumption.

Pesticides Regulations and Lab Results on Peruvian Quinoa

The Peruvian government started to prohibit hazardous components of pesticides in the nineties (from 1990 to 2000 prohibited more than 20 components). From the 2000s, prohibitions were rarer (around 6 components were banned from 2001 to 2015), and since 2016 a new group of regulations started to prohibit the use of certain pesticides' components that were already banned internationally, such as Azinphos, Methyl and Alachlor (Directoral Resolution 0094-2016 MINAGRI-SENASA-DAIA), Clodercona (Directoral Resolution 012-2017), Metamidophos (Directoral Resolution 002-2020-MINAGRI-SENASA-DIAIA), Paraquat (Directoral Resolution 0057-2020-MINAGRI-SENASA-DIAIA), and Forato (Directoral Resolution 0002-2021-MIDAGRI-SENASA-DAIA). In the case of the highly toxic Metamidophos (Lee et al., 1996), the regulation (enacted in February 2020) established the ban from November 30th 2020 (El Peruano, 2020) but giving to merchants and/or manufacturers a period of 90 days from that date to withdraw from the market all products containing Methamidophos. Therefore, food with this toxic pesticide could have been sold in the Peruvian market until February 28th 2021. It must be noted that since 2013, methamidophos is listed on the basis of the final regulatory actions of the prior informed consent (PIC) taken by the European Union and Brazil to severely restrict and ban as a pesticide, respectively (UNEP-FAO-RP, 2015).

Regarding MRLs, Supreme Decree 006-2016-MINAGRI that modifies the Regulation on Agri-food safety, established that agricultural food consumed in the national market – produced in Peru or imported – must not exceed the MRL of chemical residues and other pollutants, established in national regulations or in the lack of national regulations, those established by the Codex Alimentarius, the European Union and/or sanitary authorities of the United States. In fact, Peru has never had specific regulation on MRLs and in the past just relied on the Codex Alimentarius to regulate pesticides; however, as the Codex establishes general parameters, in practice, more agricultural products lacked MRLs. With the 2016 legislation, Peru is reaching the highest international standards for MRLs, but it still suffers from a lack of proper enforcement mechanisms to make these standards effective (Delgado-Zegarra et al., 2018).

Regarding US MRLs, the database is maintained by a third party outside the U.S. Department of Agriculture System and the information in it may not be completely up-to-date or error free (FAS USDA, 2021). Thus, Table 5 shows the results of the pesticides analysis of the four bags of Peruvian quinoa (mg/kg) in relation to MRLs of the European Union (given that the Codex Alimentarius has no specific MRLs for quinoa). Private quinoa label (or white label) is a popular low-cost brand from a well-known Peruvian supermarket. In the first analysis, before the ban of methamidophos in Peru, it was found its residue (in mg/kg) in the white label brand quinoa bag. Thus, Peruvians have been consuming highly contaminated quinoa since at least 2010, as reported by the National Agrarian Health Service of Peru (in Spanish Servicio Nacional de Sanidad Agraria del Perú, SENASA) (SENASA, 2014).

Table 5: Results of the Pesticides Analysis of the Four Bags of Peruvian Quinoa (mg/kg) (April 2020)

| Brands/Pesticide s | Cypermethri n | Chlorpyrifo s | Methamidopho s | Pendimethali n | Pirimiphos - methyl |
|-------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------------|
| White label brand | 0.014 | 0.006 | 0.014 (*) | - | - |
| Brand A | 0.017 | 0.015 (*) | - | - | 0.007 |
| Brand B | - | 0.009 | - | 0.006 | - |
| Organic Brand | - | - | - | - | - |
| European Union MRL | 0.300 | 0.010 | 0.010 | 0.050 | 0.500 |

(*) Surpass the European Union MRL
Source: Merieux NutriSciences Laboratory, 2020

In the second analysis (Table 6), after the ban of methamidophos, results show no methamidophos residues were found in any sample. Nonetheless, other hazardous pesticides were found in the white label brand, as chlorpyrifos, dimetomorf and tebuconazole. The first and the second pesticides components surpassed the European Union MRL.

Table 6: Results of the Pesticides Analysis of the Four Bags of Peruvian Quinoa (mg/kg) (January 2021)

| Brands/Pesticides | Cypermethrin | Chlorpyrifos | Dimethomorph | Methamidophos | Pendimethalin | Pirimiphos-methyl | Tebuconazole |
|---------------------------|--------------|--------------|--------------|---------------|---------------|-------------------|--------------|
| White label brand | 0.0064 | 0.011 (*) | 0.015 (*) | - | 0.0085 | 0.0052 | - |
| Brand A | 0.012 | 0.016 (*) | - | - | 0.0072 | 0.0079 | 0.01 |
| Brand B | 0.0085 | 0.021 (*) | - | - | - | - | - |
| Organic brand | - | - | - | - | - | - | - |
| European Union MRL | 0.3 | 0.01 | 0.01 | 0.01 | 0.05 | 0.5 | 0.02 |

(*) Surpass the European Union MRL
Source: Merieux NutriSciences Laboratory, 2021

Chlorpyrifos was also found in the domestic Brand A and Brand B, also surpassing the European Union MRL. It must be noted that the European Union confirmed the ban of this widely-used insecticide after January 31, 2020. In a regulatory committee vote on December 6th, 2019, EU countries backed the withdrawal of the authorization for the chlorpyrifos and the related substance chlorpyrifos-methyl (Bloomberg law 2019), which have been identified as a possible cause of neurological damage in children.

In the third analysis (Table 7), after the ban of methamidophos, results show no methamidophos residues found in any sample. Quinoa samples were cleaner than the ones taken in the two moments before. A possible reason of these results are the rises of pesticides and fertilizers costs due to COVID-19 pandemic and the increase in exchange rates since producers invest more in acquiring the inputs in national currency. The lack of acquisition of chemical inputs has contributed to a minimum application of these in agricultural fields. Additionally, the shipping container crisis and the freight rates cost increases could discourage quinoa exporters to sell their product abroad. Farmers have to plan the sowing and the inputs that should be used which must comply with the demands of the international market to which the product is directed. But, due to uncontrollable external factors given the COVID-19 pandemic, the projected shipment to the international market is paralyzed and remained within Peru. As result, Peruvians eat quinoa that converges with the international quality standards during the pandemic.

Table 7: Results of the Pesticides Analysis of the Four Bags of Peruvian Quinoa (mg/kg) (November 2021)

| Brands/Pesticides | Cypermethrin | Chlorpyrifos | Methamidophos | Pendimethalin | Pirimiphos-methyl |
|-------------------|--------------|--------------|---------------|---------------|-------------------|
| White label brand | - | 0.0067 | - | - | - |

| | | | | | |
|---------------------------|------------|-------------|-------------|-------------|------------|
| Brand A | - | - | - | - | - |
| Brand B | 0.012 | 0.013 (*) | - | - | - |
| Organic brand | - | - | - | - | - |
| European Union MRL | 0.3 | 0.01 | 0.01 | 0.05 | 0.5 |

(*) Surpass the European Union MRL
Source: Merieux NutriSciences Laboratory, 2021

Discussion

From a Food Security and Food Safety Point of View

Many of the unallowed pesticides residues (see table 8) identified and reported by US authorities from 2009 to date in order to reject quinoa from Peruvian company exports are the same as those found in the laboratory reported results in both periods of time (2020 and 2021 reported in Table 5 and 6 respectively). Thus, it is highly possible that rejected products of less quality quinoa are redirected to the national market. They end up in local brands and were consumed by locals without being aware of the pesticides content of what they were eating. Moreover, low-cost brands show more quantity of pesticide residues. This means that low-income Peruvian consumers who purchase low-cost quinoa, are exposed to consume a higher quantity of pesticide residues.

Table 8: List of the Pesticide Active Component at Quinoa to Detection under the Red List Alert that caused a Rejection of Export Containers due to Hazardous Pesticides

| Description | Problem | Date published |
|---------------------------|---|----------------|
| Quinoa | Promecarb | 7/07/2016 |
| White Quinoa Seed | Propamocarb | 06/19/2014 |
| Red Quinoa Seed | Chlorpyrifos | 04/15/2014 |
| White Quinoa | Propamocarb | 06/30/2014 |
| Quinoa Seed | Propamocarb | 07/28/2014 |
| White Conventional Quinoa | Carbofuran | 05/16/2019 |
| Organic White Quinoa | Pirimiphos-methyl | 8/09/2019 |
| White Conventional Quinoa | Chlorpyrifos | 05/16/2019 |
| White Quinoa | Chlorpyrifos | 11/05/2014 |
| Black quinoa seeds | Propamocarb | 01/25/2016 |
| Red quinoa seeds | Metalaxyl | 2/09/2016 |
| Quinoa | Chlorpyrifos; Pirimiphos-Methyl; Methomyl | 07/24/2018 |
| Organic Red Quinoa | Chlorpyrifos | 12/26/2019 |
| Whole Grain White Quinoa | Propamocarb, Chlorpyrifos | 09/15/2014 |

| | | |
|------------------|--------------|-----------|
| Tri Color Quinoa | Chlorpyrifos | 3/02/2020 |
| Tri Color Quinoa | Chlorpyrifos | 3/02/2020 |

Source: U.S. Food and Drug Administration (FDA), 2020

One main factor of the US containers returning was the shipping of coastal quinoa. The coastal growing area does not offer ideal conditions for growing quinoa due to its high level of humidity and low nutritional status of the field, which prompt diseases and pests (Bastantes-Morales et al., 2019). Thus, farmers had to spread pesticides/herbicides not allowed internationally or surpass international MRLs to combat the biological pressure of pests that attack their crops. Probably in those containers, there is a combination of quinoa from the coast with quinoa from the mountains because it is not enough to complete the volume requested by international markets. In the case of the lot destined to the US market, quinoa of Arequipa province origin was found that was passed by trucks through Puno- main producer with a 52% share of national production in 2014 (MINAGRI, 2015) and even through Bolivia. What was intended, in this case, was that the international client could assume or think that quinoa was organic because it came from the highlands border of Peru and Bolivia, from where the highest quality of quinoa around the world is grown, which was not the real case. The mixture of these two types of quinoa from different production processes- from Peruvian coast and from highlands- finally caused the rejection of the product when it reached its final destination. Then, national producers decided to sacrifice food quality (as many herbicides applied in the crops not only surpass the MRLs but also are not even allowed in the US) to complete a certain quantity of export volumes.

The domestic consumption controls are not rigorous enough compared to those made for food intended to export (Delgado-Zegarra et al., 2018). SENASA just carries out evaluations of sample analysis requested by the private sector. A report from SENASA (2014) found Chlorpyrifos accross the Peruvian territory; Methamidophos in the Andes region (neither in Puno nor in Cuzco); Pirimiphos-methyl in Piura (coast); dimetomorf in Huancavelica (highlands), Lambayeque, Piura and Arequipa (the three provinces located in the coast); and Tebuconazole in Piura and Arequipa (SENASA, 2014). Since the release of this report, the high percentage of quinoa with pesticides was known to be non-compliant for export, neither for the EU nor for the United States (SENASA 2014; see Table 9). Moreover, the SENASA reports (2017b) mentioned that neither they do have an action plan after detecting high levels of pesticides in food nor established actions to follow regarding the test reports with results of chemical residues or contaminants above the permitted levels.

As shown in section 2, pesticides components generate high risks on human health, then, the interest of state authorities in reaching international demand for quinoa must be accompanied by efforts to reach also the higher food safety standards. Otherwise, the lack of regulation, monitoring, and enforcement might risk the health of Peruvian consumers.

Peruvian authorities might adopt in this regard the Common Agricultural Policy (CAP) of the European Union, through the implementation of “more territorially and environmentally balanced, climate-friendly, resilient, competitive and innovative” agricultural practices. The government

should also follow low carbon and climate-resilient agricultural economy standards, as well as sustainable consumption and productions merits (Finkbeiner 2014 in Cancino-Espinoza et al., 2020). In addition, authorities should promote organic production and control of the crop, as this is the most appropriate technique to produce healthy and nutritious food for export and internal consumption (Bastantes-Morales et al., 2019). In turn, a high-value cash crop that is increasingly consumed in high-income countries and urban market segments can be beneficial to quinoa producers as it increases their income (Gamboa et al., 2020b) and thus, their food security. It is well known that farmers do not sell all their quinoa as they all saved part of their harvest of different varieties for home consumption (McDonnell, 2020). In sum, in the medium and long term compromising with higher agricultural standards, sustainable practices, and effective enforcement and monitoring is more crucial than seeking to reach the international demand at any cost.

From an Ecological Point of View

From the ecological risk point of view, Lambin and Meyfroidt (2011) cited by Bedoya-Perales et al. (2018) mentioned the concept of displacement is associated with the quinoa boom given the speed of the increase in production in Peru to meet global demand, resulting in the expansion of the acreage in traditional producing regions in the highlands to the Peruvian coastal regions - especially in Arequipa province-, where quinoa has been introduced, producing astronomic yields (Gamboa et al., 2020b). The second phenomenon, the rebound effect, is related to pressures on land-use. If there is an increase in yield in this region, there may be greater demand to expand the planted area, substitute crops or abandon traditional agricultural practices to meet market demand (Bedoya-Perales et al., 2018). Thus, no crop rotation is the basis of quinoa farming or respect for the biodiverse characteristics of the original zone. This situation also may cause food insecurity of the farmer as the producer decides not to have crops diversification for their self-consumption. Finally, the cascade effects phenomenon may be one of the quinoa boom consequences as for instance erosion and salinization; loss of genetic diversity in the local agriculture and the emergence of difficult-to-control pests due to the reduced genetic diversity and climate change in the producing regions and reducing the impact on nutritional security, decreasing the livelihoods of small farmers.

From an Ethical Point of View

Several questions arise from a moral analysis. The main ethical problem is linked to human life and health as universal values and fundamental. Our research uncovers the presence of pesticides which represent a potential risk for the life and human health of consumers. But, even before them, these substances are dangerous for farmworkers and their families. The workers are the first group exposed to these pesticides. It is not just that they are exposed without proper training and protection, but they should not be exposed at all. Then they carry this contamination to their nuclear families. These risks are more serious because of lacking proper regulation and control from authorities or protocols from farms. Finally, as explained in previous sections, some pesticides remain in quinoa locally consumed.

Peruvian legislation acknowledges the consumer right to food safety. It means: “an effective protection for products and services that, under normal or foreseeable conditions, represents risk or danger to life, health and/or physical integrity” (Article 1.1.a. of the Code of Consumer Protection and Defense - Law No. 29571, 2010). Despite this fact, the government allows products that do not fulfill food safety conditions to be offered in the Peruvian market. Further, the Norm 0022-2020-MINAGRI-SENASA-DIAIA published on February 13th 2020, openly allowed to continue selling products containing methamidophos for one more year until February 28th 2021 (Dextra international. 2020). It is presumed that this time extension allows suppliers to run out of their stock with methamidophos from the domestic market in that period of time.

It is necessary to alert around the impact on ecosystems and biodiversity, especially the extension of quinoa crops. This is especially relevant because Peru has its agriculture based on small-scale production, since approximately 82% of the existing agricultural units in the country cover fewer than five hectares (Bedoya-Perales et al.. 2018). The authors of this paper subscribe to ecological values as central for ethics too. In previous sections, it has been explained how the expansion of quinoa crops produces the next negative results: displacement, no crop rotation and the cascade effect. Therefore, this affectation on ecosystems and biodiversity must not be postponed by economic gains. In sum, caring for the integrity and quality of the environment is an ethical valuable goal.

To reinforce the last statement, it may be useful to start from the agricultural ethics definition (Chrispeels and Mandoli. 2003; Zimdahl. 2019). The main focus of agricultural ethics may be summarized in two goals: the critical analysis of agricultural production as a still prevailing model and the promotion of an alternative vision that involves evident ethical components as agricultural sustainability, food security and food safety. The case of Peruvian quinoa proves that agricultural production is still too present. Producers, stakeholders, local authorities and the government give priority to an economics approach instead of ethical issues as sustainability and human health. The Peruvian consumer's health does not have the same protection as the international consumer to whom Peruvian quinoa is exported as a final destination.

There is a better ethical situation since producers were forced to adopt healthy standards. Findings prove that Metamidophos has been eliminated as commanded by new regulations. "A good law serves as means to achieve virtue" is a precept stated by moral schools for centuries (Aristotle. 1958; Aquinas. 2000; Machiavelli, 1989). Even if the agents act by fear of penalties, their conduct has been positively changed. Nevertheless, this could be a short-term behavior in the case of quinoa directed to the domestic market due to fear of punishment. This behavior could be reversed as providers realize that there is no audit or that the authorities are corrupt. As a consequence, it is profitable, presumably, to pay the bribe instead of complying with the law.

Conclusions and Implications

There are environmental and human health problems related to unrestricted use of pesticides contamination. First, as Peru is home to an extraordinary wealth of genetic resources of great importance to agriculture and food production, there is a need to determine whether expanding

the acreage of quinoa jeopardizes agricultural productivity, the production of other Andean crops, and/or accelerates soil fertility loss, either by transformations to traditional agricultural practices or the excess use of pesticides (Bedoya-Perales et al.. 2018).

Despite the clear commercial and economic importance, the use of pesticides should not overlap with human health. This study shows that in Peru, although there are international standards towards the MRLs, there is a lack of monitoring on the Peruvian domestic food safety norms and the absence of protection and information that consumers face for their daily purchases in the Peruvian markets (Delgado-Zegarra et al.. 2018). Also shows that when the government releases a resolution as for instance, the methamidophos eradication from the internal market, the industry follows the law. Nonetheless, other hazardous substances were found in quinoa. Peruvian resolutions for other pesticides should be released in order to eradicate brands that contain these kinds of harmful pesticides. Clear regulations are important to be shown to the public in order that the consumer can choose what to eat. Peruvian government should monitor internal MRLs standards in domestic products. International standards as the European Union MRLs should be applied to Peruvian food products that contain moderate hazardous pesticides.

In order to reach the goal of SDG12, especially the target 12.4 “achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks by 2020”- notice that unlike most SDG targets thich are set for the year 2030, this indicator is set for 2020- (SDG-tracker, 2022) there are a number of international multilateral agreements on hazardous chemicals including the Rotterdam Convention, the Montreal protocol, the Basel Convention and the Stockholm Convention (SDG-tracker, 2022). For instance, the Stockholm convention showed in 2001 the persistent organic pollutants (POPs). In addition, the Rotterdam convention, mentioned that developing countries and countries in transition may also propose the listing of severely hazardous pesticide formulation. There is an urgent need for global action, especially in countries like Peru, to protect human health and the environment from chemicals that are highly toxic, persistent, bioaccumulate and move along distance in the nature. The best way to do pest control is through prevention, planting selected seeds or resistant or tolerant varieties of pests and diseases, certified and disinfected; avoiding monoculture; integrated pest management; rotating and associating plants and avoiding excess moisture and flooding (Bastantes-Morales et al.. 2019). The Common Agricultural Policy (CAP) of the European Union can be a good example. Additionally, organic production is an alternative to take advantage of the agrobiodiversity that Peru has. Cancino-Espinoza et al. (2020) reported a Life Cycle Assessment (LCA) of organic quinoa in Peru and concluded that is one of the lowest greenhouse gases (GHG) emission products (Gamboa et al.. 2020b). The Peruvian national agency of charge of agricultural safety standards (SENASA) should implement enforcement mechanisms vis-à-vis pesticides distributors and to farmers who have no technical training to use pesticides. Finally, institutions as cooperatives should make additional efforts to increase the level of control over farmers-members' practices. Namely, they are becoming *de facto* verifiers.

What it matters is that we should ensure sustainable consumption and production patterns without endangering the systems (each country contributes to the world structure) on which our future development and survival depend, applying adequate resources efficiently. In order to contribute

to the SDG12 goal, avoiding to apply hazardous pesticides in the field, has the greatest potential to improve the environmental and social impact of the life cycle as a whole.

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Mindsets and Air Pollution in a Dynamic Urban Environment: How Attitudes and Behaviors May Aggravate Public Health Outcomes in Almaty, Kazakhstan

Alua Bekbossynova, Dinissa Duvanova, Niko Jones, Kate Lyden,
Tess McGinley, and Hannah Moss (Lehigh University, Pennsylvania, United States)

Abstract

Using an original public opinion survey we study attitudes and behaviors toward air pollution in Almaty, Kazakhstan, a growing modern city with extremely high concentration of air pollutants. Utilizing the Health Belief Model (HBM) framework previously used to understand an individual's health decision-making, we evaluate levels of citizens' awareness of the poor air quality, their perception of risk and harm it poses to health, and their willingness to devote time and resources to reduce their air pollution exposure. The issue of air quality in Almaty—Kazakhstan's most populous and wealthiest city—has received much attention in recent years, but little research has been done to thoroughly examine public attitudes, which ultimately would drive any solutions to the problem. Our study finds that although citizens are aware of the gravity and general harms of Almaty's air pollution, they significantly underestimate their personal risks and health consequences. The survey also shows citizens are unwilling to think of air pollution as their own personal health problem and often engage in daily routines that exacerbate their exposure to pollution. We conclude that shifting public discourse from the collective/government to the individual/community problem domain will have a beneficial effect on daily practices which may lead to reduction of exposure and improvements in public health outcomes. Such attitudinal and behavioral changes are necessary first steps to promote environmental consciousness and effective pollution reduction programs.

Keywords: HBM, air pollution, environment, public opinion, public health, Kazakhstan, Almaty

Introduction

The city of Almaty is the largest urban area in Kazakhstan, an upper middle income and the most prosperous country in Central Asia. A former capital, the city is home to 1.8 million people, or nearly 3 million, including the entire metropolitan area. A major exporter of oil and minerals, Kazakhstan is an industrialized and dynamically growing transitional economy. Unlike many other Kazakh cities that host industrial production, Almaty's economy is primarily service oriented. With no major polluting industries around the city, population growth and increased prosperity have been the major factors contributing to increasingly poor air quality: heating and traffic in a megapolis surrounded by the world's highest mountains (Tian-Shan mountain range is part of the Himalayas) are the major culprits of air pollution.

A 2020 study that analyzed most common air pollutants between 2013 and 2018 reported that annual averages of PM_{2.5}, PM₁₀, and NO₂ pollution concentrations in Almaty exceeded the WHO annual limits by 5.3, 3.9, and 3.2 times, respectively (Kerimray et al., 2020). The US Environmental Protection Agency considers PM_{2.5} (particulate matter 2.5 micrometers or smaller) pollution to pose the most severe health risks because the particles are small enough to penetrate lungs and get into the bloodstream (EPA.gov). According to the World Bank in 2013, the levels of PM₁₀ and PM_{2.5} in Almaty cost the city an additional 486 million US dollars in medical care (Kerimray et al., 2020). These health costs increase the number of people with asthma, chronic obstructive pulmonary disease (COPD), and other cardiovascular health issues. Research has conclusively linked air pollution across Kazakh cities to higher than average instances of respiratory and cardio-vascular disease. Air pollution is estimated to contribute 16,000 cases per year to the national mortality estimate (Kenessariyev, 2013). The poor air quality contributes to the severe visible smog, accumulation of dust and residue inside buildings, and residents reporting difficulty breathing. In 2018, city residents spontaneously organized online groups and traditional civil initiatives to seek more information about the extent of air pollution, its sources, health effects, and to pressure the government to enact environmental measures. Still, Kazakh meteorological services or medical institutions do not issue air quality alerts to the general public, nor do they advise vulnerable populations to avoid outdoor pollution. The information from the existing air quality monitors remains a purview of a narrow group of specialists and enthusiasts. No individual protection and mitigation measures, such as air filtration systems, avoidance of outdoor activities for vulnerable populations, or face mask wearing are being practiced or promoted in the city.

The local government of Almaty has taken steps to address the air pollution problem in their city. These include regulatory initiatives, infrastructural changes, and renovation of the central heating plants. Starting in the late-1990s the city introduced environmental inspection block posts to enforce traffic emissions standards. It invested in municipal tree planting and banned unauthorized logging of trees, which are widely regarded as essential components of air pollution mitigation. In 2018 the city of Almaty launched a program to develop a more sustainable bus system, and became a customer of Eurobus, an electric bus service, in an attempt to reduce pollution from traffic. In 2021 the city awarded a contract to upgrade the existing coal and natural gas powered heating plants that supply hot water and heat to the vast majority of city's residential and business buildings. The purpose of the upgrade is to reduce harmful emissions that contribute to nearly half of particulate matter pollution during a 6-month long heating season. Nonetheless, the government is still not doing enough to address the public health consequences of poor air quality. With the city population growth projections, existing measures might be able to slow deteriorating pollution, but are unlikely to revert the trend in the near future.

Kazakhstan is rich in hydrocarbon resources. The government's high share of ownership in the energy sector allows it to subsidize energy prices for residents, which make coal and natural gas the most cost-effective sources of residential heating. Heating with hot water is produced and distributed centrally and most residents do not have access to alternative heating options. Average incomes are high enough for gas-powered vehicles, but not sufficient for more expensive electric cars. These factors make a speedy energy transition highly unlikely in the near future.

As the air pollution continues to affect Almaty residents, preserving their health becomes the most paramount concern. Unfortunately, the city takes no preventative public health measures to mitigate adverse health effects of air pollution. Even the majority of the citizens of Almaty are not taking the necessary steps to keep themselves safe. Moreover, they often preserve unhealthy and environmentally damaging practices, such as opening their windows during the heating season. Such practices simultaneously increase their exposure to air pollution and increase the demand for more heat generated by burning fossil fuel. Due to the lack of governmental and individual effort to mitigate the health risks of poor air quality, it is pertinent to find out what is stopping people from engaging in healthier behavior. To understand why most Almaty citizens do not take action to reduce their air pollution exposure, we conducted a public opinion survey, distributed electronically throughout the city of Almaty.

One purpose of the survey is to evaluate the general awareness the public has of poor air quality and their opinion of the environment in Almaty. To our knowledge there are no national surveys that tell us what the population of Almaty knows about air quality. However, a 2013 study measured the awareness Kazakhs had on the health effects of smoking. Roberts et al. found that only 61.6% and 58.2% of people in Kazakhstan are aware that smoking can cause heart disease and bronchitis respectively and found that only 19.4% of Kazakhs had the characteristics associated with a high knowledge of the harmful effects of tobacco (Roberts et al., 2013). Because poor air quality causes many of the same health problems, but is a more obscure problem, it is likely that less than 19.4% of Almaty residents have high levels of knowledge of the negative effects of air pollution.

To analytically disintegrate various aspects of an individual's opinion on air quality's health effects we design survey questions about awareness, perception of harm, and behaviors. Our approach is inspired by the theoretical framework of Rosenstock's Health Belief Model (HBM). The HBM is a collection of five perceived attitudes of a certain health risk, which theoretically can predict if a person will make a health behavior change. These attitudes include: 1) Perceived severity, 2) Perceived Susceptibility, 3) Barriers to Preventive Action, 4) Benefits of Preventative Action, and 5) Self-efficacy (Rosenstock et al., 1988). The sixth factor of this model is cue to action, which is the trigger for the health behavior. The model posits that, if perceived susceptibility and severity are high, barriers to preventive action are low, benefits of preventive action are high, and self-efficacy is high, a person is likely to follow healthier behavior.

The HBM can be used to predict taking a medication or quitting smoking or attending a program or getting a mammogram test, any positive health behavior. We believe that this model is well suited to analyze individual behaviors to reduce air pollution exposure as well. In other words, we expect that the lack of awareness of individual harm and belief in the efficacy of individual actions can explain why some Almaty residents engage in practices that increase their exposure and aggravate the negative public health effect of pollution.

HBM is well established. The predictive quality of all the factors of the model is not certain. In a meta-analysis study of 18 studies using the health belief model, benefits and barriers were the only strong predictors of longitudinal behavior change (Carpenter, 2010). The model has stronger

predictive ability when the treatment was preventative versus for an existing illness (Carpenter, 2010). There is also debate about whether self-efficacy should be officially included in the HBM, but it will be included in this study. A 2021 study found that self-efficacy was the only predictive factor of healthy eating in young adults (Dumitrescu and Iacob, 2021). In a study that tested when Jordanians adhered to home quarantine instructions during the COVID-19 pandemic using the HBM, researchers found that seriousness (or severity), benefits, and barriers were significant predictors (Al-Sabbagh et al., 2022). These results are significant in the case of air quality because reducing exposure to air quality requires many of the same actions as reducing exposure to COVID-19. We expect to see similar results for air pollution attitudes in Almaty.

Using questions that correspond to different perceived attitudes within the HBM, we will assess which of these factors are most relevant to making good health choices in the Almaty population, and attempt to target those attitudes with information distribution. The survey will combine demographic questions with questions addressing the HBM in order to control for variables that might impact attitudes. A study found that a higher level of education and income lead to increased knowledge about cancer and, therefore, healthier practices like not smoking (Wilkinson et al., 2009).

Contextualizing our Study: In-person Interviews, Observations, and Interactions

To better understand various ways Almaty residents are being affected and respond to air pollution between May 19th, 2022 and May 29th, 2022 we conducted observational field research in Almaty. We learned that people in Almaty are not oblivious to the poor air quality around them, but often view the problem as an unavoidable consequence of living in the city. In conversation, people mentioned air quality issues are discussed as early as elementary school. People made it clear they believe air quality is poor in Almaty, but it is much worse in other parts of the world. The day to day exposure to poor air quality has made people apathetic to the issue. Many activists blame the construction of high rise buildings for disrupting air flow in the city, but these claims are as of yet unsupported by scientific evidence.

Rapid urbanization within the city of Almaty has not only led to the construction of new high rise buildings, but increased transportation and energy demands as well. This has resulted in decreasing air quality, but has not led to changes in behaviors. In peak stand-still traffic cars sit idle with their windows open, even when functioning air conditioning is available. This exposes passengers and drivers to PM_{2.5} concentrations of over 35 $\mu\text{g}/\text{m}^3$ in summer months when air quality is considered best. Homes and professional buildings equipped with air conditioning chose to open windows when it is hot regardless of proximity to major pollutants, letting particulate matter contaminate cleaner indoor air. This is due to the widespread belief that air conditioning can cause illnesses like the cold.

In winter months air quality is at its worst due to pollution from coal heating plants, at-home furnaces used for heating, and vehicle emissions. In homes built before 2005, residents are unable to regulate the temperatures of their at-home radiators. The heating is state-regulated, and the state sets the temperature of the water that travels out to every home. Many homes then

become too hot, with residents subsequently deciding to open their windows for relief, which, in turn, allows in polluted air.

Additionally, representatives for air filtration units come to school, but it is agreed these units are too expensive for most people to purchase. As one person said, the units are too expensive because the problem is not of high enough importance.. Some people mentioned they would be willing to take alternate routes to school to avoid poor air quality, but they often must walk near high pollution sources like major roadways. Nearly every person shared the same thought process: air pollution is a problem, but it is an unavoidable one.

Survey Design and Data Collection

The survey was developed on the Qualtrics platform and is being distributed electronically in Almaty, Kazakhstan. The survey can be taken anonymously on a personal computer or a smartphone. The Qualtrics platform ensures anonymity and prevents multiple submissions. Confidentiality of respondents is enhanced in electronic distribution: they can answer survey questions in the privacy of their homes and at the time most convenient for them. The prospective study participants were enrolled via two methods: a QR code available to scan and a list of emails provided by the Almaty Management University (AlmaU). At the end of the survey respondents had an opportunity to send the survey invitation to their friends and families, forwarding the anonymous survey link to their phones or emails.

The Qualtrics survey solicits participants' informed consent, explains the purpose of the study, and provides the PI's and local contact information. Participation in the survey is voluntary and can be terminated at any point during the survey. The survey was translated to local languages, Kazakh and Russian, giving the respondent an option to choose their preferred language. The accuracy of translation was verified by our Kazakh co-investigators fluent in Russian and Kazakh.

At the beginning of the survey the participants are informed about the anonymity of their responses and that the results will be used in an aggregated format to study public attitudes and general behavioral patterns of city residents. At the end of the survey we provided a debriefing statement that more specifically outlines the air quality focus of the research. Our survey questions encompassed multiple categories to give us a strong and more complete understanding of the health and beliefs of citizens in Almaty. Our main categories of questions include: awareness of air pollution, concern regarding air pollution and its health effects, behaviors increasing risk of exposure to air pollution, and the willingness to change behavior and/or pay.

Our first category of questions, awareness of air pollution, focuses on understanding the basic knowledge regarding air pollution among citizens in Almaty. There were a total of seven of these questions, and they were positioned at the beginning of the survey. These questions were largely scale or ranking based, so as to give us a better understanding of awareness regarding air pollution, as a single-input approach may have not provided the larger picture that a ranking system of questions does. Furthermore, we placed these questions at the beginning of the survey to get as unbiased responses as possible, as information later in the survey may have influenced

participants to select answers indicating more awareness of air pollution. However, these answers may not have been completely organic, as they could have been influenced by previous questions, but placing them at the beginning minimizes this effect as much as possible.

Closely related to our first category of questions are our questions which asked participants their level of concern regarding air pollution and its health effects. These questions were somewhat intermixed with the first category regarding awareness, as this would again protect against potential bias they may experience if these questions were placed later in the survey. These questions, again similarly to the first category of questions, were answered either on a scale or in levels. This was integral, as we wanted to gauge concern among and between different demographic groups in the city, and a scale system allowed us to do this.

The next category we included in the survey is behaviors increasing risk of exposure to air pollution, and is by far the longest. It is also the most important, as it gives us a direct look into what actions and behaviors people in Almaty are partaking in. These questions are framed in ways that do not immediately create a bias, and never mention air pollution. This is done to ensure participants do not answer these extremely important questions with a bias, as we want to truly understand their behaviors, especially if they are dangerous in relation to air pollution. These questions focused on home life, travel, and activities outside, as actions and habits regarding these settings often account for the vast majority of air pollution exposure in Almaty. These options for responses to these questions range in format, based on whatever is deemed most appropriate in order to get the clearest understanding of the respondent's behaviors. This was done because we wanted specific and generalizable behaviors and habits that we could address, instead of a large board of different answers which would make it difficult to create a solution to the problem. Furthermore, we sacrificed some customizability for the sake of time, as though we did have fill-in-the-blank options, too many would lead to a far longer survey, which often leads to far fewer responses.

Lastly, we included questions relating to individuals' willingness to change their behavior/pay to mitigate the level of air pollution. These questions were specially designed, and treated as experimental questions. They were placed at the very end of the survey, as we were not as concerned with bias with these questions, as they would be more informed moving forward regardless. These questions were specially designed by our team, and utilized graphics to more accurately convey the question, due to the moderate level of complexity in the questions. Furthermore, we tested levels of knowledge as well, as we first asked what percentage of monthly income would individuals spend to reduce their risk by 33%. However, the next question included information detailing the true nature of the air pollution problem in Almaty, and then asked the participant the same question to test if more awareness would change beliefs among the citizens.

Along with the four main categories of questions mentioned above, we also included a large number of demographic questions to give us a better idea of who each participant was so we could draw more advanced socio-economic conclusions. These demographic questions were placed throughout the survey, and often overlapped with other categories of questions like actions exposing individuals to air pollution, children, and household location.

Data Management and Analysis

Qualtrics' platform recorded anonymous survey responses and stored these on the inscription-protected server. After the survey was concluded the anonymous data was downloaded and all digital identifiers, such as the timestamp of the survey collection were purged from the data. The data bill is organized by assigning unique identifiers to the anonymous respondents. These data were analyzed with the difference of means (for the randomized experimental element) and regression analysis tools using STATA.

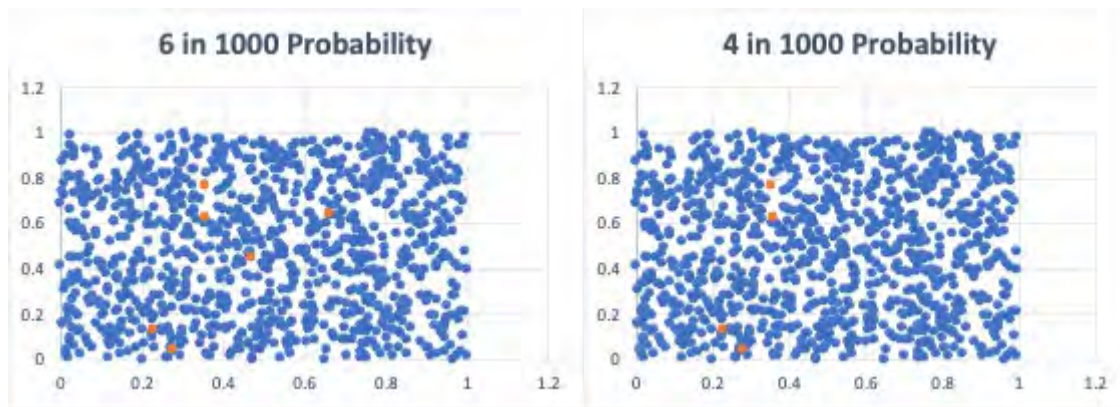
The final survey consists of 49 questions and is expected to take 10 minutes to complete. We translated the questions to Russian, Kazakh, and English languages to make the survey accessible for the whole population of Almaty. The first distribution took place on April 17 on Almaty Marathon, which our AlmaU partners have attended to distribute the posters with the printed QR code for the survey. It was a crowded event, so people were approached to complete the survey. During the fieldwork, on May 27, our team did the second QR code distribution during a presentation of the project to the Almaty public at the "American Corner" public meeting space located in the center of Almaty and administered by the US Consulate's public affairs division. Before the presentation, the attendants had the option to scan the code or start the paper version of the survey, but all opted for the digital version and completed the survey.

The other major distribution took place in April, when we sent out the email about the survey to over 4,500 AlmaU faculty and students. In the email, we introduced the AlmaU and Lehigh partnership and provided the overview of the project. Our final distribution strategy is designed to reach a wider public and is following a snowball sampling approach in which the participants of our email-distributed survey will receive a sharable link to forward to their friends and family. We expect to finalize data collection by June 30th and reach 300 completed responses.

| Perception | Questions that apply | Answer that indicates a perception | Level of perception |
|--------------------------|---|--|---------------------|
| Perceived susceptibility | Do you think pollution affects your health? | Yes | high |
| | In your opinion, what are the major causes of health problems you and your relatives have? (you may choose multiple answers) | bad environment, pollution (other answers irrelevant here) | high |
| Perceived severity | How concerned are you about environmental pollution? | 1 to 3 | low |
| | | 4 to 7 | mid |
| | | 8 to 10 | high |
| | To what extent do you agree or disagree with the following statements?: Air pollution can lead to serious health problems | agree | high |
| | | middle | mid |
| Perceived benefits | To what extent you agree or disagree with the following statements?: I can take actions to prevent negative health effects of air pollution | disagree | low |
| | | agree | high |
| | | middle | mid |
| Perceived barriers | What best describes your position on air purifiers? | disagree | low |
| | | I have an air purifier and use it | low |
| | | I have an air purifier, but don't use it as often as I should | mid |
| | | I have an air purifier, but don't use it because it does not make a difference | mid |
| | | I don't have an air purifier because these are not available/ affordable | high |
| | | I don't have an air purifier and i don't believe i need one | high |
| | | I don't have an air purifier but i want to buy one | mid |
| | | I do not know what an air purifier is | high |
| | Do you use air conditioner (have an air conditioner)? | I use it all the time when needed | low |
| | | I don't use as often as I would like to save energy | mid |
| | | I don't use it because it does not make a difference | high |
| | | I don't use it because I don't need it | high |
| | Do you use air conditioner (do not have an air conditioner)? | I don't have an air conditioner because these are not available/affordable | high |
| | | I don't believe I need one | high |
| | | I do not have an air conditioner but I want to buy one | mid |
| | | I do not know what an air conditioner is | high |
| | Do you wear a face mask while outdoors? | often | low |
| | | sometimes | mid |
| | | rarely | high |
| | | never | high |
| | Does the way you travel to work or school change depending on weather? | Never | high |
| | | Rarely | high/mid |
| | | Sometimes | mid |
| | | Often | low |
| Perceived self efficacy | Which of the following do you feel has the most potential to protect the environment in Almaty? (Rank order options: 1 - the most potential, 8 - the least potential) | Always | low |
| | | Citizens rank 1-2 | low |
| | | Citizens rank 3-6 | mid |
| | To what extent do you agree or disagree with the following statements?: Wellness practices (diet, exercise, etc.) can prevent illness | Citizens rank 7-8 | high |
| | | agree | high |
| | | middle | mid |
| | | disagree | low |

Table 1: This table explains how we will analyze each of the questions associated with perceptions included in the HBM. Note that rating high in perceived barriers will work against completing a healthy behavior while rating high in other perceptions is in favor of a healthy behavior.

To test for the role of cues to action, the survey embeds an experimental design. Respondents are randomly assigned to two treatment groups and one control group. The treatment groups receive one of two prompts: 1) discussing risks of air pollution and benefits of mask wearing and air filtration; 2) discussing the risks only. The prompt is then followed by a question that asks the participant to select their willingness to pay (WTP) for a marginal reduction in premature mortality risk. This question will help us quantify the value of statistical life (VSL) in Almaty, which provides a general understanding and estimate of how dire Almaty citizens feel their current situation is (OECD, 2014). VSL was developed in the European Union, and is primarily used there. Because of this, the VSL had to be converted in order to be properly calibrated to the socio-economic status of Almaty. This WTP question will also be accompanied by a graphic illustrating the magnitude of risk change based on their answer. Here are examples of this graphic:



The next questions touch on the respondents' willingness to change their daily commute, wear masks, insulate and air-filter their houses. The survey also includes a battery of socio-demographic questions to address the confounding variables suggested by the theoretical model.

After we finish data collection, we plan to test hypotheses about how different components of the HBM contribute to the self-reported pollution-mitigation practices. In accordance with the HBM, we expect separate and positive effects of various measures of awareness and harm perception on individual pollution-mitigation practices. By analyzing the distribution of responses to our question we will be able to identify the “weak links” in public awareness and behavioral practices. This may suggest promising areas for the community-outreach activities, such as designing health and well-being information campaigns, developing wellness mobile applications, and interacting with the local stakeholders representing the vulnerable populations in the city of Almaty.

Results of Survey

We received a total of 34 complete responses from the survey across our distributions. This was less than we anticipated, but still provides us with a better understanding of the citizens of Almaty and their attitudes towards air pollution and their health. The first questions in our survey, those asking participants of their knowledge of air pollution, were surprising to us. On our first question, which asked “How concerned are you of environmental pollution? (on a scale from 0- not concerned to 10- very concerned)”, 34% of participants responded with a ten. Furthermore, 53%

of respondents chose answers of 7-9 on the scale of concern. We did not anticipate this, and were expecting a number closer to 30% of responses for the entire scale of 7-10 in concern.

This trend of apparent higher awareness of air pollution continued, especially in earlier questions which dealt directly with knowledge of air pollution. However, we did find something we were expecting in our question inquiring as to the effect of air pollution on individuals' health. Our sixth question asked: "Do you think air pollution affects your health?", and the possible responses to this were yes, no, and maybe. The responses to this question were that 94% of participants stated they believed air pollution affected their health. These responses were not surprising, given the trend of seeming increased awareness of air pollution. However, we wanted to measure not just the overall awareness of air pollution and base effects on health, but wanted to get a sense of just how much individuals thought air pollution affected their health. To better understand this, we included question 9, which asked participants "In your opinion, what are the major causes of health problems you and your relatives have? (you may choose multiple answers)." The responses to this question shed some light on the previous responses to earlier questions asking about baseline awareness of air pollution and its effects, as only 17% of responses selected air pollution as a major cause of health problems. The effect of poor air pollution on health problems in Almaty is expected to be much higher than 17%, and is something we were expecting to see, which is a lack of high levels of knowledge on the issue of air pollution and its effects.

Another important aspect we noticed in responses was a lack of knowledge of effective and safe methods of air pollution exposure mitigation. For example, our 11th question which posed the question "To what extent do you agree with the following statements?", and then listed: "air pollution can lead to serious health problems", "it is important to spend time outside to get fresh air", "it is important to ventilate my home to let fresh air in", "wellness practices can prevent illnesses", "sometimes it's better to stay inside to not breathe bad air", "I can take actions to prevent negative effects of air pollution", and "sometimes air outside is worse than air inside my house." The majority of these statements are false in Almaty, and the air outside homes is typically 2-3 times more polluted than inside the home. We asked this question to further gauge true knowledge of air pollution and its effects on health. We received expected responses, such as 68% of participants believed it is important to spend time outside to get fresh air and 65% of participants believed it is important to ventilate their homes to let in fresh air. Additionally, 47% of participants selected a 5 or lower on a scale of 10 as a response to the statement "I can take actions to prevent negative effects of air pollution." The responses on this question in particular reinforces our idea that action can be taken to better inform the public on their ability to mitigate the effects of air pollution, and that the majority of people in Almaty are not as informed as is necessary to protect themselves from air pollution.

Another integral element of this survey was that of the behaviors and habits of the citizens of Almaty. We dedicated a large portion of our questions to this purpose, and received results we were mostly expecting. For example, for our question 29, we asked participants to check all the statements they agreed with, and included answers of "When the heating is on, the best way to to make my house comfortable is to open windows", "On hot days, it is better to open the windows than to run air conditioning", "In a car or on a bus I like open windows for fresh air", "I regularly

check air quality reports to know levels of pollution”, “On days when the air is highly polluted I do not feel well”, and “On days when the air quality is bad I avoid outdoor activities.” This question was extremely important for us, as it would give us a much better understanding of the habits of the people of Almaty, and their level of danger in relation to air pollution. Predictably, the habits expressed in this question are not mitigating the effects of air pollution. 29% of responses to this question agreed the best way to make their house comfortable when the heat is on is to open the windows, and this was validated by observations and conversations during fieldwork. This is an extremely dangerous habit given air pollution is at its worst during the winter months. Furthermore, 32% of respondents agreed they like to open windows in buses or cars for fresh air. Again, this habit only increases exposure to air pollution, as traffic is one of the main contributors to air pollution in Almaty, and air pollution readings are extremely high on roads. Possibly the most startling statistic in the entire survey was also received in response to this question, only 0.4% of respondents agreed they regularly checked air pollution readings. As stated earlier, these responses are alarming, but they reinforce our resolve to continue our work to mitigate individuals’ exposure to air pollution in Almaty, especially through education, as a change in just a few of these habits could significantly increase quality of life for so many.

The last category of questions were the experimental questions included at the end of the survey. The experimental element consisted of two questions, with the same set of answers, but with differing information. The first question asked participants what percentage of their income they would be willing to contribute to bring their risk from getting sick due to air pollution down from 6 in 1000 to 4 in 1000. Every respondent selected that they would contribute some percentage of their income, with the majority selecting to contribute 1-5% of their income. The follow-up question contained all the same answers to the question, and consisted of largely the same writing, but also included writing of how this cost would most-likely also include changes in habits, such as taking different routes to work and biking more. Unlike the answers to the previous question, there was a single response that indicated they would not spend any of their income to reduce their risk.

As noted in Table 1, each question was part of a certain perception category and each answer was assigned a level of perception (high, medium, or low). For all of the categories, except for perceived barriers, a high level of perception works in favor of healthy behavior. For perceived barriers, a low level of perception works in favor of healthy behavior. Calculating the percentage of people that had perceptions in favor of healthy behaviors allows us to gain a wider understanding of how likely people in Almaty are to change their habits. These percentages were calculated by question and then averaged within each category. Perceived susceptibility had the highest average, with 82.7%. Perceived severity and perceived self-efficacy were next, with 49.5% and 46.85%, respectively. Perceived barriers average was 23.2%, and, finally, perceived benefits fell last, with an average of just 17%.

Conclusions

Our study indicates that people in Almaty generally understand that there is a severe air pollution problem, but they do not feel confident they, as an individual, can do much about it. They feel the

barriers are high enough to prevent easy access to exposure mitigation options, and they subsequently feel that, even if they took steps to protect themselves, it would not make a substantial difference. While it is good that citizens understand the problem, our work now lies in increasing awareness about the ease with which people can protect themselves. It is clear there is a negative attitude towards the city's air pollution, but the results of the survey indicate there are certain behaviors that we can now directly address. For example, considering only 59% of people use air conditioners regularly and only 6% of people use air purifiers regularly, targeting these two products by convincing more people to use them and increasing their accessibility would make a significant difference in people's indoor air pollution exposure.

Further, based on answers to a question about what influences views about the environment, people are open to receiving information from academics and scientists, with 73% of respondents ranking academics/scientists within the top 3 ways they are influenced. This means initiatives like ours do, in fact, have the potential to influence citizens' views.

The major limitation of our conclusions is that they are based on the narrow demographics, which are likely to overestimate the level of awareness. Nearly 78% of respondents are ages 18-24, with no respondents older than 54 years, and 84% of respondents report having completed at least an undergraduate college degree. This reveals most of the survey respondents are young, educated people, who are generally more environmentally educated and aware. While this was to be expected given the survey was primarily distributed to AlmaU students, it likely means that results with representation from more of Almaty's older citizens would decrease the perception percentages even more. Ultimately, by increasing the number of survey responses and sample diversity we will build a better picture of Almaty citizens' perceptions of the air pollution issue, but even with our current responses, we can see some clear patterns, ones that are strong enough to point our team in the right direction. We now know we must focus efforts on educating people, not about the air pollution problem, but specifically that mitigation efforts *will* work. With the preliminary conclusions from this study, our team feels confident in our next steps, moving forward with the necessary HBM information to change citizens' habits and, ultimately, improve the public health in the city.

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Problems of Climate Change-related Hazards in African Coastal Communities

Basil Ewane, Aminkeng Lucienne Fuanyi, and Tata Emmanuel Sunjo
(University of Buea, Cameroon)

Abstract

Climate change continues to be a key development concern, being one of the SDGs (Goal 13) which aims at mitigating and adapting to climate change adversities. While there are increasing efforts in reducing development risks and vulnerabilities orchestrated by climate change in many continents, African coastal communities continue to experience complex hazard risks. This study uses a mixed methods approach with data from the International Emergency Database to assess climate change-related hazards on the continent. Analysis points to the fact that the communities are exposed to hazard risks that have been intensified by climate change manifested in global warming and its attendant consequences as witnessed in the rise in sea levels (resulting in the inundation of coasts and sometimes whole islands) and climate vagaries (changes in rainfall patterns, El Nino effect, and extreme weather events) which are further compounded by unplanned urbanisation and environmental degradation. While global collaboration targets climate change from a macro level as witnessed in summits that focus specifically on gas emissions and global warming, local level effects especially in African coastal communities are often overlooked. The increasing frequencies of these hazards calls for the need to collaborate at the global, national and local levels in accelerating and intensifying mitigation and adaptation measures that go down to coastal communities. Improving knowledge on early warning mechanisms based on consistent data records and improved monitoring technologies of weather and climatic phenomena, as well as robust coastal stabilisation programmes are essential in this respect.

Keywords: climate change, hazards, coastal communities, adaptation, mitigation, partnerships

Purpose

With an intricately connected world, coastal areas of Africa, like many others in the world, have been densely populated. They continue to attract humans as a result of multiple advantages and opportunities they present, some of which Neumann, Vafeidis, Zimmermann and Nicholls (2015: 2) indicate to include "...their rich resources, particularly their supply of subsistence resources; for logistical reasons, as they offer access points to marine trade and transport; for recreational or cultural activities; or simply because of their special sense of place at the interface between land and sea." These have encouraged phenomenal development of coastal zones resulting in dramatic socio-economic and environmental transformations (Neumann, *et al.* 2015). These have equally resulted in dramatic increases in demographic growth and urbanisation rates that have already outstripped those of their counterpart hinterlands.

Despite the advantages and opportunities of coastal areas, they equally remain highly vulnerable to a number of shocks especially in Africa, many of which are driven by climate change. Climate change is one of the central issues affecting human wellbeing and safety today (World Bank, 2011). Undeniably, the rate of greenhouse gas (GHG) emissions today clearly indicates that the world is warming and will continue to do so into the 21st Century even if mitigation was possible (IPCC 2022). Climate change remains a threat not only to human wellbeing but also to the health of the planet (IPCC Press Release, 2022). In spite of the global mitigation efforts, global warming has continued unabated with human activities estimated to have caused approximately 1.0°C of global warming (IPCC, 2018). The IPCC (2022: 6) reports that “available evidence on projected climate risks indicates that opportunities for adaptation to many climate risks will *likely* become constrained and have reduced effectiveness should 1.5°C global warming be exceeded and that, for many locations on Earth, capacity for adaptation is already significantly limited. The maintenance and recovery of natural and human systems will require the achievement of mitigation targets.”

Consequently, the concern about global warming is largely driven by the fact that it has significantly affected human and natural systems beyond survival levels. Anthropogenic-driven climate change continues to create growing and diverse adverse impacts and related losses and damages to nature and human societies. The severity of climate change impacts significantly depends, in part, on the global mitigation efforts (World Bank, 2011). While successes have been recorded in some development and adaptation efforts in reducing vulnerability, across sectors and regions, the most vulnerable people and systems are observed to be disproportionately affected (IPCC, 2022). This is more especially for developing countries of Africa, Asia and Latin America with increasing vulnerabilities driven by weak and inadequate adaptation capacities.

Africa is all surrounded by water ‘empires’ and with rising sea levels in the face of increases in the frequencies and intensities of extreme weather and climate events (which are accentuated by climate change), her vulnerability to climatic shocks is therefore a major concern to development stakeholders, researchers, policy makers and the population. The sustainability of policies and their implementation hinges significantly on the quality of research on hazard risks. It is within this context that this paper dissects the various climate change-related hazards affecting coastal areas of Africa in order to understand the varying degrees of vulnerability and the need for robust mitigation and adaptation preparedness to these risks. This is critical given that as in many coastal zones of the world, most of Africa’s megacities and metropolises are situated in large deltas and coastal zones in general as defined by the Millennium Ecosystem Assessment, where combinations of specific economic, geographic and historical conditions to date attract people and drive coastal migration (Neumann, *et al.*, 2015).

Changes in urban land use, urban expansion and population growth have been observed not only to be significantly higher in coastal zones than in the non-coastal hinterlands but to continue to be higher in the future (Seto, Fragkias, Güneralp, Reill, 2011; Nicholls, Wong, Burkett, Woodroffe, Hay 2008; Fragkias, Seto. 2012; all cited in Neumann, *et al.*, 2015). Even though already susceptible to coastal hazards, dramatic environmental impacts (resource depletion, pollution and environmental degradation) which accompany these developments (which are dominantly

haphazard) in coastal zones of Africa have significantly raised levels of vulnerabilities to hazard risks especially of the dominantly socio-economic marginalised segment of the population. This situation makes these coastal zones unsafe especially without adequate adaptation measures put in place. Reducing these hazard risks in coastal communities through building better adaptation measures and the global commitment to mitigation is essential in the attainment of Sustainable Development Goal No. 13 on Climate Action. Addressing these climate change risks in African coastal communities requires partnerships and commitments at the global, regional, national and local levels. This has been debated at the various Conference of Contracting Parties (COP), specifically COP 21 from which the Paris Agreement was born and that emphasizes on partnership and support to developing countries in addressing climate change adversities. However, much of the discussions and efforts have centred on cutting down on carbon and other greenhouse gas emissions, whereas, coastal communities in Africa continue to suffer from the ravaging effects of climate change on their livelihoods and development infrastructures. This therefore calls for the need to engage more in partnerships to build better and sustainable adaptation and resilience capacities of coastal communities in Africa against the persistent and growing climatic shocks. It is against this backdrop that this paper examines the problems of climate change induced hazards in African coastal communities, their adaptations and the attendant challenges.

Methodology

This study uses various data on climate change-induced hazards from a combination of primary and secondary sources. First, the various climate change-related data were identified and studied. These were broadly categorised into climatic, hydrological and meteorological types. From these broad categorisations, six hazards were then selected and studied; these include droughts and wildfires (climatological), floods and landslides (hydrologic), storms and extreme weather events (meteorological). This categorisation has been in line with that of the International Emergency Data Base (EM-DAT) of the Centre for Research on the Epidemiology of Disasters (CRED) at the University of Louvain Belgium from which primary data on the specific data events since the 20th Century were obtained.

Data on deaths, injured, affected number of people and estimated costs of damages were equally obtained from the data base of CRED. Data on the specific climate-change induced hazards covered the period 1900 to 2021. The criteria for a disaster event to be entered into EM-DAT are; ten or more people reported killed, hundred or more people reported affected, declaration of state of emergency and call for international assistance (Mulugeta, 2016). Further, information on sea level rise, other impacts of selected hazards and their management were obtained from secondary sources through literature reviews of online and printed texts.

Primary data on specific hazards and impacts were sorted, organised and analysed using descriptive statistics such as frequencies, averages and percentages of each of the hazard types. Trends in hazard event occurrence frequencies were determined using simple linear regression model in Excel 2016. Further, rates of change in the frequency occurrence of concerned hazards between decades (1900 – 2021) were determined using the formula:

$$\text{Rate of Change in Hazard Frequency} = \frac{B-A}{A} \times 100$$

where:

B= hazard frequency at current decade

A= hazard frequency at previous decade

The results were presented graphically in line graphs, bar graphs and pie charts using Excel 2016. Secondary data were subjected to thematic and content analysis and discuss in the results section

Findings

Climate change continues to usher in different types of hazard risks which are driven by a number of factors. The following section presents the types and drivers of these hazards, their effects and various adaptation measures put in place in African coastal communities.

Types and Trends of Coastal Climate Change Hazards

Africa, like other parts of the world, is experiencing hazards amplified by climate change. Mbaye (n. d.: 5) underscores this by indicating that “climate change will undoubtedly present one of the most significant risks to Africa’s sustainable development objectives over the next decade, and nowhere is the threat more imminent than on its coastlines.” The key climate-change driven hazards in Africa in general include, droughts, floods, storms, heat waves, extreme weather and landslides. Since the 20 Century, a total of 1877 of these hazards have been recorded by the EM-DAT, CRED / UC Louvain, Brussels, Belgium (www.emdat.be). Flood has been most frequent (61%) than all others with the least being extreme weather events (Figure 1).

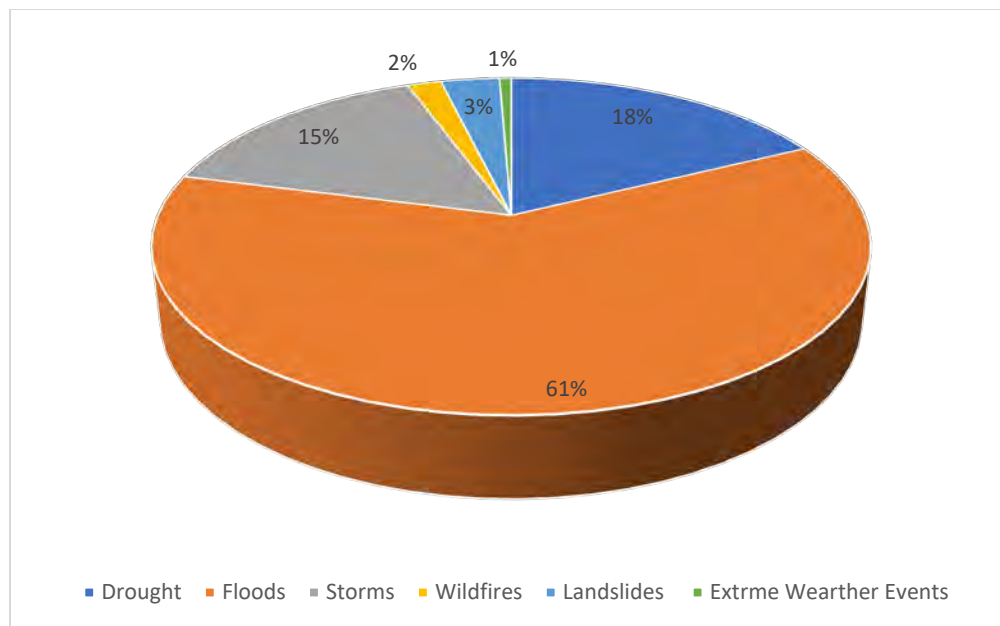


Figure 1: percentage occurrence of climate change-related hazards in Africa since the 20th Century
Source: EM-DAT, CRED / UCLouvain, Brussels, Belgium

Indeed, floods and droughts pose serious threats to lives and livelihoods in Africa including her coastal communities. Indeed, there has been a steady increase in the frequency and impacts of flood hazards (Figure 2). Within this period under study, an average frequency of 17.7 floods has been occurring in Africa every year (Table 1).

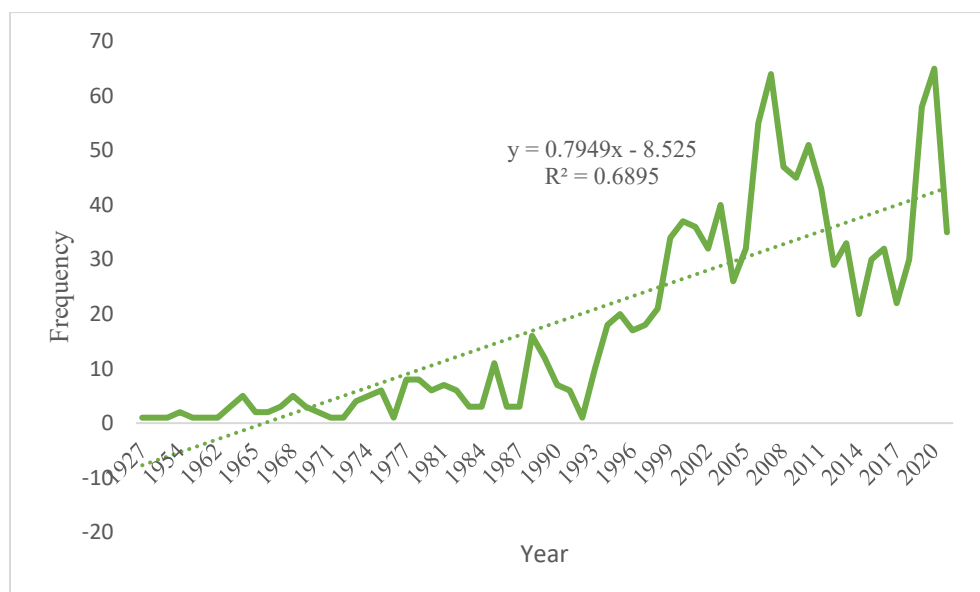


Figure 2: Trends in flood occurrence in Africa
Source: Analysis of data from EM-DAT, CRED / UCLouvain, Brussels, Belgium

These increases in flood frequency have been observed and differ from one decade to another. The decade with the highest frequency and average occurrence of floods is observed to be the 2010 – 2019 decade which recorded a total of 414 floods with an average of 41.4 floods occurring every year. The year with the highest occurrence was 2019 which recorded 58 flood events alone in Africa. However, the decade with the highest rate of change in flood frequency was the 1960 – 1969 decade with 400 rate of change in flood frequency.

Table 1: Decadal Analysis of Flood Events in Africa

| Decade | Frequency of floods | Mean | Rate of Change in Hazard Frequency | Highest frequency/year |
|-------------|---------------------|------|------------------------------------|------------------------|
| 1950 - 1959 | 5 | 1.25 | - | 2(1954) |
| 1960 - 1969 | 25 | 2.78 | 400 | 5 (1964, 1968) |
| 1970 - 1979 | 42 | 4.2 | 68 | 8 (1977, 1978) |
| 1980 - 1989 | 64 | 7.1 | 52.38 | 16 (1988) |
| 1990 - 1999 | 152 | 15.2 | 137.50 | 32 (1999) |
| 2000 - 2009 | 414 | 41.4 | 172.37 | 64 (2007) |
| 2010 - 2019 | 348 | 34.8 | -15.94 | 58 (2019) |
| 2020 - | 100 | 50 | | 65 (2020) |

Source: Analysis of data from EM-DAT, CRED / UCLouvain, Brussels, Belgium

Another hazard with similar causative factors like flood is landslide. Fifty-two landslides have been recorded between 1960 and 2021 in Africa. These have been caused by heavy and torrential rains. They have been dominant in mountainous areas of the continent such as the East African Rift Valley, the Cameroon Volcanic Line (CVL), and the Fouta Djallon Highlands (FDH) in West Africa just to name but these. Some of the most affected countries include Cameroon, Rwanda, Sierra Leone and Uganda amongst others.

Like floods, drought is another disturbing hazard whose trend has continued to rise as a result of global warming over the years in Africa (Figure 3). A total of 332 drought events have been recorded in Africa since the 20th Century with an average of 5 drought events occurring every year. As shown on Table 2, within this period, 2000 – 2019 recorded the highest frequency of drought events in Africa with 68 droughts. However, 1980 – 1989 had the highest average frequency of occurrence of droughts with an average of 7.9 droughts occurring annually. Indeed, 1980 alone witnessed the highest number of drought event alone with over 19 drought events recorded. This same decade equally witnessed the highest positive rate of change in drought event occurrence (191.30%).

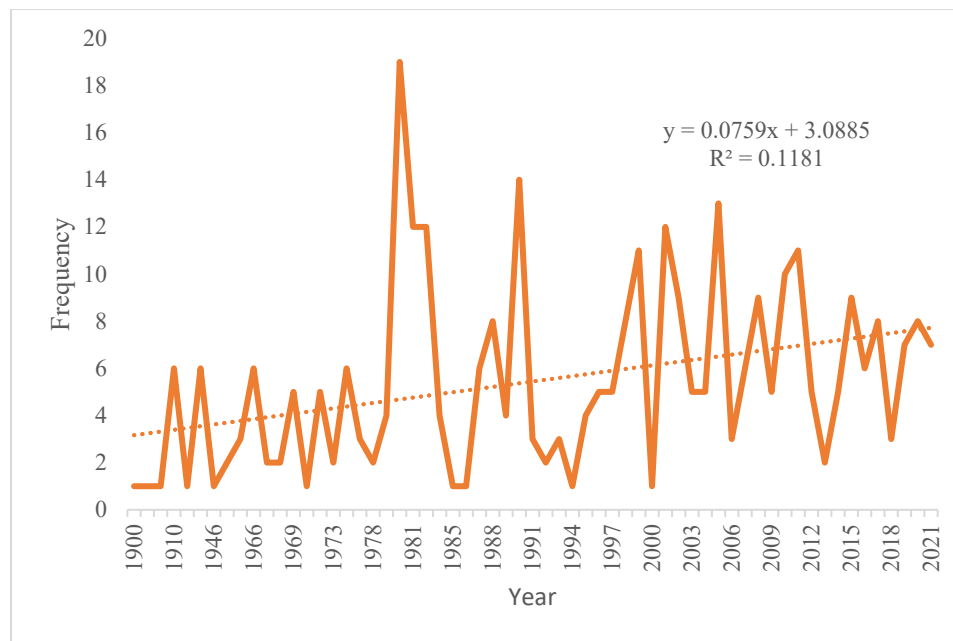


Figure 3: Frequency of droughts in Africa

Source: Analysis of data from EM-DAT, CRED / UCLouvain, Brussels, Belgium

Table 2: Analysis of Drought Occurrence in Africa by Decade from the 19th Century

| Decade | Frequency of Droughts | Mean Occurrence | Rate of Change in Hazard Frequency | Highest frequency (year) |
|-------------|-----------------------|-----------------|------------------------------------|--------------------------|
| 1900 - 1959 | 17 | 2.43 | | 6 (1910) |
| 1960 - 1969 | 20 | 3.3 | 17.65 | 6 (1966) |
| 1970 - 1979 | 23 | 3.3 | 15.00 | 6 (1976) |
| 1980 - 1989 | 67 | 7.9 | 191.30 | 19 (1980) |
| 1990 - 1999 | 56 | 4.6 | -16.42 | 14 (1990) |
| 2000 - 2009 | 68 | 6.9 | 21.43 | 13 (2005) |
| 2010 - 2019 | 66 | 6.9 | -2.94 | 11 (2011) |
| 2020 - | 15 | 7.5 | | 8 (2020) |

Source: Analysis of data from EM-DAT, CRED / UCLouvain, Brussels, Belgium

Another climate-change-enhanced hazard affecting coastal communities and areas in Africa has been storms whose frequency trends is equally on the rise (Figure 4). Within the study period, a total of 289 storms have occurred in Africa, with an average of 5 storm events occurring every year.

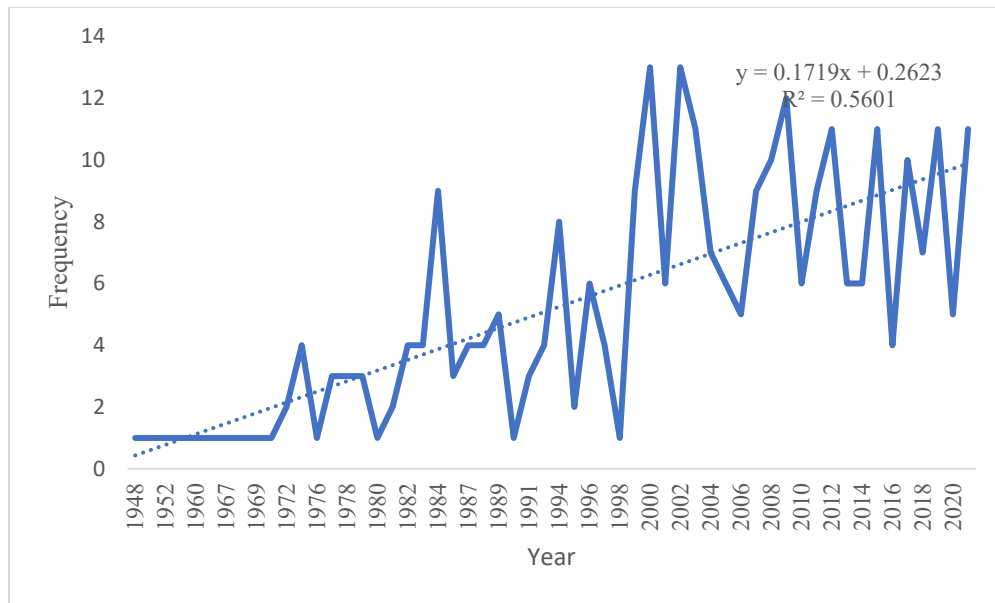


Figure 4: Trends in storm frequency in Africa since the 20th Century
 Source: Analysis of data from EM-DAT, CRED / UCLouvain, Brussels, Belgium

In the same period, unlike other hazards, there has been very few extreme weather events in Africa, with a total of 12 recorded ones (Figure 5). The most affected areas by extreme weather events are Northern and Southern Africa. Sixty-six per cent of these events are heat waves with an average extreme temperature of 48.4°C and with Nigeria twice experiencing the highest temperatures of 60°C in 2002 in its Maiduguri District (Bornu Province). Frostbite events make up 40% of extreme weather events affecting Northern African countries such as Algeria, Egypt and Morocco. The lowest temperature (-13°C) was recorded in Morocco in 2017.

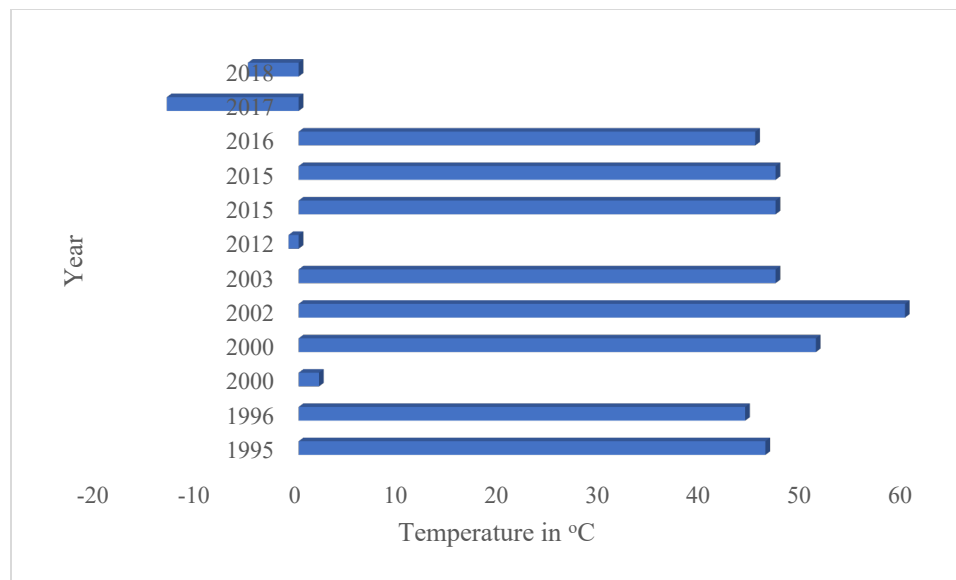


Figure 5: Occurrence of extreme weather events in Africa

Source: Analysis of data from EM-DAT, CRED / UCLouvain, Brussels, Belgium

Heatwaves have been responsible for many of the wildfires that have also ravaged some parts of Africa. A total of 34 wildfires have been recorded in every region (Northern, Southern, Eastern and Western) of Africa. Their occurrence has had serious adverse effects on forests and wildlife especially in Eastern and Southern Africa where they have been critical for ecotourism.

Drivers of Coastal Climate Change Hazards

A number of factors continue to enhance the occurrence and magnitude of coastal hazards in Africa. One of such drivers is sea level rise (SLR). Sea level rise arises partly from natural factors and compounded by human induced changes in coastal zones of Africa and the impacts of sea level rise includes; declining sediment and fresh water inputs arising from increased catchment regulation, destruction of wetlands, mangroves, coral degradation and eutrophication of coastal and shelf sea waters (Robert, 2003). Within the past 15 years, global warming has accelerated sea levels rise at 3.6mm/year, more than 2.5 times the mean rate of 1.4mm/year which was sustained throughout the 20th Century (Nyadzi, Bessah & Kranjac-Berisavljevic, 2020). The coastline of Africa that is largely located within the tropics is highly susceptible to climate change-induced sea level rise. For example, the Gulf of Guinea in West Africa is expected to experience an increase in sea level rise from +0.21m to 0.36 in 2000 to +0.55 and +1.1m during the mid and end of the 21st Century, respectively (Kebede et al. 2018, cited in Nyadzi, *et al.*, 2020)

The vulnerability of Africa's coastal communities to climate change-related hazards is significantly linked to the growing urbanisation trend in the continent. Many of Africa's fast growing towns and cities are located within the coast. Demographically, Africa's populations in low-elevated coastal zones (LECZs) is projected to rise at an annual rate of 3.3 percent between 2000-2030, which is more than double the world's average (Mbaye, n. d.).

Urbanisation itself presents serious risks to human health and livelihoods. Such risks have been further compounded by climate change through continued sea level rise, storms, coastal flooding and erosion amongst others. These effects are largely felt in economically and socially marginalised segments of the populations (IPCC, 2021) that dominate these cities and mostly residing in LECZ. The urban development process in these areas is largely unplanned, anarchical and with grossly inadequate infrastructural developments such as coastal stabilisation schemes and rural-urban linkages necessary to bring about inclusivity in the whole process. These are, in essence, factors that have increased the vulnerability of coastal communities to climate change risks such as floods, storms and coastal erosion.

The urbanisation process in Africa in general is driven by population growth (both natural increase and soaring rural exodus) with limited efforts to provide commensurate or adequate housing, energy and infrastructural developments essential to ensure the safety of the population from climate change risks. Indeed, since 2000, there has been a steady increase in the populations of LECZs in Africa (Figure 6). This trend is projected up to 2030 with the highest rates of population growth and urbanisation in the coastal zone expected, particularly in Egypt and sub-Saharan countries in Western and Eastern Africa (Neumann *et al.*, 2015).

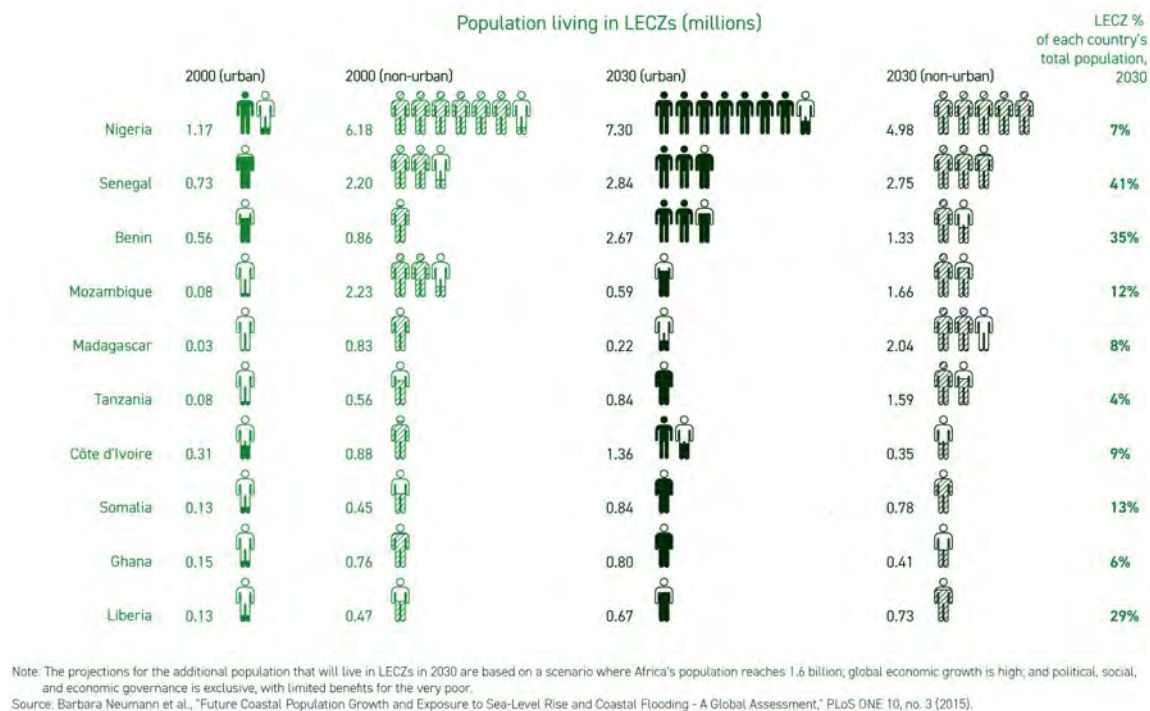


Figure 6.: Populations in low elevated coastal zones in Africa by 2030

Source: Neumann *et al.*, 2015

One of the drivers of storms, floods, droughts and wildfires has been the occurrence of El Nino Southern Oscillations (ENSO). Many drought years have coincided with ENSO occurrences.

Climate change has increased the frequency and intensity of ENSO events with significant local, regional and global consequences in livelihoods such as fishing, food security as well as critical infrastructure as a result of floods and droughts that accompany ENSO events.

Effects of Hazards on Coastal Communities

Hazards continue to inflict direct and indirect effects on peoples and communities in Africa's coasts. Based on the analysed hazards above, Table 3 presents the direct effects of hazards in terms of deaths, injury, homelessness and material costs. Overall, the recorded climate-change related hazards have led to more than 9 hundred thousand fatalities in Africa with 61,000 injured. Over half a billion have been affected by the six hazards considered within the timeframe of the study. In terms of damages, they have caused the continent over 44 million US Dollars. Droughts, even though second in frequency to floods, by far, is responsible for more fatalities and damages than any other hazards. The least of the hazards in terms of fatalities and the injured is extreme weather events.

Table 3: Statistics of Effects of Concerned Hazards in Africa

| Hazard | Fatalities | Injured | No. Affected | Homeless | Damages, Adjusted US\$ ('000 US\$) |
|------------------------|---------------|--------------|--------------------|----------------|------------------------------------|
| Drought | 867131 | 0 | 489,869,007 | 0 | 11999141 |
| Floods | 31750 | 36527 | 86176221 | 7037484 | 17591671 |
| Storms | 7855 | 23882 | 21857331 | 1910585 | 14167555 |
| Wildfires | 427 | 773 | 111788 | 32088 | 1021207 |
| Landslides | 3146 | 464 | 212948 | 33784 | 63418 |
| Extreme Weather Events | 372 | 216 | 3727500 | 0 | 98745 |
| Total | 910681 | 61862 | 601,954,795 | 9013941 | 44941737 |

Source: Analysis of data from EM-DAT, CRED / UC Louvain, Brussels, Belgium

Further, sea level rise has significant signatures in African coastal communities. Based on the Third IPCC Report, there has been a rise in sea level from 1900-2010 from 9cm to 88cm with a mid-estimate of 48cm (Church *et al.*, 2001 in Robert, 2003). Sea level rise has direct impact on coastal communities in Africa due to increasing concentration of people resulting in rapid urbanization (Cian *et al.*, 2019 and Dodman *et al.*, 2017), as well as the growth in economic activities along the coast adding to the natural values located in these areas (Robert, 2003). Coastal communities are prone to certain hazards such as floods, landslides, earthquakes, sea level rise, hurricanes, typhoons, droughts, and heat waves. Sea level rise will have different effects along various portions of coastal communities in Africa depending on conditions such as sediment types and coastal platform (Hughes 1992).

The importance of wetlands especially mangroves in provisioning, regulation, and even cultural services cannot be unrecognized. Thus with the destruction of wetlands by sea level rise in coastal communities, these vital services diminish and in some cases they are lost completely. Sea level rise have equally lead to increase loss of property and coastal habitats, increase flood risks and potential loss of live and damage to coastal protection work and other infrastructure, loss of renewable and subsistence resources, loss of tourism potentials, and transportation functions as well as agriculture and aquaculture as is the case with most African coastal cities such as Nigeria, Mozambique, coastal province of Western Cape Town, and Limbe and Douala in Cameroon (Kaitano et al., 2021; Robert, 2003, Mclean *et al.*, 2001, Yande 2009 and Ouikotan *et al.*, 2017). Table 4 presents an aggregate result of some selected coastal communities in Africa and impact of sea level rise.

Table 4: Impact of Sea Level Rise on some Selected Coastal Communities of Countries in Africa

| Country | People affected | | Capital loss | | Land at loss | | Wetland at loss | Adaptation cost | |
|----------|-------------------|---------|--------------|-------|--------------|---------|-----------------|-----------------|---------|
| | # people (10000s) | % total | Mil US\$ | % GNP | Km2 | % total | | Mil US\$ | (GNP %) |
| Egypt | 4700 | 9 | 59000 | 204 | 5800 | 1.0 | - | 13100 | 45 |
| Senegal | 110 | >1 | >500 | >12 | 6100 | 31 | 6000 | >10000 | >0.21 |
| Benin | 1350 | | 118 | | 230 | | 85 | | >0.41 |
| Malaysia | - | - | - | - | 7000 | 2.1 | 6000 | - | - |
| Nigeria | 3200 | 4 | 17000 | 52 | 18600 | 2.0 | 16000 | >1400 | >0.04 |
| Mauritus | 3 | <1 | - | - | 5 | 0.3 | - | - | - |

Nb: Assuming existing development and a 1m sea level. All impacts assumed no adaptation, while adaptation assumes protection, except in area of low population density cost are 1990 US\$.

Source: Bijlsma et al. (1996) in Robert (2003).

Coastal towns are by far the most developed of Africa's urban areas and by implication, have a high concentration of residential, industrial, commercial, educational and military facilities (UN-Habitat, 2008). Urban residential development along the coast has, however, been indicated to be a large creator of risk for much of the urban population. Hazard (such as flooding) has been identified as one of the major factors that prevent Africa's growing population of coastal city dwellers from escaping poverty and stands in the way of achieving United Nations 2030 Sustainable Development Goal of significant improvement in the lives of coastal urban dwellers (Action Aids, 2006). This is because many coastal cities lack the infrastructure to withstand coastal hazards especially in Africa (Ouikotan *et al.*, 2017).

It is unarguable that large concentration of assets and infrastructure in coastal regions in Africa has contributed substantially to higher direct losses from coastal hazards. Flood, erosion, ocean surge, salinity, air pollution and others periodically revisit the same geographical zones. The increased concentration of assets and infrastructure in coastal areas will lead to more damage caused by coastal hazards. According to the United Nations (1997), a growing number of

extremely large cities are located in hazardous areas, which means that large amount of infrastructures may be affected. Community assets and infrastructure have been adversely affected by series of coastal hazards. Critical public infrastructure affected by coastal hazards include: market, road, school, worship Centre, electricity and others and pose varied risk levels to different segments of the population especially the poor and vulnerable.

Yande (2009) examined the impact of floods on the socio-economic status of livelihoods for the people of Sikaunzwe communities in Zambia using both qualitative and quantitative approaches. The study established that floods impacted on people's socio-economic livelihoods and critical aspect such as agriculture, health, education, housing, water and sanitation and property and assets. The impact of floods also includes; water borne diseases, cholera, dysentery, diarrhea (Theron 2017), homelessness (parker 2000), and destruction of infrastructure such as roads (Theron, 2007). Du Plessis (1988) also stated that farming communities in Southern Africa coastal communities had been particularly hit by the successive floods of 1983, 1984, 1985, 1986 and 1987 leading to shrinking incomes and built up of debt in certain farming communities. Farmers suffered losses in stock and irrigation land, houses were destroyed, bridges and roads destroyed as well as telephone and rail way lines. This led to severe economic stagnation as government had to divert funds to revamp the economy by dealing with the impact of floods (Yande, 2009). Flooding also threatens the very existence of humans in coastal communities in Mozambique (Parker, 2000). In Mozambique, at least twenty urban centers are at risk of flooding including major settlement along the Zambezi. Further, in Sudan in 1988, severe floods, like the recent ones in 2020, led to food shortages due to destruction of farmlands and livestock, warranting food aid after the floods (Parker, 2000).

Growing incidences of flooding is linked to the compounding impacts of sea level rise and intense rainfall caused by climate change in many locations. The Kenyan coastal city of Mombassa-Kenya has been particularly vulnerable to rising sea level which impact infrastructures; roads, building via flooding threats (Kabanda, 2020). Rail ways, parking lanes, power supply, communication infrastructures have been damaged in the area over the years. A similar situation has been experienced in Cape Town in South Africa due to flooding (Taylor and Davies, 2019; Engvist and Zurvigel 2019) leading to poverty and hardships (Jordhus-Lier *et al.*, 2019; Dube,*et al.*, 2020). Between 1990-2018, at least 334 major flood events occurred in Western Cape, South Africa with the highest recorded in 2008 with over 20 floods episodes (Kaitano, Godwel and David, 2021). These have led to serious economic loss over the years in Southern Africa (Dula *et al.*, 2018 and Fitchette *et al.*, 2016). Flooding equally leads to clogging of water system with either overgrown vegetation or wastes as is the case with Limbe and Douala in Cameroon (Ndula, 2018; Abass *et al.*, 2020, Datu *et al.*, 2015; and Mahmood *et al.*, 2017).

IPCC, (1996) posited that climate change will exacerbate existing physical, ecological/biological, and socio-economic stresses on the African coastal zone. Most existing studies focus on the extent to which rising sea level could inundate and erode low-lying areas or increase flooding caused by storm surges and intense rainstorms. The coastal nations of west and central Africa (for example, Senegal, The Gambia, Sierra Leone, Nigeria, Cameroon, Gabon, Angola) have low-lying lagoon coasts that are susceptible to erosion and hence are threatened by sea-level rise,

particularly because most of the countries in this area have major and rapidly expanding cities on the coast.

Tackling the Effects of Hazards in Coastal Communities in Africa

Knowing the origin or triggers of coastal hazards is vital to attempt managing these hazards (Ribot, 2014). Hazards of climatological origin such as floods and droughts faced by coastal cities emanate from a combination of factors such as uncontrolled urban development, climate change, urbanization, and sea level rise (Chan, 2018). There is the need to enhance understanding of coastal communities' vulnerability to these hazards in Africa (Kilhiia, 2011). Building resilience should be one of the primary focus of stakeholders in ensuring coastal communities are sustainable in the wake of climate change and its deleterious impacts such as floods, sea level rise and hurricanes (Handayani et al., 2019) and severe droughts (IPCC, 2019).

Flooding in the coastal communities in Africa is a growing issue due principally to the impact created by flood events and given that these coastal environments host a myriad of investments and growing population. There is therefore the need to augment flood hazard management strategies. Flood hazard management can be divided into two parts; flood hazard assessment and hazards reduction (Ouikotan et al., 2017). The objective of flood hazards assessment is to establish where the hazard is unacceptably high while hazard reduction is to select and implement measures in order to alleviate the flood hazard. Structural measures such as dams, dikes, coastal embankment and drainage network are insufficient and even the existing ones are not well maintained (Ouikotan *et al.*, 2017). In cities like Lagos in Nigeria, structural measures are varied and comprise of storm water drainage channels, breakwater, dredging of river, channelization and revetment; these were constructed to protect the city from storm surges and coastal flooding (Ouikotan *et al.*, 2017; Adelekan, 2015).

Adaptations which could be planned or autonomous are therefore necessary. In some communities, adaptation is widely seen as a public responsibility (Klein et al., 2000). This therefore means that all levels of government have a key role in developing planned adaptation measures which can be planned, accommodation and protection (Klein *et al.*, 2001). However, a mixture of these operates in most cases and in certain circumstances the accommodation option remains largely unassessed (Robert, 2003). There is need to anticipate and plan for tomorrow rather than wait and react only when the capricious events have hit a community (Robert, 2003). Given that many decisions at the coast have long-term implications, the coastal zone is an area where anticipatory adaptation needs to be carefully considered such as upgraded flood defense and waste water discharges, construction of new bridges, and building setbacks to prevent development (McClean *et al.*, 2001 in Robert, 2003).

In Mozambique coastal areas, Yande (2009) recommended relocation with the provision of necessary social amenities such as hospitals, water, school and infrastructure, delineation of both the flood prone and non-flood prone areas with the latter serving as a temporal shelter for settlement during flood episodes. He also underscores the need for construction of canals into the Zambezi River and communities encouraged to use durable material for constructions as well

as awareness made by stakeholders to local authorities and community based floods early warning system.

In some localities in Accra, Cotonou, Dakar, Nigeria, Limbe, Douala, and some Southern African coastal cities children are taken to the rooftop to preserve them from flooding; blocks or sand bags are used to create pathways for pedestrians, valuables goods are displaced to higher places such as top of the wardrobes, cupboards and tables (Action Aid 2006). Households in Accra fill and cement the compound of their houses; raise the building foundation or construct a retaining wall (Abeka 2014). In some coastal communities in Cameroon like Douala, during flood periods, people evacuate floodwater with the means of buckets, basins or they dig some trenches or place some PVC pipes to drain water from the houses (Ndula, 2018). In Lagos, moveable properties are relocated outside the flooded area, drains are constructed in front of houses, buildings are renovated, walls are built to prevent floodwater from entering houses, outlets are made at the backyard of houses to let floodwater flow from the houses (Ouikotan *et al.*, 2017; Adelekan, 2010).

There is much that decision-makers can do to protect the well-being of the city's population and lessen the potential harms of natural disasters and climate change to the economy. In a bid to respond to hazards, urban planning has been implemented such as in the North African Coastal Cities of Alexandria which is exposed to risks. The Master Plan is prepared to direct future urban growth, define city limits, and establish a land-use program with rules for densities, building heights and open space ratios taking into account future climate scenarios. This is therefore a good way to tackle hazards in coastal Africa.

Also, infrastructure investments are a non-negotiable. Investments in making existing structures more resilient would benefit coastal marine defenses. Some key urban infrastructures and buildings, along with water supply and drainage systems, could be made more robust and better able to withstand the damages that can occur in storms such as the one that affects most African countries. Some of these cities can lower flood-related risks by taking steps to improve control of runoff and discharge sources, and routine maintenance of the sewage system. These would lower risks during floods and storms. In addition, areas slated for development can be sited and prepared to minimize the vulnerability.

There is equally need for institutional preparedness in areas where same is lacking. Upgrading early warning systems covering all types of disasters emerges as a particularly sound investment. Improved management of coastal areas also emerges as critical. For example, a system of "smart buoys" along the coastline could help generate timely data that could help protect people and property from coastal storm surges. Improved communication among agencies involved in disaster prevention and response could strengthen timeliness and coordination, leading to more robust responses.

Breakwaters are offshore structures designed to intercept and reduce wave impact arriving at the coastal areas in communities mostly hit by coastal hazards in Africa. In West Africa, breakwaters are mostly implemented at the harbours for the purpose of reducing wave actions on ships. For instance, the deep water port of Lomé opened in 1967 and the distant Akosombo Dam in Ghana

have played a great role in disrupting the sediment dynamic along the western coast in the Bight of Benin (Anthony and Blivi 1999). Togo faced several coastal management challenges that involved shoreline dynamics, pollution, flooding, and the possible effects of rising sea levels. The Lomé beach eroded at an average rate of nearly 7 m/year (Blivi 1993). To control this, the coastline was protected by building breakwaters along 12 km of the coast from Kpeme Gumukope to Aneho (Blivi 1993). Furthermore, as part of the Benin Sea Defence Project to protect 7 km of coastline that was eroded to 762 m in 40 years, a 300 m long breakwater was constructed. Other breakwater projects implemented in Africa include the Abidjan Port Expansion Project. The construction includes the demolition and reconstruction of the east and west breakwaters at the entrance to the canal. The project aimed to improve the status of the port of Abidjan as a central port on the Atlantic coast and to promote socio-economic development of Côte d'Ivoire and West Africa as a whole.

Another important way of managing coastal hazards in communities of Africa can be through the use of groynes. It is the process to mitigate, or displace, coastal erosion facing urban or punctual important (important enough to be protected) areas. Amongst the most popular is the method practiced in the West African sub-region, from Senegal to Nigeria. The Keta coastal area which is located east of the Volta River estuary started experiencing erosion between 1870 and 1880 after about 200 m to 300 m of land was removed from the central Keta area (UNESCO-IOC 2012). The recession at the mouth of the Volta grew annually at between 4 m and 10 m after the Akosombo Dam was constructed on the Volta River (Angnuureng *et al.*, 2013). This dam prevented about 99.5% of sediment discharged by the river from getting to the beach (Ly, 1980).

Jetties and revetment ensure reliable stabilization of tidal inlets or river mouths, regulating the development of undesirable features, like channel siltation. These structures are usually constructed to intercept sediment that is transported alongshore, so that they can prevent sediment accretion in inlets or estuaries. Large quantities of sediment are trapped in the updrift of the jetty. But such a process also results in a narrowing of the coastline downdrift of the jetty. Since jetties are relatively longer than groynes, greater sediment loss to deep water is much more experienced during storm events (Masselink and Hughes 2003). Jetties are, for example, located at the eroding tidal inlets of the Elmina Benya lagoon in Ghana, in the port of Takoradi, in the port of Cotonou as well as in other areas along the Gulf of Benin (Anthony *et al.* 2019; Abessolo Ondo *et al.*, 2020). Revetments are structures to protect a soft feature such as a dune or coastal slope or provide supplementary protection to existing defenses such as a dike or seawall (Bayle *et al.* 2020). Between 1959 and 1960, a 100 m long revetment was built on the coastline of Jamestown, Accra (UNESCO-IOC 2012).

Training courses, data collection, budgetary preparations are a good way to revert the impact of climate related hazards in coastal communities in Africa. Most African coastal hazards countries are today organizing training courses to help build the capacity levels of their engineers or officials in order to equip them properly. Also, these officials are trained on how to take and prepare data collection and forecast prior and after a coastal hazard occur. Furthermore, most of these coastal hazards communities in Africa sometimes make available a budgetary package for any eventuality of such coastal hazards like flooding, earthquakes, tsunamis etc.

Hazards Management Challenges in African Coastal Communities

Despite the observed increases in the trend of hazard events and huge magnitude of damage, the management methods implemented to solve them are inadequate and inefficient. Ouikotan *et al.*, (2017) point out the gaps and the challenges that need to be tackled for a proper flood risk management in West African coastal cities. First, structural measures are a means to revert the impact of hazards on coastal communities in Africa. However, these measures fall short yielding the desired outcomes. In Senegal, Nigeria, Ghana and Cotonou coastal cities, the simple way of determining floods risk as at 2017 was by flood prone areas mapping, done by simple observations and interviews, recording and mapping of flooded areas (Ouikotan *et al.*, 2017). Flood damages estimate is done roughly after a flood event mainly to know the number of affected people and organize the relief services. There is equally the problem of little or no publication of figures of damage cost but for Lagos-Nigeria whereby sometimes figures of damage cost are published by Lagos Insurance Companies (Ouikotan *et al.*, 2017).

There is equally the challenge of using obsolete master plans in most coastal environment. For instance, structural measures such as dams, dikes, coastal embankment and drainage network are used which sometimes are insufficient and lack maintenance. For instance, in Dakar their master plans were not reviewed until 2013 (Diongue, 2014) due principally to the lack of political will, so drainage works were designed without any scientific basis. Another challenge is that of insufficient and not well maintained drainage networks (Diop 2006, Gnele 2010, and Africa Development Bank Group, 2006).

Aside the structural measures, the non-structural measures such as land use control and catchment management via legislations or use of institutional approaches are vital in mitigating the impact of the effect menacing the coastal communities in Africa. Based on land-use control and catchment management, myriad of the literature points out the fact that in most coastal communities in Africa, laws and guidelines for land planning and management are diverse, uncoordinated with a lot of centres of decision making (Ouikotan *et al.*, 2017, Abilabi, 2018, Alemagui, 2006 and GFDRR, 2010). Urban planning policies, until now, have been weak and not capable of reducing or prohibiting settlements in low areas, flood plain and swampy areas and also to regulate the population movement towards the city; so that a lot of population are living in flood prone areas (Balgah and Fombe, 2012, Fogwe, 2007, Kemengsi, 2018). According to Rain *et al.*, (2011) 172,000 residents are estimated to be at risk in Accra of a 10-year flood and 33,000 residents are located in slums. The General census made by the Municipality of Cotonou showed that in 2010, 9% of the parcels were in flood prone areas (Ouikotan *et al.*, 2017). In Dakar, the irregular constructions cover more than 25% of the urbanized zones (Ouikotan *et al.*, 2017). Just as in Douala and Limbe coastal towns of Cameroon, Western Cape, South Africa, Mozambique, Zambezi coastal areas. In Lagos-Nigeria, it is estimated that 70 per cent of the city's population lives in slums. Since 2011, Lagos state government has embarked on the demolition of buildings located on drainage paths (Adelekan, 2015 in Ouikotan *et al.*, 2017).

Preparedness and planning disaster relief are another measure of adapting to the deleterious impacts of floods in coastal communities in Africa. Many coastal communities in Africa have

developed flood disaster relief and implemented an emergency plan in case of disaster (Ouikotan *et al.*, 2017). In Ghana, the National Disaster Management Organization (NADMO) was established in 1996 to manage disasters and similar emergencies in Ghana. It is responsible for the preparing plans against flooding, coordinating resources of government institutions and non-governmental institutions, mobilization of help for affected communities and relocation of people and providing food aid in a post disaster scenario (NADMO, 2016). However, the level of preparedness, recovery and response in post disaster phase is very low and this increases the chances of further damage (Bhattacharya-Mis and Lamond, 2011 in Ouikotan *et al.*, 2017).

Furthermore, early warning systems in African coastal communities are equally an issue of concern. As opined by Ouikotan *et al.*, (2017) early warning schemes have not yet worked properly as the case with flood damage reduction measures especially in West African coastal cities. For instance, in Cotonou and Dakar, they are not yet implemented and in Accra and Lagos where they are implemented, they are not working properly. Even when implemented with the aid of bilateral cooperation, the lifetime of projects is short-lived, due to lack of maintenance.

Research Limitations/Implications

Even though committed to fighting climate change by ratifying relevant global and regional instruments, a lot is needed from many African governments in addressing SDG 13 of the UN Agenda 2030 on Taking Climate Action. Importantly, it is necessary to adopt adequate measures and mobilize resources in developing coastal stabilization programmes necessary to reduce coastal exposures to these hazards. Indeed, there is limited application of the Sendia Framework on Disaster Risk Reduction as coastal communities still experience loss of human lives, human injury and destruction of livelihoods and critical infrasture as a result of climate change-related hazards.

Originality/Value of the Paper

This paper highlights and discusses the trends and impacts of climate change-induced hazards on African coastal communities. The paper sheds light on the growing trend as well economic impacts of such hazards. In terms of the various existing adaption, the paper indicates that major gaps still exist especially as these hazards to continue to kill, injure and destroy the livelihoods of mostly the vulnerable coastal populations. Given the limited investments in infrastructure to help adaptation efforts in these communities, the paper indicates that most of the economic costs linked to climate change relate to livelihood destructions.

Even though committed to fighting climate change by ratifying relevant global and regional instruments, a lot more is needed from many African governments in addressing SDG 11 of the UN Agenda 2030 on Taking Climate Action. In ensuring the effective implementation of 2015 Sendai Framework on Disaster Risk Reduction (DRR), it is necessary to adopt adequate measures and mobilize resources in developing coastal stabilization programmes necessary to reduce coastal exposures to these hazards. This is critical in saving lives and livelihoods. The success of this will largely depend on creating and emphasising partnerships at all levels. The

2015 Paris Agreement in this light offers glimpse of hope in the global commitment to address climate change. However, without effective political commitment and partnerships with local, national and regional institutions and stakeholders, the expectations of the agreement especially in contribution to attaining SDG 13 could remain utopic.

One of the key ways of addressing these risks therefore lie in developing robust early warning mechanisms based on consistent data records and improved monitoring technologies of weather and climatic phenomena, while ensuring sustainable land use practices. The success of this is anchored on synergies between development stakeholder involving national, regional institutions, and global institutions. While national governments should live up to their commitment to the Nationally Determined Contributions (NDCs) including reviving the National Adaptation Plans (NAPs) in addressing climate change in line with UNFCCC, activities of regional organisations such as the Africa Development Bank Climate Change Financing projects are critical in helping communities adapt sustainably to the adversities of climate change especially on businesses in coastal communities of Africa.

Conclusion

Climate change is indeed an existential threat to African coastal communities. The geographical diversities of Africa's coasts serve as precursors to many anthropogenic climate change-related hazards such as floods, droughts, storms, landslides and wildfires amidst others. This paper e-rays the trends and balance sheet of these hazards on coast communities in Africa especially in terms of casualties, loss of livelihoods and infrastructural damages. This clearly indicates that the implementation of the Sendai Framework of DRR in Africa needs to be expedited in order to make Africa safe in the face of climate change adversities. Key amongst other areas of intervention are improving disaster monitoring and early warning systems as well as investing and supporting local, regional and national governments on building robust coastal stabilisation programmes that will enable them sustainably adapt to these adversities while efforts to decarbonise the global economy continue as a sure step towards climate change mitigation.

Furthermore, in order to ensure effective hazard management in coastal communities in Africa, there is the need to adopt proper hazard assessment not emergency management after due diligence has been taken to collect the necessary data pertaining to the pre, during and post hazards events. Most importantly are data on climate, hydrology, hydraulic, land and soil conditions. Adequate tools like hydrological and hydraulic models and potential damage evaluation tools are needed for flood hazard assessment and they cannot be applied effectively mainly due to lack of data and lack of skilled personnel (Oukotan *et al.*, 2017). Even when the data exist, the legal instruments to ensure the implementation of policies are lingering with lapses and there is limited application of modern day tool such as GIS and satellite images or models for hazard assessment and management in most coastal environments in countries such as Nigeria, Cameroon, and Ghana amongst others.

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Climate Change and Environmental Migration Case Studies that Indicate Potential Future Movements due to Climate Events: Austria, Greece, Spain, and the United States

Lara Gil (Spain), Paraskevi Karpos (United States), Nefeli Karpodini (Greece),
Marina Rodriguez, and Sabrina Reinbacher (United States)

Abstract

Climate changes are becoming more and more noticable. The number and frequency of extreme climate events such as fires, floods, storms or earthquakes are rising. Many of them are related to the increase in the average global temperature. While direct ecological effects seem to be obvious, the impact on cultural, economic, and social patterns must also be considered. Based on Sustainable Development Goal 13 (SDG 13) “Climate Action” this paper therefore investigates the relationship between climate phenomena and migration. It explains the concept of climate migration and displacement. It takes a look at four Northern Countries (Austria, Greece, Spain, United States) and analyzes climate events that happened in 2021, and its effect on migration as well as their economic, social, and cultural ramifications and future trends. As data refers to events of 2021 statistics may not have recorded adequate migration patterns. Still, there is a trend towards internal and short-term migration visible. Taking a deeper look at commonalities among these countries, the paper emphasizes the comprehensive nature of this phenomenon and shows the intertwined nature of SDGs. The paper therefore tries to raise awareness on the topic of climate migration and the increasing urgency to take actions and to build future adaptation strategies.

Keywords : Climate, Environmental Migration, Climate Action, Climate Change, Climate Events, Sustainable Development Goals, and Migration

Introduction

Our planet has always experienced changes in the processes that take place both on the surface and within the Earth and in its atmosphere. However, with urbanization and the expansion of human activity, climate change has begun to become more noticeable over time. In recent years, the effects of climate change –increase in the average global temperature, extreme phenomena, ice melting, etc.– have become a front line issue that affects not only biodiversity, but also humans (Global Climate Change, 2022). Large-scale earthquakes, fires or floods are only some of the manifestations of climate change that have already shown its impact in forest land, residential areas, crops, businesses or property, leading to the so-called ‘environmental migration’. This phenomenon, although widely ignored among popular conscience, constitutes the first cause of world-wide internal displacements and it’s, thus, a major source of alteration of all humans’ living conditions (Internal Displacement Monitoring Center, 2021, 12).

Environmental migrants have been described as “persons or groups of persons who, predominantly for reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad” (IOM, 2007, 1). While sudden and extreme phenomena that produce macro-level displacements, especially in the Global South, seem to be perceived as the primary source of climate migration, the internal migratory consequences of gradual environmental changes appear to be overlooked in Northern Countries. On the contrary, far from being circumscribed to some remote Global South areas, current events suggest that climate phenomena arise and arouse the need for responses in the Global North.

Within the UN SDG 13 “Climate Action” framework, this paper focuses on raising awareness about the impact and implications of environmental migration in our cultural, economic, and social patterns, showing the intertwined nature of SDGs. In this spirit, the paper studies the extent to which climate migration is an issue of increasing saliency across the world. With this aim, the study seeks to evidence the increasing presence and prominence of climate migration in Northern countries, to observe the relationship between climate phenomena and migration, to identify the impact of climate change and climate migration on the socio-cultural and economic realm and, thus, on other SDGs, and to raise awareness about the comprehensive nature of the problem.

The first section of the paper focuses on the concept of climate migration, outstanding and remarking its different elements from a wide-ranging approach. The second section displays the situation in four different countries: Austria, Greece, Spain, and the United States. It analyses already occurred climate migration events and their economic, social, and cultural ramifications, as well as current climate trends embodying a potential risk to unleash similar consequences. This is followed by a reflection on the commonalities among the four countries that highlights the far-reaching nature of this phenomenon, as well as its comprehensive impact in SDGs, beyond number 13. Finally, the last part of the paper gathers the authors’ conclusions on climate migration, trying to highlight the need to raise awareness on the topic as a first step towards a solution of alerting and increasing the sense of urgency among current generations, as the basis for future education strategies.

Methodology

This research is based on the Sustainable Development Goal 13 “Climate Action”. Within this goal it focuses on the specific topic of climate migration. As already mentioned, this paper displays the situation in four countries in the Global North: Austria, Greece, Spain, and the United States. It analyses climate events that happened in those countries in the last two years and their economic, social, and cultural impacts including effects on migration and displacement.

Due to their respective nationalities, the choice of these countries as case studies results from the authors’ intimate knowledge about them and personal connection. Besides, these countries share as a common element the internal rather than external climate migration. It allows a comparison to find commonalities and differences between these countries and enables a

comprehensive view and an accurate answer to the research objectives. However, the focus on four countries of the Global North limits the scope of obtained information and, therefore, the chosen case studies cannot serve as an immediate representation of the whole of Europe, the United States, nor global perspectives.

The study's data refers to events of the last year (2021) that may not have recorded adequate migration patterns (i. e. statistics), as internal migration appears to be more common and often short-term, or where direct migration patterns will only be visible in a few years. This accentuates the need for identifying current trends as well. In consequence, the paper looks not only at determined statistics or data, but also tries to detect relationships between them to get the required information.

All the information has been retrieved from a variety of sources which include institutional reports, national statistics and international databases. Facts have also been collected from different newspapers which, although they might not provide scientific and neutral evidence, have sufficiently served the purpose of this paper. Nonetheless, a disclaimer needs to be done in this regard, as the information retrieved from these sources might not be entirely accurate.

Climate Migration: A First-order Cause of World-wide Displacements

Climate migration is defined as the movement of individuals and groups of people who, either compelled or voluntarily, decide to leave their habitual residence, permanently or temporarily, as a consequence of sudden or progressive environmental changes that affect their living conditions (Chazalnoël and Randall, 2021, 21). As the authors exemplify, the definition of climate migration is wide and flexible, encompassing not only the most visible long-term displacements caused by extreme events, but also those provoked by the slow and progressive deterioration of living conditions due to environmental changes. In addition, the concept refers to relocations that occur both within the State and across international borders (2021, 21).

In 2020, 30.7 million people were displaced due to climate related phenomena, the highest number of its historical record. Indeed, in contrast with the popular belief, environmental issues are, by far, the main cause of human displacements, accounting for more than three quarters of them in 2020. Among the latter, only 2 % responded to geophysical factors, while the remaining 98 % were produced by weather-related hazards (Internal Displacement Monitoring Center, 2021, 12).

Figure 1: Number of Displacements in 2020 in the World (Internal Displacement Monitoring Center, 2021)



Unfortunately, climate migration is not simply about the displacement of citizens due to hurricanes, wildfires or tornados; it is also about abandoned territories, altered livings and uprooted human beings. Its consequences pose a challenging threat for the accomplishment of the universally agreed 2030 Agenda beyond SDG 10, whose seventh target points to facilitating “orderly, safe, regular and responsible migration and mobility of people” (United Nations, 2022). Although no explicit reference to migration is made in the remaining 16 global objectives, climate induced movements entail social, economic and cultural disruptions that reveal the “mutually supporting relationships” between this phenomena and SDGs and that, thus, hinder the advancement towards all the 17 goals (Migration Data Portal, n.d.).

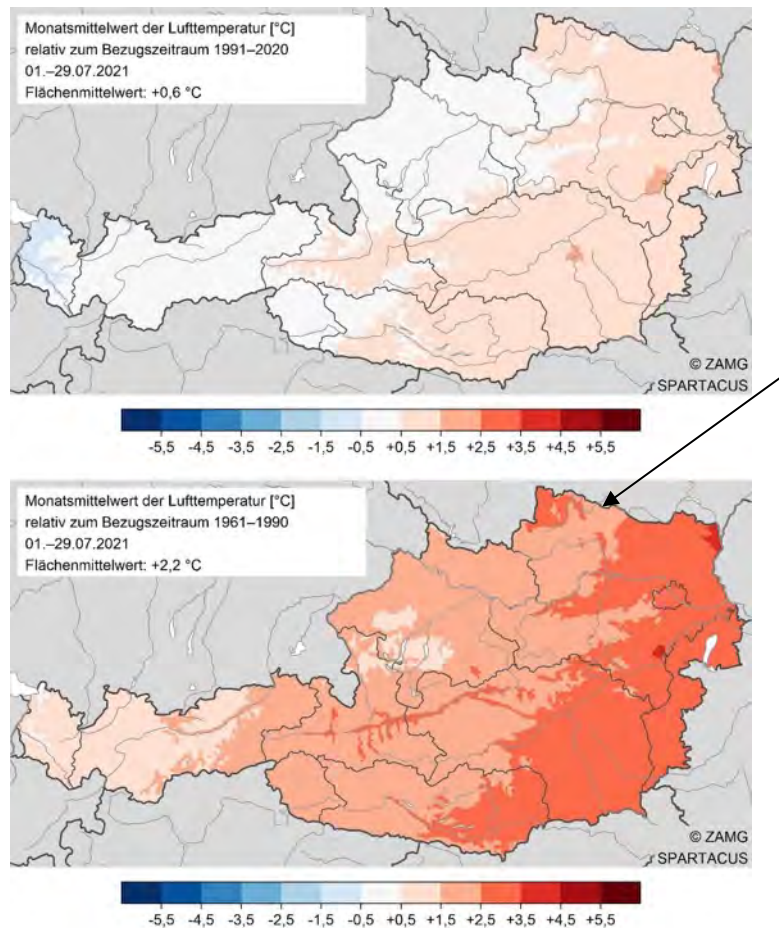
In this sense, even if massive displacements provoked by extreme phenomena in developing countries seem to be at the forefront of climate migration concerns, and even if, indeed, numbers point to countries in Sub-Saharan Africa and the Middle East and North Africa as the most affected by it (Internal Displacement Monitoring Center, 2021, 12), the internal low-scale movements produced by the progressive deterioration of environmental conditions in Northern countries are equally an alerting reality that bode ill for the achievement of the global agenda.

Climate Migration in Austria, Greece, Spain, and the U.S.

Austria: Flooded Lives

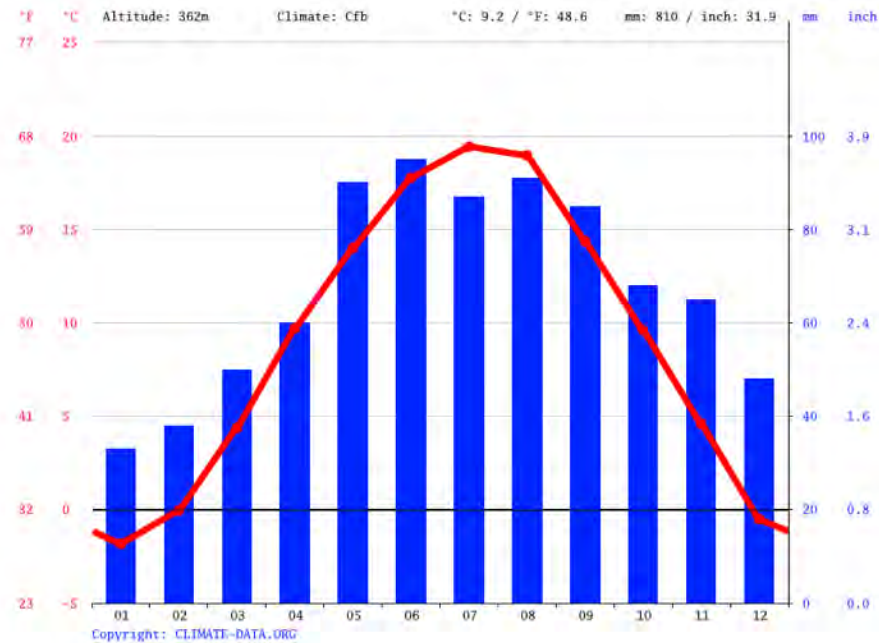
On July 30, 2021, huge floods occurred in Styria, in the Southeastern and central part of Austria, especially in and around the city of Graz. In that area, July 2021 was one of the warmest (3rd) in the history of measurements. In the south of Austria July was between 20 and 50 % too dry, with 10 to 40 % more heat days with temperatures over 30°C (ZAMG, 2021). This is also accentuated in Figure 2, where a comparison to the periods 1961-1991 and 1991-2020 is depicted. As the picture shows, the mean temperatures are nearly everywhere too high. The black arrow points at Styria, where the changes are extremely noticeable.

Figure 2: Mean Temperatures in °C in Austria - a Comparison of the Periods 1961-1991 and 1991-2020 (ZAMG, 2021)



By rising temperatures, especially after a long warm period, there is more steam causing more moist air and the development of big clouds, which in turn can lead to intense rainfalls and thunderstorms. Before this happens, the weather is mostly sticky (Malberg, 2007, 159). Furthermore, vertical movement of air also pushes thunderstorms to develop (Glaser et al., 2010, 82). Rainfalls with big drops and high intensity, affecting just a small area are also called convective precipitation (Glaser et al., 2010, 136). These short intense rainfalls are an increasing phenomenon, leading to small-scale floods (Science ORF, 2021). Additionally, due to the previous dry period, the water cannot seep away easily.

In July 2021, media reported extreme amounts of precipitation of more than 100 liters/qm (Kurier, 31/07/2021). The following graph in Figure 3 shows a climate diagram for Graz, the main city of Styria. It reveals that the average amount of precipitation in July is between 80 and 90 mm, which equals to 80 and 90 liters/qm. This means that, in the evening of July 30, 2021, the amount of rainfall largely exceeded the average amount of precipitation of the whole month.

Figure 3: Climate Diagram of Graz (Climate-Data.org, 2021)

The floods led to different problems in urban and rural areas, not only being of ecological nature, but also economic, social and cultural. Its relevance becomes apparent when looking at the news at that time: many newspapers and social media channels reported about failures in infrastructure, material and property damages. These impacts were rather short-term, but still of a high significance for the affected population.

One message was striking, as there are almost never messages of that kind in Austria. In Graz, the capital city of Styria, several main streets were flooded. The sewer system was overloaded and water could not be held anymore. This also led to flooded basements and ground floors. As a consequence, the Grazer security management called the population up to not leave their houses, to not drive their cars and to avoid flooded areas and sources of electricity. Additionally, many trees fell over and damaged cars and power lines. However, it is said that most damage could be avoided by the numerous retention basins around the city (Kurier, 2021).

While the above mentioned problems did occur in urban as well as in rural areas, the latter were also affected in agricultural terms. These intense floods and heavy rainfalls also caused huge damages in agricultural areas, which seem to be even of higher importance, as they do not only cause short disturbances but a seasonal impact in terms of decreasing yields, lower quality of the crops and also pest invasion (BMK, 2021).

Figure 4: Destroyed Pumpkin Fields (Reinbacher, 31st July 2021)

Looking at this kind of event, induced by the previously mentioned climatological trends, we can predict that the economic costs (damages in infrastructure, agriculture, etc.) are, and will be, rising in the future. For instance, it can be assumed that, in the long term, the number of insurances (crop and hail insurances, private health insurances, ..) will rise as a response to climate change or, rather, its impact.

Regarding migratory consequences, even though extreme climate phenomena like the described floods destroy houses and infrastructure, or have a negative impact on agriculture and its harvest, people in Austria tend neither to leave the country nor to leave the region they are living in. In other words, adaptation to these new circumstances and rebuilding their homes is preferred over migration.

Still, this kind of event is compulsory connected to short term, internal migration that does not usually seem to be present. This can be proved by the following statistics: in 2020, in all federal states in Austria, more immigration than emigration occurred. Concerning internal migration within Austria, statistics show that in 2021 (until now) there was more internal immigration than internal emigration in Styria, following nearly a balanced development (Statistik Austria, 2021).

However, an internal migration from cities to rural areas can be noticed. This is shown in the following Figure 5 (Statistik Austria, 2021). The same statistics also show that young people (age 18-26) tend to move to cities, whereas all other age groups prefer to leave cities. It can be assumed that heatwaves are one of the reasons why people in cities tend to migrate to surrounding regions, as they have an even greater impact in cities.

Figure 5: Internal Migration in Austria 2020 (Statistik Austria, 2021)

To sum up, climate events do not yet have an enormous impact on migration within Austria. At least, there have not been recorded adequate migration patterns. Apart from that, there is no clear connection to find between climate changes and migration within Austria.

This specific case study, however, is of local and regional impact and usually does not pose a risk at national, international or global scale. However, the solutions on a local level can also serve as a solution in other parts of the world. The implication of successful solutions may even lead to a reduction of climate change induced migration in poorer countries.

Greece: Running Away from Fire

In the summer of 2021, Greece experienced a devastating fire season with heat waves being the most intense in the last thirty years, and temperatures reaching 45°C (EFFIS, 2021). Specifically, the summer of 2021 was the hottest in the last 43 years. Between July 27 and August 6 the heatwave that occurred lasted 188 hours. As the scientists of the National Observatory of Athens explain:

“The cause of the intense and prolonged heatwave is the movement of the jet stream, a powerful air current located about 10 km above the earth's surface and moving from west to east. In recent days, the jet stream have been found to be displaced further south of their mean climatic position in the Western European region, which has also resulted in the development of a high pressure field over our region and a gradual rise in temperature (2021)”

The increased temperatures in combination with the heatwaves contributed to the outbreak and expansion of hundreds of mainly forest fires, ranking the summer of 2021 the most devastating summer of the last 13 years (National Observatory of Athens, 2021). Greece mapped 84 incidents of forest fires which burned a total area of more than 1.300.000 acres. This performance is the worst of the 2008-2021 period, as it approaches almost the sum of the burnt areas of the 2013-2020 period. It is worth noting that the average burned area per forest fire in Greece until 2020 was 500 acres, while in the summer of 2021 the average performance exceeded 1.500 acres (EFFIS, 2021).

Wanderung 2020: Binnenwanderungen
nach Politischen Bezirken

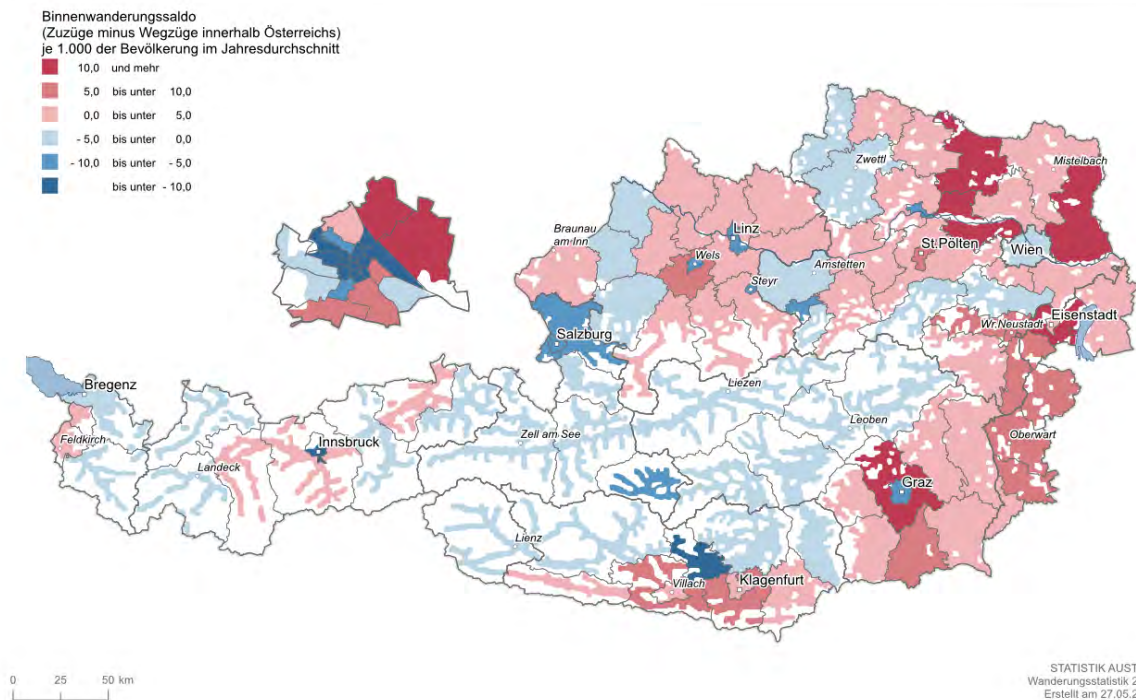
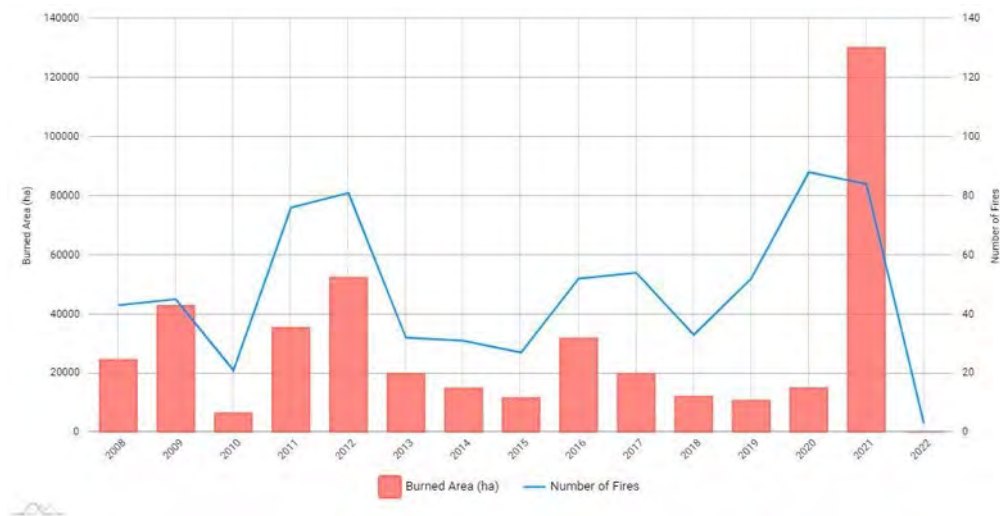


Figure 5: GWIS Annual Statistics for Greece (Copernicus Europe's Eyes on Earth, 2022)



The fire brigade recorded fires in the Prefecture of Attica (Eastern Central Greece), in North Evia Island, in Iliia (Western Greece) –where the archaeological site of Olympia was also in danger–, in Messinia (Southwestern Greece), in Mani (South-Epirotic Greece), in Achaia (Peloponnese, Southern Greece), in Grevena (Western Macedonia), in Salamis (island near Attica), in Fokida (Central Greece), as well as in the islands of Rhodes (see figure 6).

The most devastating fire that evolved into a mega fire was that of Northern Evia, with a total burned area of 66.000 acres (EFFIS, 2021). Evacuations were carried out in many areas and villages, as well as in Athens. In Northern Evia, hundreds of residents were even evacuated on ferries and fishing boats as the wildfire reached the sea (BBC News, 2021).

The fires burned forest areas, agricultural lands, residences, businesses, as well as many wild and domestic animals which either did not manage to be saved due to the rapid spread of the wildfire or were trapped in the estates of many livestock breeders who had to leave to save themselves.

Figure 6: Greece and the Fires of 2021
(Greek City Times, 2021)

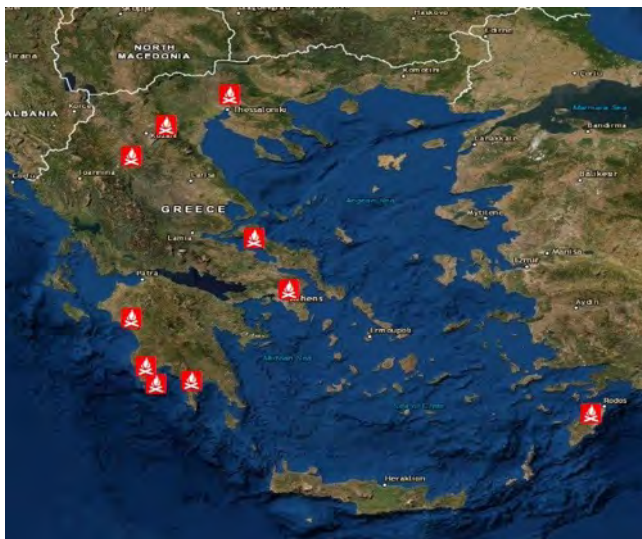


Figure 7: Wildfires in Vilia, Attica
(Charokopio University, 2021)

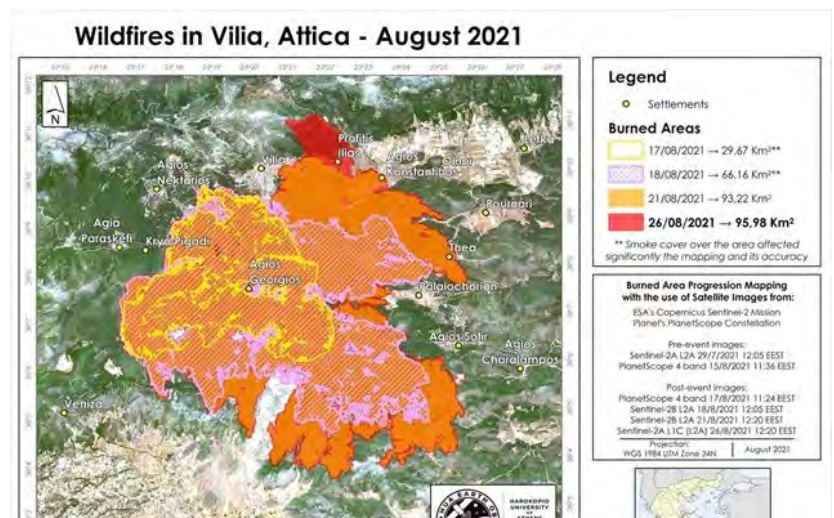
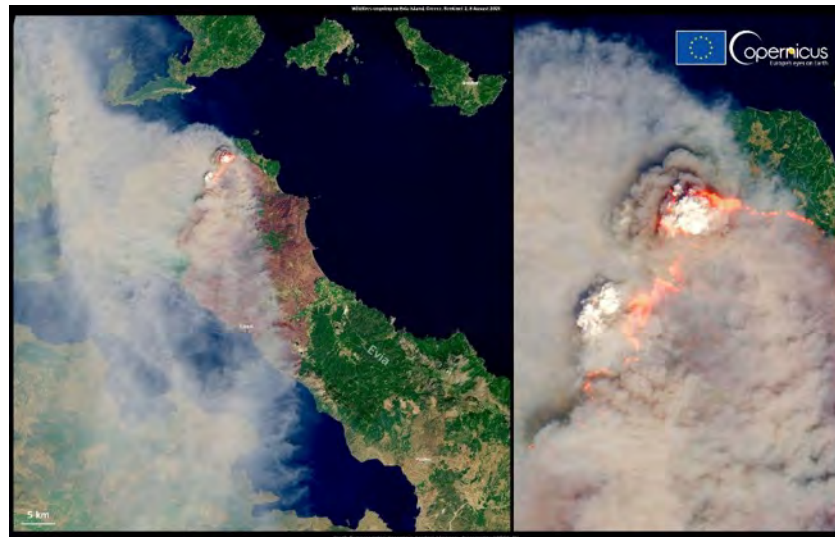


Figure 8: The Ongoing Wildfire on the Island of Evia in Eastern Greece (Copernicus Sentinel-2 satellites, 8th August 2021)



During the fires, Greece provided 71 firefighting equipments, while due to the uncontrolled and critical situation it activated the European Civil Protection Mechanism and received emergency reinforcements from 11 member countries of the European Union (Austria, France, Germany, Spain, Croatia, Cyprus, Poland, Romania, Slovakia, Czech Republic and Sweden), as well as from 13 other countries (Egypt, Switzerland, U.S., United Kingdom, United Arab Emirates, Israel, Qatar, Kuwait, Moldova, Ukraine, Russia, Serbia and Turkey) (Kathimerini newsroom, 2021).

Figure 9: The Coastguard Moved 650 People from Limni, in the North of the Island of Evia (BBC News, 7th August 2021)

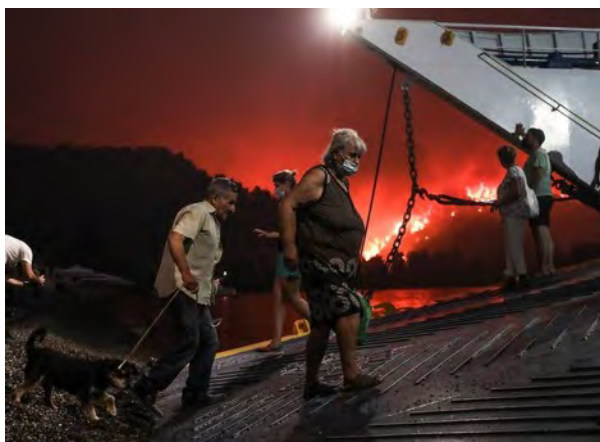


Figure 10: Firefighting (REUTERS/Alexandros Avramidis, 2021)



The increased temperature, soil moisture conditions and the presence of trees and shrubs were catalytic factors for the creation and reinforcement of fires. In addition, changes in the climate with hot and dry conditions led to the drought of organic matter in the forests, resulting in the fires

spreading faster and becoming even more powerful. Another factor that led the spread of fires, mainly in forest areas, was forest management by the inhabitants of those neighborhoods, as the accumulation of huge amounts of vegetation, houses and other infrastructures in risky areas resulted in the increase of fuels and the reinforcement of fires, making them powerful and destructive in their path (C2ES, 2021).

Mediterranean countries such as Greece may be adapted to fires (rapid recovery of forests and vegetation), but the continuous increase in the intensity of fires due to climate change points to a huge threat and danger for its economy, society and culture. The devastating effects of wildfires are found in the flora and fauna of the ecosystem, in human property and infrastructure, in agricultural and livestock income as well as in health (both physical and mental) (WWF, 2022).

In this sense, the high temperatures caused by fires lead to soil erosion. As there is no vegetation, the absorption of water becomes increasingly difficult and, as a result, there risk of flooding increases in case of rain. On the other hand, a large percentage of animals benefit from vegetation and, once it is burned, there is a lack of food to feed them (2022). It is worth noting that as mega fires destroy the vegetation of an ecosystem, it has terrible effects on farmers and ranchers, since agricultural and livestock income is directly dependent on the breeding of animals, as well as the cultivation of land. As a consequence, it can be stated that the Greek economy gets completely affected by the fires, as the exports of agricultural products account for one third of the country's total exports, while this sector contributes to 4.1% of Greece's GDP (SelectUSA, 2019). The local production system (timber, apiaries), as well as tourism, are also largely affected by this phenomenon, as most of the burnt forest areas were natural landscapes of high aesthetics with a huge biodiversity of wild animals and birds.

In parallel, the devastating effects of fires affect people's physical and mental health in the short and long term. The increase in the levels of CO₂ (carbon dioxide), PM₁₀ (particulate matter) and O₂ burden in the atmosphere cause health issues, being mainly of respiratory nature. In this concrete case study, the psychology of the people of both, those who immediately experienced the disaster, and of the volunteers who contributed by any means to the extinguishing of the fires and the support of the affected residents (medical care, hospitality, provision of food and necessities) was affected to a huge extent, causing traumas that are difficult to recover. The moments they experienced will remain etched forever in their souls, especially in the vulnerable groups (the elderly) as they suffered a mental shock seeing their property covered by flames.

When it comes to wildfires, control and treatment is difficult and especially in Northern Evia it was impossible. The flames with the help of the heat wave on the days of August and the high temperatures became uncontrollable. The important thing in such cases is proper prevention. Unfortunately, in Northern Evia and Attica there was no proper and comprehensive prevention in case of a mega fire. There was a lack of fire lanes, there were not enough patrols and water tanks so that the fire authorities did not have time to reach all the fires that broke out at the same time. "We were waiting for the fire brigade, which never arrived and as a result I drove my family away and saved my house from the flames on my own along with three other residents", testifies a resident of the village Kiparissi (North Evia).

Despite all the difficulties experienced by the affected areas, the struggle of the volunteer groups that were set up during and after the fires and that still persists is very important.

Apart from the weaknesses and mistakes made, the actions that were taken in the following days after the fires were extinguished should be noted. The main ones are the following:

A) 6th September 2021: creation of the first Ministry of Climate Crisis and Civil Protection in Greece by the government of Kyriakos Mitsotakis, the Civil Protection, and the Fire Brigade. The purpose of the General Plan of Civil Protection is the effective confrontation of destructive phenomena for the protection of citizens and the natural environment (Ministry of Climate Crisis and Civil Protection, 2021)

B) 10th August 2021: establishment of the "Special Committee for the Reconstruction of Northern Evia" headed by Mr. Stavros Benos in collaboration with the non-profit Association "DIAZOMA". The aim of the Committee is the restoration of the burnt North Evia through a holistic and anthropocentric program. Specifically, its actions focus on environmental regeneration (reforestation, creation of a forest nursery, opening of paths), infrastructure (construction of a new road axis), support for residents so that they do not have to migrate, entrepreneurship, urban plans, culture, tourism, and the governance system (Reconstruction Program of Northern Evia, DIAZOMA, 2021).

Figure 11: Eftixia Papoulia (ALPHA Free Press, 6th August 2021)



Figure 12: Satellite Image from NASA, Wildfires from Greece (8th August 2021)



Spain: A Warming Economy

The Spanish Commission for Refugee Aid (CEAR) and Greenpeace warn that Spain is not either exempt from the impact of climate change; rather, its socioeconomic and geographic characteristics make it highly vulnerable to this phenomenon (CEAR and Greenpeace Spain, 2021, 24). According to National Geographic, due to its location in the Mediterranean basin, Spain is likely to be one of the most affected countries, especially in regards to the increase of temperatures (Crespo Garay, 2021).

By the middle of the year 2021, the country had already doubled the number of major fires⁷⁰ recorded in 2020 (Greenpeace, 2021), and even if the balance of the year resulted positive compared to the average of the last decade, Spain witnessed one of the largest wildfires of its history (Ministry for Ecological Transition and Demographic Challenge (MITECO), 2021). On August 14, a car wreck in the road of Navalacruz, in the Province of Ávila, led to a twelve day long wildfire that burnt over 22.000 hectares, causing the displacement of around a thousand people (The World News, 2020). Despite the main cause of the event being a car accident, the events that followed were nothing but a manifestation of the impact of climate change in Spain.

Experts state that the rise of temperatures, the enlargement of the climatological summer and other phenomena like torrential rains or dry winds caused by climate change are a first order agent in wildfires in the country. Concretely, instead of the root triggering cause, they rather embody an aggravating factor. In other words, as also shown in the case of Greece, what scientists foresee is that, there will not be more wildfires due to climate change, but worse ones (Romero, 2021, 65). Indeed, going back to Navalacruz's case, on August 14, 2021 the

⁷⁰ Understanding major fires as those that affect more than 500 hectares.

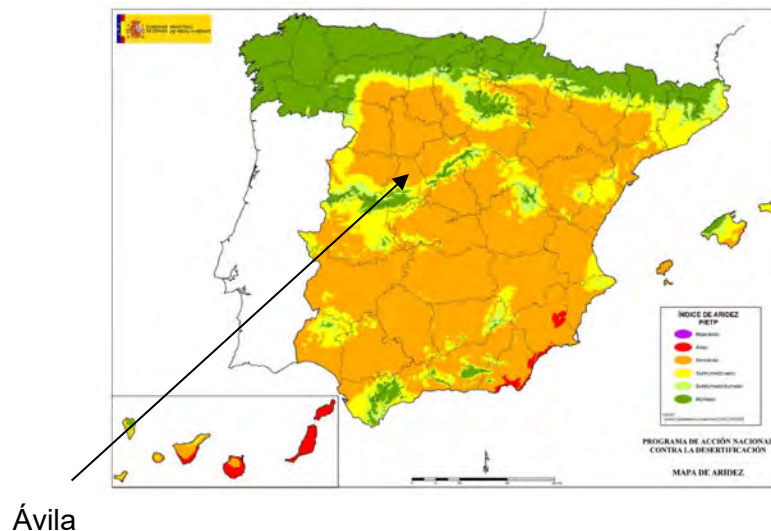
municipality registered a record temperature of 38,8°C at day time and 38°C at night, accompanied by a moisture content of 2 % and wind gusts of 70 km/h (Europapress, 2020).

The events of the last decades show that the rise of temperatures is an already tangible reality in Spain, where temperatures are 1,5°C over preindustrial times (Greenpeace, 2021). Data reveals that eight out of the ten warmest years in the country since 1961 occurred in the XXIst century, seven of them being in the 2011-2021 decade. Indeed, 2020 was the warmest year of the historical record after 2017, when the average temperature was 1°C above the average between 1981-2010. Accordingly, the number of record heat waves is currently around eleven times higher than that of cold waves (State Meteorological Agency, 2020, 5).

Nonetheless, the impact of climate change is beyond the already realized manifestations; experts' predictions for the upcoming years highlight that this phenomenon constitutes a risk both in the present, and mostly in the near future. It is expected that if emissions continue at an intermediate level, the temperature will rise around 2°C by the end of the century, and if these reach higher rates, the increase will be that of 5°C (2020, 1). In the light of these considerations, it seems accurate to claim that the threat of climate change for Spain is not only climatological, but that it also extends to its social, economic, and cultural dimensions. As the case of Navalacruz shows, people will be forced to move to escape from the damages caused by climatological episodes, such as those of extreme events. However, these will not be the only source of displacements; the progressive and unconscious alterations produced by the increase of temperatures will, indeed, be a pivotal cause of internal migration in Spain.

For instance, the risk of desertification, soil degradation, floods or droughts caused by the increase of temperatures pose a significant threat for the agricultural and ranching industries in the country. The prolongation of summer temperatures, which leads to earlier flowering and harvests, is expected to cause a redistribution of crops in the long term, displacing most of the affected harvest to Northern areas (Sanz and Galán, 2021, 79). At the same time, higher temperatures will be followed by a higher demand of water resources, which, linked to the expected lower availability of the latter, is likely to provoke water deficits in the crops, decreases in production, and losses of harvests (2021, 80). For example, regarding the cultivation of olives, the predictions are that in the 2030-2050 period the productivity of watered and dry land groves will decrease by 3,5 % and 7 %, respectively, compared to the 1980-2009 timeframe (2021, 82). In parallel, extreme events and the rise of minimum temperatures in summer are also likely to produce episodes of thermic stress to animals, reducing their comfort, feeding and production. At the same time, the decrease of water availability will hinder their ability to relieve such stress, which adds to the foreseen variations in disease patterns and plagues (2021b, 85).

Figure 13: Map of Aridity in Spain (Ministry for Ecological Transition and Demographic Challenge, 2022)



In Spain, over 23 million hectares – *i.e.* almost half of its territory– is destined to agricultural activities, of which around 17 million are occupied by crops. Regarding the ranching industry, data reveals there are over 25 million heads of pig and over 16 million heads of cattle (MITECO, n.d.). Although the share of the Spanish GDP occupied by this sector does not reach the 3 %, it is the largest share among the members of the European Union, and it employs over 749.700 people in the country. It is a “deeply rooted activity in the economy, society and territory [of Spain] that fosters wealth not only through its practice, but also in the rest of the economy through its interrelation and capacity to influence other sectors” (PwC and AEPLA, 2019, 9). Altogether, adding the interrelated activities, the agri-food system constitutes one of the prime industries of the country, contributing to the 10,6 % of the GDP and 14,2 % of the employment (2019, 14). This means that if, as manifested, the increase in temperatures alters the distribution of crops, makes territories unfertile and reduces the farming production, such a large share of the population devoted to these activities will have to be equally redistributed. Migration of people to the North will follow the foreseen displacements of crops to these areas; farmers with elevated expenses to maintain appropriate living conditions for their cattle will have to either move to where temperatures are lower or search for a different job; accordingly, fresher areas in the country will experience the arrival of the exodus from other villages; and, ultimately, abandoned territories will be left with no economic activity, no population and no culture.

Climate change will also impact other important sectors of the Spanish economy, such as that of tourism, which employed almost 2.5 million people before the COVID-19 pandemic (Statista, 2022). Good weather conditions and large sandy beaches are a determining factor for Spanish tourism, especially in the Mediterranean basin. Thus, the rise of temperatures, the erosion of beach areas, the alteration of sea temperatures and the increase of its levels and swell can all contribute to the discomfort of tourists that resort to Spanish costs during summer (Sanz and Galán, 2021, 169). This, added to the impact on other touristic attractions like the disappearance of ski stations due to insufficient snow, or the risk of many turistic infrastructures to lose their

economic rentability due to a possible absence of hydric resources in the future, leave no positive prospects for Spanish towns and cities that are highly dependent on tourism. It goes without saying that the consequent prediction would be that a large part of the population will have to find new locations for their businesses, activities and living.

The United States: Increased Severity of Hurricanes

On August 29, 2021, Hurricane Ida hit the Louisiana coast with upwards of 241 kilometers per hour (kph) winds, going down as the most powerful and rapidly intensifying storm in United States history. Ripping across more than 2,400 km, Ida proved destructive while entering the United States near Louisiana and exiting near New York. Most tropical storms weaken rapidly after landfall as they lose access to the ocean; however, Ida maintained her Category 4 strength for up to six hours after landfall (Adamo, 2010).

The immediate impact of Hurricane Ida was over eight East coast states. Tornadoes touched down in six states. Storm surge heights reached between two and five meters, with offshore waves measured by satellite reaching up to 12 meters high (US Department of Commerce, 2022). Ida resulted in 43-cm of rain in New Orleans, with up to 20 cm as it moved across states (US Department of Commerce, 2022). 1.5 million people lost power in Louisiana alone as a primary transmission line was downed. Leaving residents without power for weeks, this was Louisiana's most significant power outage since 2000 (Hillburn, 2021). There were approximately 115 deaths and over \$75 Billion worth of damage.

Hurricanes form from disturbances in the atmosphere over warm, tropical ocean water (US Department of Commerce, 2022). They continue to grow as the storm travels over areas with warm water, low winds outside the storm, and high moisture levels in the atmosphere. In the center of a hurricane is a calm channel of calm weather called the "eye" of the storm.

The National Weather Service defines a hurricane as a "tropical cyclone with a maximum sustained winds of 119 kph or higher" (NOAA, 2022). Using the Saffir-Simpson Scale, hurricane-strength tropical cyclones are classified into five based on maximum sustained wind speeds (Table 1). Major hurricanes fall into categories 3, 4, and 5, while super-typhoons reach categories 4 and 5 on the Saffir-Simpson Scale (NOAA, 2022).

Table 1: The Saffir-Simpson Scale (NOAA, 2022)

| Category | Miles Per Hour (MPH) | Meters Per Second (MPS) | Knots |
|----------|----------------------|-------------------------|---------|
| 1 | 119 - 153 | 33 - 42 | 64 - 82 |

| | | | |
|---|-----------|---------|-----------|
| 2 | 154 - 177 | 42 - 49 | 83 - 95 |
| 3 | 178 - 208 | 49 - 57 | 96 - 112 |
| 4 | 209 - 251 | 58 - 69 | 113 - 135 |
| 5 | 252 | > 70 | > 136 |

According to NOAA analyses, a 241 kph Category 4 storm has more than 250 times the damage potential of a Category 1 storm. As seen from Ida, hurricanes result in strong waves, high winds, and intense rainfall that destroy coastal towns and flood areas further inland. Most flooding from hurricanes is caused by storm surges, a temporary rise in sea level that occurs when storm winds push water towards the coast (UCAR, 2022). The low pressure of the storm impacts the strength of the storm surge (UCAR, 2022).

But, how does climate change influence the power of hurricanes? Climate scientists understand that humanity's carbon footprint has changed the baseline conditions of the climate, influencing every weather event across the globe. Hurricanes are driven by the transfer of heat from the sea to the air through evaporation. The storm's wind speed, or the potential intensity, depends significantly on the temperature of the ocean water. Climate scientists agree the Earth and our oceans are warming due to human activities. Sea surface temperature increased during the 20th century and continues to rise at an average rate of 17.7°C per decade (IPCC, 2013). Sea surface temperature has been consistently higher during the past three decades than at any other time since reliable observations began (IPCC, 2013).

This way, researchers agree that more intense hurricanes and tropical cyclones will occur as sea temperatures rise. The Intergovernmental Panel on Climate Change special report on Global Warming of 1.5°C has detected trends of the occurrence of very intense tropical cyclones (category 4 and 5 hurricanes on the Saffir-Simpson scale) over recent decades (IPCC, 2013). Indeed, climate change and warming oceans allowed Hurricane Ida to gain strength at landfall. In as little as 24 hours, Ida moved from a Category 1 to a Category 4 storm as it moved over abnormally hot water in the Gulf of Mexico. According to the National Oceanic and Atmospheric Administration measurements, the water in the Gulf of Mexico was 30°C , a few degrees hotter than average (NOAA, 2022).

Such increased levels of intense hurricane activity will produce storm surge flooding, landslides, saltwater intrusion in soils and surface water, resulting in loss of human life and livelihoods, impacts on buildings and environment, and salinity impacts on crops (US White House, 2021). However, it is essential to note that, as seen in the case of wildfires, hurricanes and tropical

cyclones will not increase in frequency but rather intensity (IPCC, 2013). Stronger and slower hurricanes will result in increased precipitation levels, both in coastal areas and areas inland. As the climate continues to warm, the atmosphere can hold more water, encouraging hurricanes to become "wetter." Increased heavy precipitation events will encourage flooding, erosion, channel modification, and debris flows that will result in loss of life, impact homes and infrastructure, damage crops and increase flood insecurity across the eastern United States (US White House, 2021).

At the same time, global climate change and increased intensity of hurricanes, precipitation, coastal flooding, rising sea levels, and general scarcity of natural resources could, directly and indirectly, affect movements (Laczko and Aghazarm, 2009, 15). Cities regularly exposed to climatic events can trigger environmental migration to other cities and states. Coastal cities, like Louisiana, where Hurricane Ida hit, are often confronted with sudden events like hurricanes and flash flooding that trigger massive evacuation and population displacement. This displacement is generally to nearby areas and is short-term (Smith and McCarty, 2009). However, as populations return to their homes, they find deterioration of the city appeal due to erosion of beaches and destruction of property. Deterioration of cities results in permanent displacement and increased internal migration flows. Significant and sudden increases in the inflow of migrants can lead to accelerated urbanization —particularly the expansion of slums or neighborhoods in vulnerable areas— which may overwhelm the city's capacity to deliver services (education, health, public safety, etc.) and increase the population at risk, particularly in small urban centers (Tacoli, 2009).

As for Hurricane Ida, it is too soon to tell how much impact it will have on environmental migration. However, there are parallels between Hurricane Ida and Hurricane Katrina that devastated the same in 2005. To compare, New Orleans, Louisiana shrank from 485,000 to 230,000 people after Hurricane Katrina. However, according to the Census Bureau, New Orleans regained 80 % of those losses by recovering 390,000 people by 2020 (Cusick, 2021). Equally as devastating as Hurricane Katrina in 2005, Hurricane Ida will see the same economic impact. People trying to escape the destruction and water, cities on the East Coast and beyond were inundated by people. As climate change continues to influence the weather, we can predict that we will see more people attempting to escape areas where flooding, coastal erosion, and infrastructure loss are rampant.

Climate Migration as a Challenge for Global Goals

As shown in the four case studies, climate change will undeniably impact all sectors of our society. It is now understood by scientists that climate related events might increase in frequency and, mostly in severity. In this case, all of the 17 global goals will be impacted in some capacity.

The case studies reflected in this paper showcase the interconnected nature of the impact of global environmental change as well as the impact to human population as a result. Although the overarching theme for examining these case studies is SDG 13 "Climate Action", the results and predictions point to multiple commonalities and overlaps among the global goals. For instance, long term impacts of catastrophes like fires, flooding, and other extreme events exacerbated by climate change may result in temporary or permanent migration that cannot allow for the existence

of sustainable cities and communities –SDG 11–. In this sense, each case study has shown that the number of displacements and deaths will increase, and this will significantly increase the “direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations” (United Nations, 2022). In parallel, unsustainable communities will exacerbate poverty and food insecurity, directly correlating with global goals 1 and 2. If the highlighted trends continue, it will be impossible to achieve the target 1.5 of building “resilience of the poor and those in vulnerable situations and reducing their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters” (United Nations, 2022).

The phenomenon of climate migration, as outlined in the case studies, is also interlinked with SDG 15. Life on Land will be greatly impacted as areas such as Greece and Spain continue to experience hotter than usual conditions, whereas countries like Austria and the United States will continue to see more inland flooding. Both heat, fires, and flooding will result in desertification, degraded soils, erosion, and saltwater intrusion, all of it leading to abandoned areas and unlivable lands. Similarly, industry, innovation, and infrastructure will be impacted if cities are unable to prioritize sustainable communities –SDG 9–.

All in all, climate change and its migratory impacts can be connected to each of the 17 global goals. It is indeed a force that impacts society at every level. Therefore, it is not a solitary issue that can be easily or readily solved. Society has also now surpassed mitigation and must focus on awareness and resiliency building with the global goals in mind. A global partnership, exchanging knowledge and technology etc., which is also discussed in SDG 17 “Partnerships for the Goal”, may serve as one of the most important bases of sustainable development.

Conclusions

As a whole, the cases of Austria, Greece, Spain and the U.S. depict a challenging future for large sections of the countries’ citizens. The land’s eroding ability to seep the water away easily in Austria will most likely lead to intense floodings, like the one occurred on July 30, 2021, in Styria. The Mediterranean basin’s vulnerability to increased temperatures will presumably result in ever-more destructive wildfires, like the ones developed in Greece and Spain during the summer of 2021. And, finally, the rising sea temperatures in the Pacific and Atlantic oceans will predictably facilitate the occurrence of hurricanes, like Ida in Louisiana on August 29, 2021.

All the above-mentioned events reveal that climate change will be a first-order issue in the four countries, accentuating the impact of each climatological event. Indeed, despite in different manners, the information provided in the four cases shows that the alterations in our climate conditions lie behind the severity of all the cited events, not as much as a root cause, but rather as an aggravating factor. In this line, the intensity of the phenomena and its impact on communities led to the displacement of people in the four cases. Although mostly internal and short-term, the movements that follow these events are a manifestation of climate migration in Austria, Greece, Spain and the U.S., with its consequent social, economic and cultural implications.

However, the aim of this paper is not to point to past events, but rather to alert about the upcoming future. By looking at current trends, the analysis made in the four states allows us to predict that climate migration will also be an increasingly noticeable reality in Northern countries. The alteration of our living conditions, caused not only by sudden extreme phenomena, but also as a consequence of the deterioration of our lands due to climate change, will force citizens to look either for a different job, for a more comfortable climate for living or even for a new touristic destination. All these changes convey further implications than those of a simple everyday decision: they involve a rearrangement of human settlements, a transformation of our current societies, an alteration of economic structures and, inherently, a modulation of one's culture.

With this in mind, climate migration cannot be understood only as a climate-related issue, nor as a territorially divided problem dominant in the global South; it is rather a global challenge and reality that concerns all countries and all SDGs. The four case studies developed in this paper reveal that, despite its particularities, they all already had and have manifestations of this phenomenon. In fact, even if these four countries do not, and cannot, directly explain the situation in every other state, nor even in the North, their joint consideration allows to identify common patterns and the existence of a global range problem which needs comprehensive solutions, regardless of each one's location on the planet. Precisely, the evidenced interconnectedness of the Sustainable Development Goals, as well as the global presence and reach of the climate migration issue, reveal the need for tackling it through increased intentional, accessible, and comprehensive global engagement that involves both the climate issue itself and its economic, cultural and social consequences.

Indeed, although the authors' goal was to identify the concrete goals related to the particular diagnosis made in each case study, the authors have found that climate migration and SDG 13 are so deeply interconnected to the remaining 16 targets, that a distinction of affected SDGs among countries would fail to understand its comprehensive nature. The effects from movements exacerbated by climate change will influence progress towards SDG 1, 2, 11, 13 or 15, among others. As highlighted by the United Nations, "climate change, [and its consequent migration], is affecting every country on every continent: it is disrupting national economies and affecting lives, altering cultures, communities and countries dearly today and even more tomorrow (United Nations, 2022). Understanding SDG 13 and focusing on global scalable solutions will inevitably reduce inequalities, poverty, food and water insecurity and drastically improve education, economic growth, infrastructure, resiliency building, and peace.

In this sense, there is a need to raise awareness about the countries and SDGs interconnection. Understanding the interrelations between SDGs is key to improving coherence, decision-making and the application of public policies in order to achieve sustainable development. Awareness about climate migration also means stressing the multiple spheres of our lives simultaneously affected by it, the interconnectedness of both problems and solutions and the need for a comprehensive answer. By looking at past events, present patterns, and resulting predictions, the paper has sought to draw the first step towards a solution of alerting and increasing the sense of urgency among current generations as the basis for future education strategies.

With SDG 13 and its subgoals in mind, the authors refrain at this point from giving further solutions, but rather focus on what it has been stressed as the essential first step: to raise awareness, which may be concreted in some recommendations:

- 1) raise climate change ambitions worldwide
- 2) prevention (reinvest) - priority to prevention, not repression
- 3) coordinate policies - clarify governance
- 4) priority in addressing the causes of extreme phenomenons by understanding and tackling climate role in them
- 5) access to more information - learn from the science (education)
- 6) raising awareness of the private sector - not only governance
- 7) last but not least, raising awareness of every individual.

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A Grounded Theory Study Exploring Why and How the UNEP Young Champions of the Earth Create Sustainable Innovations for a Flourishing Planet

Nakita Bruno Green

(Maharishi International University, Commonwealth of Dominica)

Abstract

In recent years there has been increased dialogue on the urgency of grand challenges and the role of sustainable innovations in facilitating sustainable development and creating a flourishing world. Individuals are central to this phenomenon in that they provide the ideas and actions which build innovations that alleviate social challenges, facilitate environmental restoration, and drive a new model of economic prosperity. Nonetheless, many scholars agree that the sustainable innovation and sustainable development literature are limited by a restricted epistemology that lacks a theoretical understanding of why and how individuals pioneer sustainable development as well as a multilevel approach to sustainable innovation. A more refined understanding of this phenomenon at the individual and multi-level can offer the insights necessary for mankind to transcend existing grand challenges.

This paper presents a grounded theory study on why and how the United Nations Environmental Program (UNEP) Young Champions of the Earth (YCE) award winners create innovations for a flourishing planet. The UNEP YCE have successfully tackled several of the UN's Sustainable Development Goals (SDGs) globally. The data revealed that the YCE award winners experienced grand challenges at the macro-level which triggered micro-level feelings, emotion, and cognition that then drove them to create synergy with others at the mesa level, leverage their full potential, and innovate responsibly for social and environmental evolution. These findings were used to construct a 4 E Process model where sustainable innovations are created through four processes: Entangling, Enlightening, Enacting, and Evolving. These findings enrich the academic literature in several ways.

Keywords: Sustainable Development Goals, Sustainable Innovation, Grand Challenges, Flourishing

Purpose

Over the last few decades, the environmental and socio-economic challenges facing our planet have become increasingly more pronounced. In 2019, fossil CO₂ emissions reached 36.7 gigatons globally, over 62% higher than in the 1980s when the World Commission on Economic Development advocated for sustainable development (WMO, 2020). Greenhouse gas emissions are at their highest in three million years and continue apace while the average global mean surface temperature for 2016-2020 was the warmest four-year period ever recorded. Catastrophic

tropical cyclones have inflicted unprecedented economic loss and social and environmental upheaval while wildfires resulted in the greatest ecological and economic losses on record. Furthermore, scientists predict that by 2050 the lives of nearly 1.6 billion people will be threatened by floods while between 2.7 to 3.2 billion people will live in severe water scarce areas. Anthropogenic climate change threatens life-sustaining systems, across the entire globe but it is the direct effects such as deaths and climate induced migration which are the most agonizing (WMO, 2020). Scholars across various disciplines agree that these grand challenges demand immediate and radical attention (George et al., 2016; Rockström et al., 2009). Nevertheless, both the practical management and academic literature have yet to offer a theoretical understanding or clear roadmap that aspiring innovators and entrepreneurs can use to create a flourishing world.

Despite the urgent need to create sustainable innovations that resolve grand challenges the subject of sustainable innovation has not been adequately examined (Wright & Nyberg, 2017). Most of the scientific research in this area is centered on what drives sustainable innovation from the meso and macro levels, while the micro-level processes which facilitate sustainable innovation have been ignored. Consequently, understanding why and how the UNEP YCE have created innovations that are well aligned with the goals of sustainable development is critical as this knowledge may direct future efforts towards sustainable development. This study extends the sustainability literature and advances management scholarship on the SDG's by presenting findings from an exploration of sustainable innovations created in diverse global settings, at the micro-level and across levels.

Addressing a Research Problem

In 1995 the Academy of Management Review published its first special issue on sustainability in which many contributors argued that management scholarship in this discipline was too focused on a single level of analysis and recommended analyzing systems and multilevel interactions instead (Shrivastava, 1995; Starik & Rands, 1995). Since then, this same critique of sustainability research has persisted, particularly as it relates to research that focuses on the micro-level (Sharma, 2002; Howard-Grenville et al., 2019). For example, in a review of 588 journal articles and 102 books on responsibility and sustainability published from 1970 to 2011 only four percent of studies were at an individual or micro-level and five percent on two or more levels (Aguinis & Glavas, 2012). Similarly, Bansal and Gao (2006) found that in 79 publications in high impact journals only six percent of studies were at the individual level and nineteen percent crossed levels (Bansal & Song, 2017). Recently, in 2019, another special issue on sustainable development was published by the Academy of Management Discoveries. There, the editors urged that there should be more work done at the microlevel of analysis as knowledge is needed to understand how people suffer or thrive as individuals (Howard-Grenville et al., 2019).

Similarly, in the groundbreaking article on grand challenges, George et al., (2016) posit that actors operate at multiple levels: at the individual level, community level, country or regional level, the global level, and that their actions have multi-level influences. Hence, they are significant in solving Grand Challenges and in the attainment of the SDGs. In a discussion on transformative innovation, Bright et al., (2006) also brought attention to the individual as a key driver of

transformative innovation. They explained that the influence of the individual is translated to the group, the mesa system, and to the organization the macro-system. Furthermore, a prominent example showcasing the significance of the individual's internal dynamics is presented in a study of the UN Climate Change Summits where Schussler et al., (2014) found that if leaders were unable to manage paradox these summits could fail and serve as a mechanism of field maintenance rather than as catalysts for change.

In addition, management scholarship has mostly been fixated on the role of corporate players in enabling sustainable development, again focusing on the organization or mesa level as opposed to understanding how the micro level facilitates sustainable development (Bode et al., 2019; Wright & Nyberg, 2017). A continued disregard for microlevel analysis, and cross-level analysis will result in the continued failure to present the multilevel understanding needed to solve grand challenges. Still, the lack of research studies which focus on microlevel analysis is not the only gap in this field of research. The editors from the AMD special edition also pointed out that management scholarship has a western bias and that there is an opportunity to make further progress on the SDG's by having a global focus where research is not limited by geographical reach (Howard-Grenville et al., 2019). Therefore, this study advances the Sustainable development discourse in several areas.

Addressing a Practical Problem

Although innovation has earned the reputation of being the best medium for sustainable development. Numerous scholars have noted that despite international efforts, innovations are failing to resolve grand challenges and bring humanity closer to realizing the Sustainable development Goals (Griggs et al., 2013; Lomborg, 2004; Whiteman et al., 2013). Boons et al., (2012) argue that although sustainable innovation is creating new global markets and transforming challenges into business opportunities, SD requires radical and systemic innovations which move beyond normal incremental adjustments that are merely product and process related. Similarly, Voegtlin & Scherer (2017) contend that firm-level innovations are not yet responsibly developed to facilitate SD and that it is necessary to create responsible innovations that specifically address the Sustainable development Goals (SDGs). While, in a discussion on social innovation and grand challenges, Wijk et al., (2019) posit that shallow benign business interventions often maintain existing power structures which can reinforce wicked problems instead of bringing sustainable transformation.

Nonetheless, despite the challenges and shortcomings numerous organization face in tackling sustainable development, the UNEP YCE have successfully created innovations that are well aligned with the goals of genuine SD. Without question, they are a perfect example of how individual actors play important roles in the attainment of the SDGs. The United Nations Environmental Program (UNEP) has recognized these exemplary young leaders for their pioneering environmental and social efforts and has presented them with the Young Champions of the Earth (YCE) award. The UNEP YCE program began in 2017 with the goal of honoring young change-makers with big, bold ideas for the environment and humanity. Each year this award is presented to seven persons between the ages of 18 to 30, from each global region: one

from Africa, Europe, Latin America and the Caribbean, North America, the Pacific, and two from Asia. The UNEP YCE have innovated in the areas of clean energy, ecosystem restoration, water security, agriculture, sustainable clothing, and conscious consumption among others. Apart from the UNEP YCE very few organizations and individuals have been able to create innovations that solve Grand Challenges and move the needle on the Sustainable Development Goals.

Methodology

The primary purpose of this study was to explore the phenomenon of sustainable innovation so to develop a theory which explains how and why individuals create sustainable innovations for a flourishing world. Grounded theory, an inductive, qualitative methodology was utilized for this exploratory study. The grounded theory methodology was first espoused in 1967 by Barney Glaser and Anselm Strauss in their book, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (Glaser & Strauss, 1967). According to these scholars, new theories result from an ongoing interpretive process of constant comparison where data are collected and analyzed simultaneously (Suddaby, 2006). In grounded theory instead of testing preconceived theories the main interest is in abstracting the information gathered on the social situation under examination into theoretical statements (Suddaby, 2006). Hence, data analysis proceeds systematically from open, axial and selective coding (Corbin & Strauss, 2015). Furthermore, data analysis also includes theoretical integration, and openness to creative interpretations necessary for theory development (Charmaz, 2008). According to Bansal (2019) considering that historical data is becoming “increasingly unreliable in predicting the future, inductive and abductive research can offer more insight than hypothesis-driven research”. In light of the above quote this study makes a contribution that is both relevant and rigorous.

Participants

Fifteen winners of the UNEP’s Young Champions of the Earth award were asked to participate in the present study. From this group, six persons under the age of thirty-one participated in the study. The participants were located in a variety of geographical regions globally, Nepal, Greece, Brazil, Ireland, California, and Kuwait. The criterion for participation in the study was (1) winning the YCE award and (2) for the participants to still be working towards the goal of sustainable development through the original innovation at the time that the study was conducted. In Table 1 below, these participants are described in terms of the age when they won the award, education level, location, and the SDG’s that their innovations addressed.

Table 1: Showing Participant Characteristics

| Participant (PT) | Gender | Age | Location | Education (Degree) | SDGs Addressed |
|------------------|--------|-----|---------------|--------------------|---|
| PT1 | Female | 21 | Latin America | Bachelors | Goal number 6; Clean Water and Sanitation |

| | | | | | |
|-----|--------|----|---------------|-----------|--|
| | | | | | Goal number 8; Decent Work and Economic Growth |
| PT2 | Male | 25 | Europe | Masters | Goal number 12; Responsible Consumption and Production Goal number 13; Climate Action Goal number 15; Life on Land Goal number 17; Partnerships for the Goals |
| PT3 | Female | 30 | Asia | Bachelors | Goal number 5; Gender Equality Goal number 8; Decent Work and Economic Growth Goal number 13; Climate Action |
| PT4 | Female | 30 | Middle East | Bachelors | Goal number 4; Quality Education Goal number 5; Gender Equality Goal number 13; Climate Action |
| PT5 | Male | 27 | North America | Bachelors | Goal number 13; Climate Action Goal number 14; Life Below Water Goal number 17; Partnerships for the Goals |
| PT6 | Male | 26 | Europe | Bachelors | Goal number 13; Climate Action Goal number 14; Life Below Water Goal number 17; Partnerships for the Goals |

Procedure

The participants were first contacted by a brief invitation message on LinkedIn, a professional networking website. Those who agreed to participate were then sent an emailed letter describing the research goals and methods of data collection. This letter included an ethics statement and consent forms for their participation and for video recording. Closer to the interview date a second email was sent describing the interview process. The interviews were conducted on Zoom, an online platform for video conferences and lasted for about 45 – 75 minutes. Each interview was recorded, saved, and transcribed for analysis using Trint software. Participants were sent a copy of their transcribed interviews at the commencement of data analysis so that they could edit or expand the information. A follow up interview proceeded based on the participants availability.

Instruments

The primary instrument was an in-depth interview guide. This interview guide included questions specific to the research questions and to sustainable innovation. These questions were refined

through a pilot study where one of the UNEP YCE award winners was interviewed to assess the fit and meaningfulness of the questions. The initial interview guide included the following areas: views and attitudes about sustainability, life experiences, life purpose, support systems, and coping practices. After the first interview, the initial questions evolved to better generate answers that were more closely connected to the research questions. Consistent with the goals of qualitative research the participants were encouraged to describe their experiences in their own words and from their own viewpoints. The primary interview questions avoided using constructs which had the potential of leading the participant towards a particular response, however, the secondary or probing questions were less structured, more organic, and, in some cases, included theoretical terms to explore emerging concepts. In grounded theory data collection serves as the primary means for theoretical sampling and so the objective was to ensure the interview questions generated data that facilitated the process of category development. The UNEP YCE award winners were an interesting sample of research participants who had been interviewed many times before in different settings and so in terms of data collection, hence, there was a lot of archival data from videos and documents available to analyze and deepen my investigation on each of the participants even more.

The Researcher as an Instrument

“Grounded theory is an interpretive process that depends upon the sensitivity of a researcher to tacit elements of the data or meanings and connotations that may not be apparent from a mere superficial reading of denotative content” (Suddaby, 2006, p. 639). In this study I functioned as an instrument as I performed the function of an interviewer as well as an interpreter or the lens through which the data was read and analyzed. When analyzing the data, it is expected that my own subjective interpretation, awareness, sensitivity to the participants words, tone of voice and facial expressions influenced how I interpreted the data collected. Nevertheless, the term “theoretical sensitivity” which is commonly used in grounded theory highlights the importance of the researchers’ awareness and interpretive insight. After reflecting on how the data was collected and analyzed and reviewing the findings, I believe my role in this process was positive and successful. Table 3 below displays the interview questions and how they pair with the research questions.

Data Analysis

“Analysis begins after the first data are collected. Data collection is followed by analysis. Analysis leads to concepts. Concepts generate questions. Questions lead to more data collection so that the researcher can learn more about those concepts. This circular process continues until the researcher reaches the point of saturation” (Corbin & Strauss, 2015, p. 135).

In grounded theory research there is a circular movement between data collection and analysis, and this is the process that was utilized for this study. Hence rather than collecting all the data at once (which is done in other forms of qualitative research) the interview data was first analyzed using open and axial coding before continuing to another interview. By the third interview I had

already begun developing subcategories and categories that the other cases would later confirm. Table 2 below displays the interview questions and how they pair with the research questions.

Table 2: Interview Matrix Showing Interview Questions and Research Questions

| Main Research Question | Interview Question |
|---|--|
| Why do the UNEP Young Champions of the earth create innovations for sustainable development, are there internal dynamics that drive them to create sustainable innovations? | What led you to this type of work, towards sustainable innovation and sustainable leadership? Can you recall a particular experience that may have propelled you into this direction? |
| | What about your current role being both a leader and an innovator in your organization, is the most meaningful and energizing part of this experience for you? |
| | Imagine yourself twenty-five years from now, imagine that all of your plans and your highest visions for your organization has come to past and exceeded your expectations. What kind of legacy do you think you would have created? |
| | what has been one of the most important things that you have learned about yourself from this experience of being a UNEP YCE? |
| How are the UNEP YCE able to create innovations that are aligned with the goals of sustainable development? | Can you reflect on a situation when you first recognized your potential to create change? |
| | Could you please describe how your organization contributes to sustainable development from an environmental, social and economic perspective? |
| | What would you say is the root cause of your success? |
| | What elements have supported you on this journey? Is there any particular time throughout this journey that you felt that you were supported by something bigger than yourself or beyond yourself? |
| Are there any life experiences which may have encouraged the UNEP YCE to pursue a career in sustainability and to do meaningful work? | Considering the collective impact that you and all of the winners have had on the world, if you could create some sort of curriculum that would build the essential strengths or behaviors needed to create similar innovations, what courses would you include? |
| | It is often said that “the whole is more than the sum of its parts”, are you able to recall any experience? when this was relevant to your situation? |

Open Coding

During open coding, each interview was initially coded by employing an ‘open’ approach to the data where the data was coded with fresh eyes that welcomed the discovery of new insights. “The process of open coding is exploratory and leads to concept identification” (Corbin & Straus, 1998 p. 87). The objective was to utilize an inductive approach and focus attention to every line and each word expressed by the participants. Open coding was done in two and in some cases three rounds of coding. During the first round of open coding hard copies of the transcripts were read to select and underline in-vivo codes, key quotations of the participants which amplified the essence of their narrative while speaking directly to the research goals (Saldana, 2016). The second round of open coding employed a more systemic approach to open coding which created descriptive codes using the “what is the main idea being expressed here?” technique (Corbin & Strauss, 2015 p. 218). Process codes were also created by asking the question “what is happening here” and considering “what is the action being taken, who is doing it? When? Where? How? Why?” (Corbin & Strauss, 2015, p. 219). Approximately 350 open codes were generated after open coding all the interviews.

As part of the grounded theory methodology used to analyze the data collected for this study open codes were placed into groups. These groups were formed and reformed continuously, before, during and after the axial coding process.

Table 3: Table Showing Some Raw Data and Corresponding Open Codes for Interview Question 1

| Interview Question: What led you to this work (towards sustainable innovation)? | |
|--|--|
| Raw Data (participant's quote) | Open Codes Generated |
| <p>“One of the experiences definitely that helped lead me towards working in the environmental field was an experience I had when I was about 16 years old. I was able to go and live with an indigenous community in the deep rainforest in Mexico and I spent a week living in this community that was descended from Mayans and really experienced that way of life that's so deeply connected with a rainforest and the environment around them. Well, also seeing how that way of life was threatened by the encroachment of kind of the Western world in a number of different ways, including deforestation and cattle farming and so as a teenager, I definitely already knew that I wanted to devote my life towards doing something positive for the environmental movement.” PT 5</p> | <p>Process codes: ‘Awakening to one’s life purpose’, ‘Experiential learning’, ‘Choosing a green careers’ ‘witnessing the challenge’</p> <p>Descriptive codes: ‘Imprints of early years’ ‘Devoted environmental activist’</p> <p>In-vivo codes: “I wanted to devote my life towards doing something positive for the environmental movement”</p> |

| | |
|--|---|
| <p>“when I was growing, and I saw that it wasn’t a reality for more families that was around me my friends my colleagues. I saw that they needed to do this! I needed to do something so more people could act and do things for the environment” PT 1</p> | <p>Process code: ‘Witnessing the challenge’ ‘Feeling empathy’</p> <p>Descriptive code: ‘Imprints of early years’ ‘Aware of personal Power’ ‘Passionate environmental activist’</p> <p>In-vivo code “I needed to do something”</p> |
|--|---|

Constant Comparison

As the research study proceeded new data and open codes were constantly compared to prior data. This ensured that similarly defined codes were grouped together and if the meanings were not distinctive enough those codes were replaced with more representative concepts.

The constant comparison technique between and within interviews was employed in an effort to refine early open codes, improve their representativeness and create code groups with codes sharing a similar meaning (Corbin & Strauss, 2015). In some cases, during the open coding process descriptive and analytical memos were created simultaneously.

Axial Coding

In this research study, Axial Coding followed after the open coding process and employed methods of process thinking (Langley, 2007) and process research (Langley et al., 2013; Langley, 1999). Process research focuses on how and why things emerge or develop over time as it places close attention on the individual interpretation of experiences and the narratives which shed light on these experiences. Hence it reveals the dynamic activity underlying the phenomenon, thus transcending the linear, static analysis of outcomes (Langley et al., 2013). Understanding process is significant for advancing management research as it offers the opportunity to understand emergence, change, stability, and causality (Langley, 1999; Howard-Grenville et al., 2019).

Here, I focused on process codes that captured critical aspects of the participants, and causal relationships between actors and events, this facilitated a more formal coding process that condensed the initial code list (Howard-Grenville et al., 2013). Emerging ideas were compared with constructs in extant literature in the related field for cross-checking purposes and to reinforce the emerging concepts (Strauss, 1987).

When researchers are coding for context, they are doing what Strauss (1987) called “axial coding”. They are locating and linking action-interaction within a framework of sub-concepts that give meaning and enable it to explain what interactions are occurring, and why and what

consequences real or anticipated are happening because of action interaction. (Corbin and Strauss, 2015, p. 156)

Three tools recommended by grounded theory scholars Corbin and Strauss (2015) to perform axial coding and reveal process and context were also used; the paradigm, the conditional/consequential matrix, and memos. In addition to these analytical tools, diagrams or visual maps of processes were constructed with paper and pencil to organize and theoretically frame the data (Langley, 1999; Corbin & Strauss, 2015).

Selective Coding

This was another complex and multifaceted part of the data analysis process. During the early stages of data analysis, my focus was centered more on the specific details and concepts that were emerging and how they were related to each other. I remained close to the methodological and systemic approach of Corbin and Strauss (2015) and continually asked ‘what is this data telling me overall?’. However, further into the process, during selective coding, I took a more creative and holistic approach encouraged by Glaser. This shifted my focus directly on answering the research question – why and how the UNEP YCE create high-impact innovations for sustainable development. It included paying attention to my intuition, interpretations, and creative insights.

It was also appropriate to step outside of the data and eliminate initial categories which were less abstract and add new ones which were more appropriate in the context of a core category. According to Corbin and Strauss (2015), a core category is the central category of the research. It has the greatest explanatory power and is able to link the other categories to it and to each other, therefore it represents the main theme of the research. In addition, it is a concept that is “sufficiently broad and abstract, that summarizes in a few words the main ideas expressed in the study” (p.188-189). Hence the final four core categories Entangling, Enlightening, Enacting, and Evolving which are explained in the findings sections, are abstract and broad while being somewhat descriptive.

Data Collection & Analysis Demonstration

In this section, a small glimpse into the process of data collection and analysis is provided.

Research Question

Why do the UNEP YCE create high-impact innovations for Sustainable development?

Interview Question

I want to understand what led you to this work, could you describe or explain how you were propelled into this direction?

Participant Quote

“There are a couple of key moments starting in 2010 when I was in secondary school, I was looking to go off with a group of classmates to work in Calcutta, in India for a short period of time, it was designed as like a volunteer kind of trip. I was teaching English and math to teach children in a school that was located in the middle of one of the city's dumps and I mean, the teachers design it for us was like a wake-up, you know, there's a bigger world outside of the nicer little Western bubble where there is a lot of things that you're not gonna be comfortable with and you really need to understand and try and make a difference during your life. So that was a pretty shaking experience. I was 17 at the time and obviously, I absolutely love it, but it really makes you question a lot of things. And I suppose from that point on, I was definitely like, well, what's the point in doing anything at all if you're not trying to make a difference? So, it wasn't so much although I was interested in climate and that kind of thing at that point, it was more a knowledge that I had spent my time doing something to make the world a better place at that stage.” PT 2

Open Coding:

- In vivo codes: “wake up”, “what's the point in doing anything at all if you're not trying to make a difference?” “pretty shaking experience”
- Process codes: witnessing a challenging reality, questioning the purpose of life, awakening to one's life purpose, choosing a social career.
- Descriptive Codes: Mindset shifting experience, Experiential learning, Aware of one's power.

Memo

Here he is describing a key moment in a slum in India that led him towards sustainable innovation. He describes it as a shaking experience, a wake-up experience where he gained a broader more truthful perspective of the reality of life. These words describe the intensity of the experience. There are a few process codes; witnessing a challenging reality, questioning life, awakening to one's life purpose, choosing to work towards making the world a better place. This quote also includes knowing that he has the power to change or influence on the world – Knowing one's power of influence. When he mentions what's the point, we see the intensity of his level of commitment. He mentions that it is a short trip but it is a teaching assignment and so we might assume that this experience is of a short to medium duration.

Paradigm

Condition: witnessing a challenging reality in India

Action/Interaction/Emotion: questioning life, feeling shaken, feeling concerned, feeling the need to take action

Consequence: awakening to one's life purpose, choosing to work towards making the world a better place.

NVivo Coding Demonstration

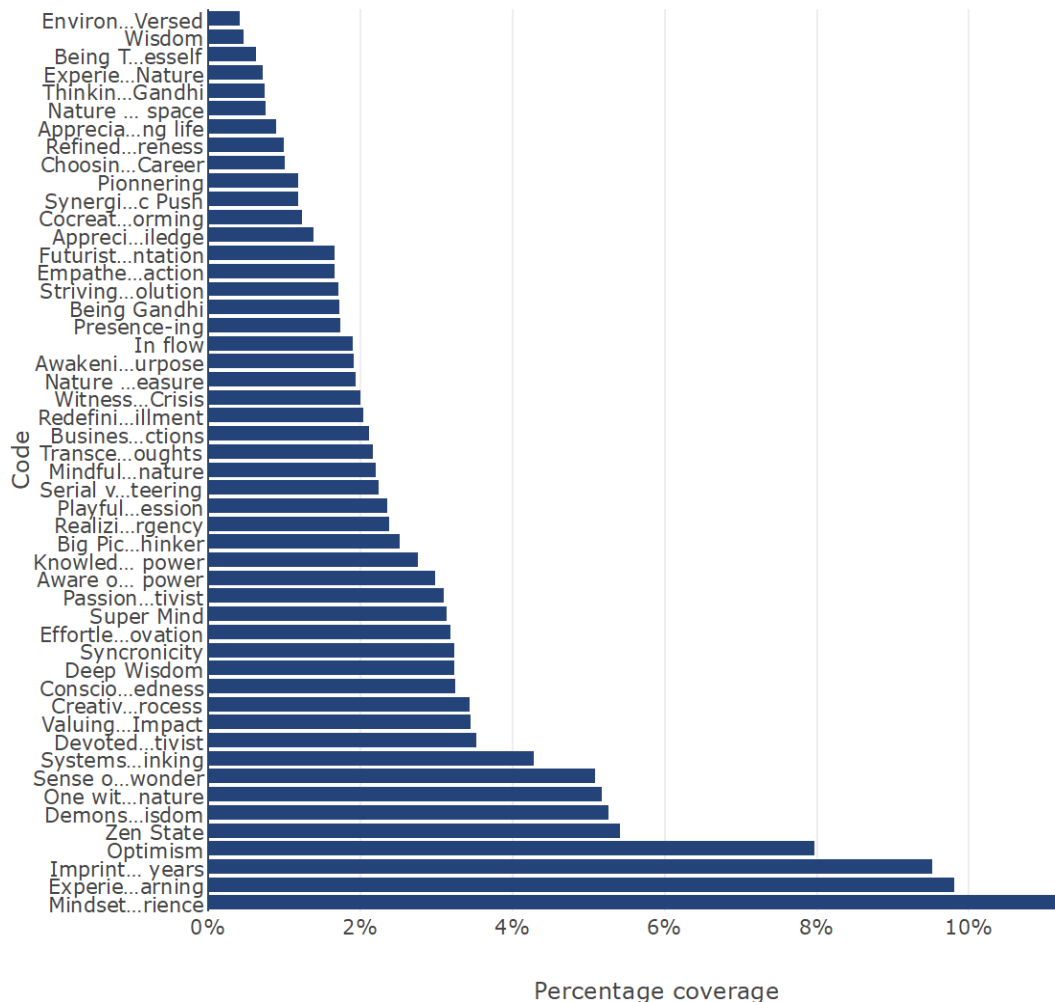
The NVivo Software also supported the data analysis process. Figure 1 shows the frequency and percentage of the codes produced from the interview with PT 5. The diagram presents the most frequently used codes in bigger blocks positioned at the top left side of the figure while the less frequent codes are positioned towards the right side in smaller blocks.

Here we can see that 'imprints of early years' and 'experiential learning' are two of the most frequent codes in this interview. Please note that both codes are grouped into the same code group during the next stage of coding and later into the same category.

Figure 1: Code Frequency Diagram, PT 5



To provide another outlook of the PT 5 Interview Figure 2 shows the percentage of the interview accounted for by each code or percentage weight of the codes in the interview. Again, here we can see which codes make up a sizeable portion of this interview.

Figure 2: Code Percentage Diagram, PT 5

Theoretical Saturation

According to Glaser and Strauss (1967) the signals of theoretical saturation include repetition of information and confirmation of existing categories. Hence in grounded theory the focus is on the data and how it aligns with, develops and confirms the categories as opposed to the number of subjects participating in the study. This element makes grounded theory different compared to other methods of qualitative research. In conducting data analysis, I focused on sampling for relevant codes and developing them into a theory that answered the research questions and illuminated the phenomenon. I began my first interview with several questions that my main research advisor and I thought would lead to answering “why” and “how” the participants created sustainable innovations, these questions evolved as my process involved using the data to generate more effective and appropriate questions and using questions to generate more relevant data. Hence, during data analysis, I identified and focused on the questions that supplied the most

relevant answers to the research questions. This facilitated the process of developing categories, core categories, the theory itself and reaching saturation. According to Corbin and Strauss (2015, p. 135) “In theoretical sampling it is concepts and not people per se, that are sampled”.

In addition, in grounded theory the categories should be explored in depth to identify various properties and dimensions. This implies not only that upon completion of data analysis no new categories or relevant themes are emerging but also that the theory is dense and logical.

Identifying properties and their various dimensions enabled me to develop the categories completely and reach theoretical saturation. This was paired with a creative lens focused on category development. In addition, in developing the theory, I took a step back from considering the systematically derived subcategories and categories and allowed my subjective interpretations and insights to merge with the empirical context of the study (subject area) and develop the final theory. According to Glaser Corbin & Strauss (2015) “Theoretical sampling continues until all categories are saturated – that is until all relevant properties and dimensions have been identified and there is variation built into the theory” (p. 147).

Steps for Validity

Traditionally research findings are only deemed rigorous when they conform to the “specific practices of knowledge production widely accepted in the academic community” (Sharma & Bansal, 2020; Van de Van 2007). For example, in the positivist tradition, it is construct validity, internal validity, external validity, and reliability that is used to access rigor (Campbell, 1979). However, according to Maxwell (2013), it is the depth of the phenomenon studied and triangulation from other studies which provide credibility and establish validity in qualitative research (Maxwell, 2013). In addition, unlike quantitative studies that test hypotheses on sizeable populations, the value of a qualitative study typically depends upon its ability to illuminate extreme or ideal cases (Maxwell, 1994). Furthermore, grounded theory is a qualitative method that stays close to the raw data and is therefore high in accuracy. Hence, when this method of inquiry is coupled with a cross-case analysis of four or more cases it provides a good basis for analytical generalization- expanding and generalizing theories (Eisenhardt, 1989; Yin, 2009).

Primarily, validity in grounded theory relies on the proper execution of the grounded theory method itself. Hence ensuring that the theory was grounded in the data through the systematic process of data collection and analysis was the most important consideration in this study. In addition, several steps were taken to strengthen the validity of this analysis. First, internal validity was established during the data analysis phase through constant comparison of the data within and between interviews and theoretical or concept sampling was executed. According to (Strauss & Corbin, 1998 p. 200) “a theory is validated by comparing it to raw data or by presenting it to respondents for their reaction”. In addition, validation of the data was achieved through peer checks and member checks. The findings were discussed with some of the participants, for their feedback and confirmation, and the data analysis process was verified with external persons - other Ph.D. researchers in the department of management at my university and members of my

dissertation committee, particularly my main research advisor who has decades of experience with this research method.

The data was triangulated with prior findings or theories from similar streams of research (Yin, 2010) and at the end of data analysis, the theory was reviewed to ensure that it was grounded in the data. Furthermore, triangulation of the interview data with archival data also enhanced validity. Although grounded theory does not focus on external validity as in other qualitative research methods or quantitative research, the following section explains how external validity is addressed in this study.

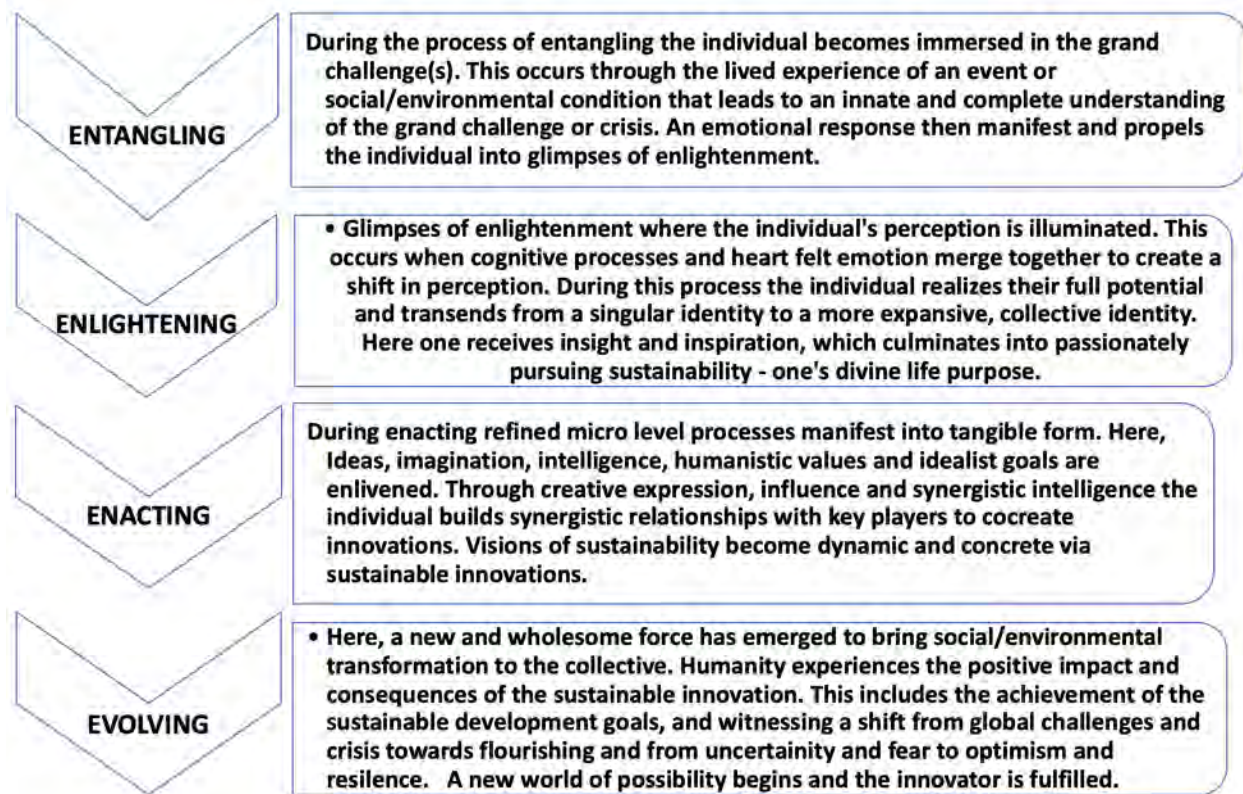
According to Maxwell (2013, p. 138), “The generalizability of qualitative studies is usually based not on explicit sampling of some defined population to which the results can be extended, but on the development of a theory of the process operating in the case studied, ones that may well operate in other cases, but that may produce different outcomes in different circumstances.” In research studies involving multiple case studies external validity can be achieved by using replication logic (Yin 2015). Here, a sound theory has been presented that enables the findings to be generalized to similar situations as subsequent cases were used to validate the findings discovered in prior cases. Furthermore, Yin (2015), also rationalized that “augmenting the study design with how and why research questions can be extremely helpful in establishing the groundwork to address external validity” (p. 46). In this study the primary research question was “Why and How the UNEP YCE create innovations for sustainable development”, this speaks directly to Yin’s recommendations. Furthermore, reliability was established through the transparency of the study methods and data analysis, which can be replicated to achieve similar results (Gibbert et al., 2008).

This section described, defined, and illustrated the methods used to conduct this research study. It described the participants, instruments, procedure, method of data collection and demonstrated how the grounded theory methodology was utilized to analyze the data collected. The grounded theory method is a meticulous process that includes many memos, outputs and diagrams from the coding software which exceeded the scope of this summary paper, however, I attempted to include some material to demonstrate the integrity of the process. The following section presents the results or findings of the study, it provides a deeper look into the final four categories and discusses how each category integrates with the other.

Findings

The data from this research revealed a 4 E Process Model where lived experiences orchestrated by grand challenges at the macro level trigger micro-level processes within the individual enable mesa level interactions which facilitate the development of sustainable innovations. These four processes were named: Entangling, Enlightening, Enacting, and Evolving.

Figure 3: 4 E Process Model



Entangling

In this 4 E process model, high impact sustainable innovations are first birthed through Entangling. Entangling is a process composed of two significant stages, immersion, and epiphany. Immersion occurs through the lived experience of an event or social/environmental condition at the macro level. This leads to an innate and complete understanding of the grand challenge or crisis. Entangling is the first and arguably the most critical phase in the model as it is the catalyst for the other three phases.

During immersion, the experience of critical social and environmental challenges is such a direct one that the perception or interpretation, and subsequent emotion generated from these critical events and experiences creates an epiphany, a mental response which drives the momentum for enlightening the next processes in the model. Hence, that the lived or direct experience of the individual extends beyond just seeing or witnessing the challenge. This lived experience is a more dynamic process that impacts both perception and emotion, two micro level processes that facilitate the resulting epiphany and completes the Entangling process. Therefore, Immersion involves two key processes:

- The experience of the macrolevel challenge.

- Perception and emotion, at the microlevel.

Perception as defined here describes the process of seeing and primes one for an emotional response. Perception was an appropriate bridge between physically witnessing the crisis through lived experience and then feeling emotion because it is this seeing and interpreting what one has seen that subsequently evokes the emotion. Emotion is another key part of this process. In this study, the emotions expressed by the participants not only gave insight into the level of intensity of the experience but also illustrate the micro-level process which facilitates action. Emotion is crucial to the model as it articulates the human condition of which feeling, and sensitivity are a central part. Following emotion, one returns to the mental plane where an epiphany occurs. The epiphany can be described as a moment where love meets logic; it moves the individual into an even deeper internal experience that grows during Enlightening, the next phase in the model.

How Raw Data Ground the Core Category Entangling

The following Table reports how the core category – Entangling was realized. The table shows the core categories, categories, code groups, open codes, and a significant quote in that category. The full paper includes such a table for each core category.

Table 4: Quotes, Codes, and Categories for the Core Category Entangling

| Core Category | Category | Code Groups | Open Codes | Most Significant Quotes |
|---------------|-----------|--|---|---|
| Entangling | Immersion | Experiential Learning Immersion | Internalizing the Challenge Witnessing the challenge Imprints of Early years Conscious of the present moment Tuning in Presence-ing Transcending thoughts | “When I was in high school, I got the chance to go and work in Calcutta, in India... So that was a pretty shaking experience, I was 17 at the time... it really makes you question a lot of things” PT 2. |
| | Epiphany | Mindset Shifting Experience | Realizing the urgency of Grand Challenges Mindset Shifting Experience Shifting mental models Emotional Triggers Pain Points Wake Up | “To be honest the first time I saw a truck full of plastic that we took from the sea I almost cried” PT5. |

| | | | | |
|--|--|---------------------------------------|---|--|
| | | Awakening to one's life purpose | Awakening to one's life purpose Reevaluating priorities Redefining Happiness Redefining Fulfillment Realizing truth-awakening Purposefully convinced Choosing green careers Led by Conviction | |
|--|--|---------------------------------------|---|--|

Enlightening

Enlightening is the second stage in the process model. It can be described as glimpses of enlightenment where the individual's awareness is illuminated. In Enlightening one receives insight and inspiration, and feels power, love and connectivity. This culminates into the drive to passionately pursue idealistic goals that save the planet and empower humanity. Enlightening can be described as a process of self-realization where cognitive processes and heart felt emotion merge together to create a shift in how one interprets the self and the outside world.

Self-Realization, as defined in my coding process is an understanding of one's true nature, one's full potential and one's place in the circle of life. It enables the highest expression of humanity to be expressed through someone's life through love and empathetic dynamism. Self-Realization is central to the Enlightening process, it includes power awareness and amplified identity. Power awareness denotes that the individual realizes their potential and intention to solve grand challenges. In addition, amplified identity denotes how during Enlightening the individuals' sense of identity becomes amplified. Meaning that one experiences feelings of love, connection and compassion and transcends from a singular identity to a more expansive, collective identity. Power awareness and amplified identity operate in unison to position the individual on a path that is recognized as one's divine life purpose. This path becomes concrete in the next phase of the 4 E Model, Enacting.

Enacting

The third phase in the 4 E process model is the Enacting phase. Sustainable innovations become concrete and tangible during the Enacting phase. Enacting is a process where refined micro level processes manifest into tangible form at the mesa level. It is an instrumental part of the 4 E process which functions as a portal that transmutes internal intelligences into external innovation. Whereas Entangling and Enlightening answer the "Why" of the research question, Enacting answers the "How".

This phase is composed of two processes that I refer to as Super Brain and Synergy. The concept of super brain denotes brain functioning at an optimum level of performance where thinking is

holistic, creative and dynamic. A super brain produces evolutionary ideas due to a high level of imagination, creativity, brainstorming and systems thinking. It is an active, energetic and exploratory brain. In addition, the thoughts produced are layered with humanistic values and idealist goals previously evoked during the Enlightening phase. A significant part of Super Brain is synergistic intelligence, the ability to think holistically and at a systems level. Here it is referred to as an intelligence because it resembles a trait that the individual possesses that is instrumental in enabling visions of sustainability to become dynamic and concrete. The micro level processes described above coupled with previous qualities in the Enlightening phase lead to Synergy.

Synergy, the second category in this core category represents the 'how' of creating high impact innovations, how the individual influences and collaborates in sync with others to construct the sustainable innovation. Synergy occurs at the group or mesa level where one effects change by enlivening others to participate, act and invest. It includes the ability to inspire, unify, and move others into collaborative action. Hence, synergistic intelligence described in Super Brain serves as a critical tool which the innovator uses to create synergy. This building of synergy with key players is essential to creating high impact innovations for a flourishing world.

Evolving

During Evolving, a new and wholesome force has emerged to bring social/environmental transformation to the collective. Here, both the planet and humanity experience the positive impact and consequences of the sustainable innovation. This includes the achievement of the sustainable development goals, witnessing a shift from global challenges, fear, uncertainty and crisis towards flourishing, optimism, and resilience. Here a new world of possibility begins to unravel, and the innovator is fulfilled. Two subcategories distinguish this process, Continuous Sustainable Innovation and Flourishing. Continuous Sustainable Innovation describes a process of constantly innovating, enhancing and refining the innovation or model so that it provides the maximum benefit to both the environment and the people. For example, one participant said "right now we are in the version number 11 so it has been a long journey trying to make the product even better, and we are still making more optimizations to make sure that it's really change people's life" Flourishing describes a planet where balance and wholeness has been restored. A flourishing world is one where the planetary systems function harmoniously and fairly. Here all life forms experience the fullness of life and the future looks of the planet looks promising. For example, one participant said, "it's like the butterfly effect, the actions of a person can change the lives of so many other people, the townspeople and the rest of the world."

Limitations

As with all studies, this study has a few limitations. First, six ideal cases of sustainable innovation were used to develop the theory. In each case study analysis, the innovator was actively and successfully pursuing sustainable innovation. Although this provided an excellent opportunity to explore why and how the participants created innovations for sustainable development, in restricting the study to these high-performing individuals it may have limited the generalizability

of the findings. Exploring cases of sustainable innovation which were not successful may provide more clarity on the phenomenon.

Second, although efforts were made to execute a multi-level study, in comparison to the analysis at the macro and micro levels, mesa level interactions were not as thoroughly assessed. My focus limited exploration of how the innovator and his/her teams worked on building and financing innovations. Hence further exploration of the actions which take place at the mesa level is needed. In addition, the data did not include observations or interviews with others but relied on self-report and some archival videos and documents. The 4 E process model taken by innovators to create innovations does answer the question of how the UNEP YCE create sustainable innovations by describing how the innovators think, interact and behave. However, more in-depth case studies could examine the step-by-step actions taken to create the innovations.

Finally, a stronger focus on temporal dimensions of the participants such as childhood history would offer further clarity into the why of the research question. Although the interview process did a good job in gathering such data, for example, some of the text was coded as “imprints of early years” and “childhood experiences”, a more deliberate focus into the participants' history may be insightful. My theorizing draws attention to the strengths of grounded theory analysis as a method of process research for understanding sustainable innovation. However, future research that can measure emotions and cognition will be beneficial. In terms of exploring emotions, a more fine-tuned analysis that explores and quantifies the total number of impactful lived experiences, as well as their intensity, will deepen the experiential focus of the research and leverage opportunities for macro-level research.

Value of the Paper

This research impacts practice and extends existing theory in several ways. It advances a broader understanding of sustainable development and sustainable innovation and contributes to the literature on process research, emotion, and entrepreneurship, and has implications for learning and education.

Sustainable Development

This study answers the call for more multilevel and microlevel analysis of the sustainable development phenomenon (Bansal, 2019). In many cases research on sustainable development has been centered on a single level, particularly the organizational or mesa level, however, it is becoming clear that it is individuals who form the foundation of organizations and social systems and are therefore the most fundamental. This study provides a richer and more profound understanding of micro-level processes and broadens the generalizability of micro-level research. Sarasvathy and Ramesh (2019) present a model focused on micro-level processes for entrepreneurs to tackle sustainability issues while offering a theoretical framework for researchers to develop and investigate micro-foundations. Their work reanalyzes a historical case study (Ostrom, 2010; 2015). This research study has advanced their efforts. It has gone beyond archival

data and analyzed data collected from multiple live interviews which permitted more fine-grained micro-level analysis.

In addition, analyzing the outcomes of each of the sustainable innovations and enterprises created by the UNEP YCE according to their response to the SDGs has illuminated their achievements and macro-level impact in the context of the Sustainable Development Goals. Furthermore, my investigations into the macro-level conditions and events which triggered the internal reactions at the individual level and the subsequent team level interactions employed for these innovations to be birthed also demonstrate my emphasis on multi-level research. As stated by the editors of a special issue of the *Academy of Management Discoveries*, multiple levels of analysis are “crucial for understanding progress on and roadblocks to the SDGs, which implicate actions at the individual, group, organizational, sector, and institutional levels and manifest at the local, regional, national and global scales” (Howard-Grenville et al., 2019, p. 355). Furthermore, unlike prior studies of innovation for sustainable development which have been limited to subjects from a single geographic region and which have a western bias, this study acknowledges that the SDGs compel a global focus and responds to the invitation to broaden the generalizability of sustainability research (Howard-Grenville et al., 2019). It transcends the Western domain and investigates cases in various global settings; North America, Asia, Europe and the Caribbean, to give more holistic insight on how grand challenges are being tackled globally.

Process Research

Second, my analysis contributes to the growing body of process research (Langley, 2007). Process studies question how and why things emerge or develop over time to reveal the dynamic activity underlying the phenomenon, thus transcending the linear, static analysis of outcomes (Langley et al., 2013). Most prior studies on sustainable innovation have focused primarily on action and overlooked the critical internal micro-level processes which form the basis for such sustainable action. However, as specified by Langley et al., (2013) understanding process is significant for advancing management research as it offers the opportunity to understand emergence, change, stability, and causality. Similarly, sustainability scholars have highlighted the value of conceptual tools that contribute to “how meanings, actions, and arrangements are constructed, perpetuated and changed” (Howard-Grenville et al., 2019, p. 356). My investigations of why and how the UNEP YCE create sustainable innovations answers this ongoing call to plunge more deeply into process (Langley, 1999; Howard-Grenville et al., 2019) as it places close attention on the individual interpretation of experiences, and the narratives which shed light on perception, emotion, and cognition. Each of the four stages of the 4 E model uncovers the conditions, thoughts, feelings, and interactions, that move the innovator through Entangling, Enlightening, Enacting and Evolving.

Emotion and Entrepreneurship Research

Third, the articulation of the phases in the 4 E model clarifies a critical debate within the entrepreneurship and innovation literature. There have been inconsistencies about the role of emotion and affect in facilitating innovation. One side of scholars have described such concepts

as poorly distinguished concepts (Arend, 2013) while others have shown that feeling and emotion serves as a motivator for entrepreneurship and prosocial behavior (Bacq & Alt, 2018; Baron, 2008; Miller et al., 2012). My theorizing is consistent with Baron (2008) who suggests that affect may be a mediator between individual-level and macro-level variables and also with Miller et al., (2012) whose theory sheds light on how other oriented compassion is transformed into social entrepreneurship by means of flexible thought processes and greater commitment to action. In addition, Howard-Grenville et al., (2013) argued that experiences and emotional involvement can shape identity understandings and collective action. The 4 E process model supports this logic as it illustrates how a two-way process between cognition and emotion facilitates sustainable innovation. Hence, this research advances the understanding of experience and emotion as drivers of processes for sustainable entrepreneurship and innovation (Howard-Grenville et al., 2013). Consequently, it has implications for further study, it suggests that further exploration of how experience, emotions and cognition function to enable pro-social and environmental decision making is needed.

Implications for Learning and Education

A key contribution of this dissertation is to the field of education, specifically sustainability education and management education (Kassel & Rimanoczy, 2018; Cook, 2019). The scholars in *Developing a Sustainable Mindset for Management Education* (Kassel & Rimanoczy, 2018) have presented experiential learning as a method for teaching entrepreneurship with a sustainable mindset. They also propose active learning and field experiential learning in developing countries as tools to guide students into sustainable leadership and innovation. The findings in this study also suggests that experiences or experiential learning can accelerate progress towards a flourishing world. Therefore, including real world, experiential and emotion-generating exercises and simulations should enhance the learning journey and cultivate students' capacity to create sustainable impact.

Similarly, scholars in *Sustainability Human Wellbeing and the Future of Education* (Cook, 2019) also discuss the benefits of transformative learning (Laininen, 2019, p. 168). There, transformative learning is said to “open up one’s frame of reference, allows seeing alternatives and changes thoughts and actions”. The implications of the present study align with the concept of transformative learning described as a deeper level of learning through experiences which can allow moments of epiphany and inspiration (Schutel et al., 2018; Stering, 2011). Shifting the education paradigm towards experiential and transformative learning where students can be immersed in firsthand, field experiences in addition to simulated experiences invites educators to evolve and rise to the challenges of the 21st century.

According to Ehrenfeld and Huffman (2013) “The scale of the sustainability challenge faced by humanity calls for a fundamental shift in our way of thinking that goes to the core of who we are as a human being, a movement to reexamine who we are, why we are here and how we are connected to everything around us”. Gaining insight into the internal dynamics that drive sustainable development (SD) at the individual level may enable both social and environmental

scientists to predict sustainable behavior and could be applied in education systems to cultivate sustainable behavior.

Summary

The present grounded theory study sought to answer the question of “Why” and “How” the UNEP YCE create sustainable innovations for sustainable development. The data was used to create a 4 E process model which model describes that the UNEP YCE experience macro-level grand challenges which trigger micro-level feelings and cognition that then drive them to leverage their full potential, create synergy with others at the mesa-level and innovate responsibly for social and environmental evolution.

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The Regressive Effect of Climate Change on Social Inequalities: Analysis and Policy Recommendations

Claudia García Zaragoza (Pompeu Fabra University, Spain)

Abstract

Climate change and within country inequalities (or social inequalities) have traditionally been studied independently. This paper aims to put two of the most pressing global challenge of contemporary times in parallel and reflect on their relationship. Climate change impact tends to be regressive, falling more heavily on most marginalized and stigmatized groups in society, thus exacerbating existing inequalities. Besides, it includes an analysis of three ways through which climate hazards impact more vulnerable groups: greater exposure, higher susceptibility to damages, and less ability to cope and recover. These three channels trap climate change and social inequalities in a vicious cycle difficult to overcome. Empirical evidence on recent climate hazards is employed to support theoretical assumptions. The paper concludes with policy recommendations to break the vicious cycle and build resilience to climate hazards and ultimately reduce social inequalities. The pack of policies suggested goes from localized tailored actions to global engagement and multi-stakeholder initiatives.

Keywords: Social inequalities, within country inequalities, climate hazards, resilience

Introduction

Climate change and growing inequalities are two of the most pressing challenges of contemporary times. The mentioned pitfalls have been traditionally approached from two independent angles. However, recent findings demonstrate the relational nexus that traps climate hazards and inequalities in a vicious cycle difficult to break.

The international discussion on climate change has been dominated by inequalities *across countries*. Mainly, the responsibility for causing climate change versus the responsibility from mitigating efforts. While *within country* or *social inequality* has received less attention. In this sense, the notion of climate justice relies upon the idea that higher income countries (HICs) produce more CO₂ and damages more the environment, while lower income countries (LICs), for their geographical location and less financial capacity to develop resilient territories, are more exposed to the adverse effects of climate change (Islam & Winkel, 2017). In this context, policies embracing climate justice have been designed to reduce the gap between countries.

For a long time, the discussion on the *impact* of climate change focused on the *physical* side (nature); with time, it paved the way towards the analysis on the *social* impact (the relationship with *poverty*) (Islam & Winkel, 2017). The study of the linkage between climate change and within-country inequalities took longer.

The IPCC's fourth periodical Assessment Report (AR) (2007) determined that socially and economically disadvantaged and marginalized people are disproportionately affected by climate change. This was one of the firsts reports advocating for such a novel perspective. It came to the conclusion that climate change exerts uneven impacts among countries and population groups. Further research drove experts like Skoufias to determine that "climate change impacts tend to be regressive, falling more heavily on the poor than the rich" (2012, p.6).

Nevertheless, the study of climate change's implications on social inequalities has been scattered and limited by spatial and categorical considerations. This paper seeks to overcome this weakness by assessing the regressive effects of climate variability on existing inequalities from a holistic approach.

Examining inequalities and draw conclusions for policy recommendations is rather challenging. It is therefore important to define which groups that will be under the umbrella of the study.

Multiple inequalities exist within countries and the term *social inequalities* are the category under which they are agglomerated. Figure 1 illustrates the breakdown of categories and groups that constitute the term *social inequalities*. In this sense, horizontal inequalities are those related to factors that determine the group's identity, such as ethnicity, race, caste, indigeneity or gender. While vertical inequalities are associated with income and wealth. Political inequalities are defined as the uneven representation and participation in decision-making most of the time based on status that is at the same time derived from horizontal and vertical inequalities within countries (Dalton, 2017). Needless to say, these various categories of discrimination are interrelated and intersectional. Socially and geographically disadvantaged people are exposed to various dimensions of discrimination (Islam & Winkel, 2017; IPCC, 2014, p. 796).

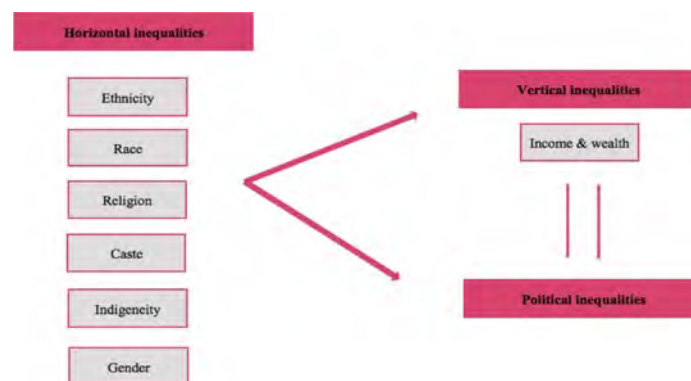


Figure 1 "Social inequalities": composition of categories and their relation. Figure elaborated by author.

Vertical inequalities are the easiest to identify and monitor, but they are the result of horizontal and political inequalities. For instance, marginalization and social exclusion are transformed into a reduction of social capital and access to community resources. In the same line, the consequential damages of an extreme event tend to be measured in monetary terms.

The term 'minority' is employed in this paper to refer to groups that are usually numerically

smaller, and who share a common religious, ethnic or linguistic identity different from the national majority (Baird, 2016). The aim of this paper is to center the scope on the effects suffered by the most marginalized groups in society. In this sense, enough evidence proves that ethnic minorities tend to live in the more marginal and exposed areas to climate impacts because they are often neglected by governments (Baird, 2014). Moreover, a study conducted in West Africa shows an interesting association of the concentration of ethnic (also religious) groups and the rural-urban split (Cavero, 2020). Employing a Civic Republican analysis of the case would show that the most vulnerable groups experience multiple types of dominations associated with the multiplicity and coexistence of inequalities they hold.

The relationship between climate change and social inequality is characterized by a vicious cycle. Initial inequality makes disadvantaged groups suffer *disproportionately* from the adverse effects of climate change, resulting in greater subsequent inequality.

Likewise, social inequalities result in more environmental degradation (Matin et. al., 2014). So we can affirm that inequalities harm climate change as well. The degree of exposure to climate hazards, susceptibility to damages driven by climate hazards, and capacity to cope and recover from climate hazards in many cases is determined by ethnicity. Of course, not exclusively on the ethnic group *per se* but for their conditionality on social and economic status. A greater understanding of the links between climate change impacts and inequalities within countries help to better tailor the design and implementation of policies able to simultaneously address climate change hazards and social inequalities. After an exposition of the different channels of the vicious cycle, the paper addresses policy recommendations to break the cycle, ranging from localized tailored responses up to global actions and cooperation to mitigate the disproportionate impacts towards marginalized groups and adapt to climate variations. The paper is global in scope since it approaches a challenge global in nature as climate change, but also because it considers the relationship between climate change and social inequalities in developing and developed countries.

The Vicious Cycle

Climate hazards tend to have regressive effects, hurting disadvantaged groups more than others. The scheme in Figure 2 illustrates the dynamic of the climate change-inequality vicious cycle. The underlying relationship that determines the cycle is the following: the *initial* inequality makes disadvantaged groups suffer *disproportionately* from the adverse effects of climate change, resulting in greater *subsequent* inequality (Islam & Winkel, 2017).

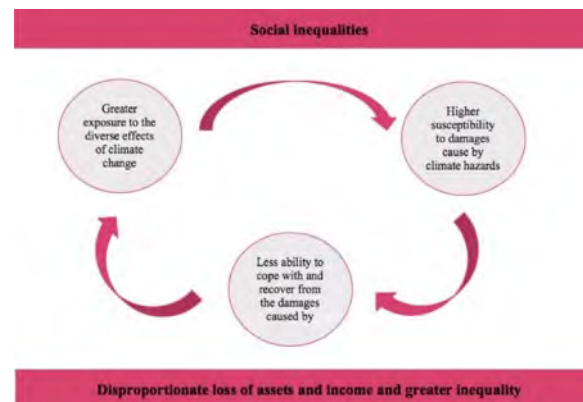


Figure 2. The dynamics and channels of the vicious cycle conformed by climate change and social inequalities.
Figure elaborated by author

Climate hazards affect vulnerable groups of society disproportionately by (1) increasing the exposure to climate hazards; (2) increasing their susceptibility to damage; (3) decreasing their ability to cope with and recover from the damages stem from climate hazards. Previous studies on the inequality- climate change nexus also evidenced that various forms of economic, political and social inequalities are critical to exacerbate the impact of climate change on most vulnerable communities (UNDESA, 2016). This section examines each of the three channels by combining theory with empirical evidence of recent climate hazards.

Higher Exposure

The World Economic and Social Survey prepared by UNDESA (2016) found out that exposure to the adverse effects of climate change is ascertained by the location where people choose or are forced to live. When narrowing the scope to ethnic minorities, we find an interesting yet disturbing association of the concentration of ethnic groups in certain regions within countries that coincides with the urban-rural split (Cavero, 2020). Particularly in countries of the global south, ethnic minorities either reside in rural areas that usually are neglected by central authorities in a country or in informal settlements of big megacities. Likewise, it is important to note that another determinant of the degree of exposure is the occupation and type of tasks performed (Islam & Winkel, 2017). In this sense, workers who rely more on weather conditions and the climate to perform their tasks or manufacture their products will be far more exposed to the effects of environmental degradation.

The research conducted by Braun and Abheure (2011) in Dhaka (Bangladesh) on the conditions of poor slum dwellers living in the megacity indicates their vulnerability to climate change. Most of the urban poor are forced to live in “extremely flood-prone areas” and the situation is likely to deteriorate by the effects of climate change on flood hazards (p. 772). In Vietnam, the agricultural sector has experienced the biggest losses, which is the largest income source for the most vulnerable people. Rural and ethnic households⁷¹ register the greatest income reduction as a

⁷¹ Particularly those living in Central Highland, Southeast and Mekong Delta regions are the hardest hit since these regions have historically most vulnerable to El Niño.

consequence of seasonal climate variability (Armando & Laderach, 2020).

The numerous reasons that push them to live in areas prone to climate hazards are usually associated with the cost of housing, which in some contexts combines with political and administrative restrictions arising from discriminatory policies (UNDESA, 2016). For instance, Mutter (2015) describes how the combination of economic and racial factors led to the higher concentration of low-income African American communities in the low-lying districts of New Orleans before Hurricane Katrina.

In sum, those who are the most exposed and vulnerable to climate variations are also the ones who are economically and socially disadvantaged and the least likely to have access to support system (UNDESA, 2016).

Susceptibility to Damages

Even if diverse communities are exposed to the same level of exposure, the disadvantaged and more marginalized groups are more susceptible to suffer greater damage from climate hazards (Islam & Winkel, 2017). The IPCC report (2014) stands that, in Latin America, Afro-Latinos and indigenous groups suffer from disproportionate climate effects compared to 'white' persons. Two reasons are considered in the analysis of susceptibility to damages: flimsy infrastructure and lack of diversification of assets in contrast to those of the majority and wealthier groups.

Very often, heterogeneous groups live in the same area where the natural hazard strikes. As mentioned in the introduction, low income status intertwines with ethnicity (and racial) status. Their low economic status evidence that ethnic minorities' private infrastructure is highly vulnerable to the effects of natural disasters since their houses were built with considerable flimsier materials than those of wealthier households. During the severe monsoon flood that took place in India in 2007, Dalit's housing had suffered tremendous damage compared to those of higher casts (Baird, 2016). Furthermore, extreme temperatures and heat waves and their effects also impact unevenly on marginalized groups. Despite the effects of heat being less evident than the effects of more extreme events, they are as lethal and detrimental. A report of the International Labour Organization (2019) (Oficina Internacional del Trabajo in Spanish) shows that workers who works outdoors and are exposed to the sun while performing physical activities are more susceptible to damages from climate variability. This prognostic applies to undocumented migrant working as seasonal workers in fruit picking in South-Western Spain. In fact, a seasonal worker original from Nicaraguan died of a heat stroke while working during the summer 2020 in Lorca (Murica). The effects of extreme temperatures are also present in the informal settlements where they live which makes them more susceptible to the damages of extreme heat than other inhabitants of the region.

The second variable is the limited diversification of assets. For example, the rural poor tend to have their savings in the form of livestock, which is vulnerable to droughts (Nkedianye, et al., 2011). Low-income farmers in Uganda lost greater shares of income due to rainfall than the average farmer (Islam & Winkel, 2017). Also in Vietnam, ninety-six percent of rural poor

households derive their assets from agriculture (Armando & Laderach, 2020). Therefore, they are more vulnerable to economic damages in the aftermath of climate disasters which in the end enlarges the economic gap between groups.

Gender is an added variable in the susceptibility to damage that cannot be neglected in this analysis. Several reasons make women more susceptible to impacts of climate change than men. Dickin et. al. (2020) showcases the link between gender vulnerability and water availability in Burkina Faso. The collection of water for the household is a practice associated with women. In dry seasons this collection requires up to 70 minutes. Besides, water stress is increasing and the quantity is not sufficient to cover drinking needs and hygienic practices, in which the latter is usually given up in satisfying the former. The study reports as well that vulnerability to unsafe water has an ethnic component: ethnic Peul women are located further away from boreholes and, if available, they tend to get surface water. Likewise, conflicts are habitual in water collection points.

Less Ability to Cope and Recover

The ability to cope and recover is the third channel through which inequalities intensify the impact of environmental hazards on disadvantaged groups. While the two previous channels –exposure and susceptibility –refer to situations that are *ex ante*, the situations that apply in the ability to cope and recover are *ex post* (UNDESA, 2016). Resources to recover take the form of (a) household resources; (b) community resources; (c) resources provided by non-governmental organizations (NGO), private companies or citizens; (d) public resources provided by the government (UNDESA, 2016). The existence of multiple and interlinked inequalities results in less access to assets necessary to cope and recover from the adverse impacts of climate change. From the four mentioned sources, particular attention is placed on (c) resources provided by NGOs, private companies or citizens and (d) public resources to better address the policy recommendations exposed in the following section.

Disadvantaged groups experience slower recoveries from climate hazards, in part because they endure the disproportionate loss of life, assets and income source. All of that leads us to conclude that, in the wake of climate hazards, different communities live different recovery trajectories; being those more marginalized the most painful and hardest.

One of the options that determine the recovery trajectory is the household's resources and capacity to diversify assets. Insurances are as well another key aspect in shaping the diverging paths in the recovery phase. However, not all groups have the same access to insurance and the more economically deprived groups are not able to buy insurance.

It has been argued throughout the paper that marginalized communities –especially the defined by ethnic differences –have constricted access to social and basic services. Leichenko & Silva (2016) argue that these groups also receive relatively fewer public resources to respond to climate hazards. Figure 3 illustrates three possible scenarios in which the degree of economic inequalities varies after a climate hazard struck. Inequalities might remain on the same level

(panel A), benefit wealthier households (panel B), or the impact on the poor might be so disproportionate that reaches a point where economic growth is very unlikely to happen (panel C).

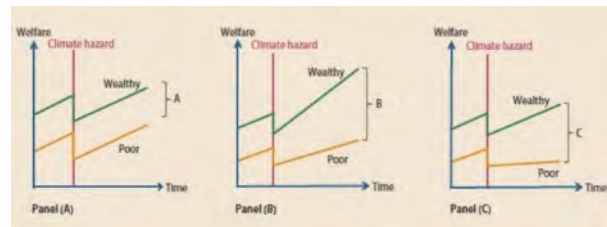


Figure 3. Differential rates of recovery from climate hazards of wealthy and poor households. Source: UNDESA, 2016 based on Mutter (2015) technical appendix

Following civic republicanism ideas, state intervention through public resources would be justified and necessary to bridge the gap economic gap.

Nevertheless, natural disasters have been perceived as an opportunity to force minority groups or less advanced economic groups out of their places of residency. These types of decisions are driven by the willingness to convert the territory into a more ethnic homogenized or to undertake a gentrification process. In the aftermath of the 1997 severe flooding that occurred in the Czech Republic, Roma families were treated very differently from 'white' families. While evacuating the affected area, white families were given flats outside the flood-affected district, Roma families were sent to makeshift cabins, or even back to homes that had been flooded (Bukovska, 2002). The other classical example used is New Orleans after Hurricane Katrina, where the African-American got less public resources to cope with and recover from the damage caused compared to that received by wealthier and white populations (Islam & Winkle, 2017). Discouraged by inadequate recovery efforts, many African Americans displaced by Katrina did not return, thus the share of African Americans decreased from 66.7 to 59.1 (Islam & Winkle, 2017).

Despite states having the obligation to protect the rights of minority groups, other agents also have a role to play in the aftermath of climate disasters. In this sense, international relief organizations are one of the most reliable sources of assistance after a disaster has devastated a territory. The World Report of Human Rights Watch (2009) establishes that after Cyclone Nargis struck Irrawaddy Delta in 2008 the government controlled and obstructed the disaster relief and international aid. Employing actions such as denying visas to disaster relief experts and aid workers, to discourage or co-opt civil society efforts. Only pro-government associations like the Myanmar Red Cross or the Union Solidarity and Development Association were allowed to operate in the Irrawaddy Delta. While denying the entrance of relief operations, reports have shown that Burmese authorities did undertake land confiscations, forced labour and forced evictions of displaced people.

Overall, the combined effect of these three factors – greater exposure, greater susceptibility to damage and less ability to cope and recover – trap climate change and inequality in a vicious

cycle in which the former aggravates the latter. The next section presents policy recommendations to break the vicious cycle of social inequalities and climate change.

Policy Recommendations to Break the Vicious Cycle

The vicious cycle proves that social inequalities exacerbate the vulnerability and exposure of disadvantaged groups to climate hazards. Nevertheless, vulnerable groups are often overlooked in integrated climate impact assessments (UNDESA, 2016, p. 54). As has been presented above, access to essential services is inexistent in remote rural areas or territories where large concentrations of ethnic minorities are concentrated. Further governmental intervention would, in the first place, promote human dignity and reduce the unequal impact climate hazards have in each of the three identified channels.

Failure to reduce horizontal inequalities can have political consequences in the long run. A report conducted by SIDA (2018, p. 9) established that there is no *direct* relationship between the two variables, but there is a clear *indirect* linkage because the factors that play a role in increasing conflict are usually reinforced by climate change. In the case of inequalities and vulnerable groups, resource scarcity might fuel ethnic tensions, leading to violence, civil war, or genocides (UNRISDP, 2009).

To prevent such terrible prospects and adapt to climate change in an integrative manner, governments and other stakeholders could get engaged through different policies. Reducing inequalities is the most effective way to fight against social disparities. However, this is such an ambitious and optimistic goal to pursue in the short run. To provide an immediate response to the imminent threat, the mitigation of social inequalities should be promoted alongside development policies and adaptation to climate change. Building resilience to climate change is an essential component of sustainable development, yet a challenge with multiple dimensions. To fulfill this aim, multilevel governance and effective coordination among tiers of governments should be endorsed. The pack of development policies proposed in this paper compiles local and global policies.

Several case-studies have been introduced throughout the paper to empirically demonstrate the regressive effect climate hazards have on social inequalities. This broad portfolio of events demonstrates that there is no one-size-fits-all remedy for the complex emergency that menaces the world as a single unit. In line with this argument, national and local policies must be adapted to integrate the specificities of each territory. Following the philosophical standpoint of “civic republicanism” defended by authors like Pettit (2010) states have the obligation to intervene in order to reduce the resounding social inequalities persistent in their societies. Otherwise, inequalities will perpetuate over generations. Following this theory of justice, correcting horizontal inequalities is an obligation states must promote since this is the first sign of domination. It relates to the cultural identity of the state and evolves in exclusionary legislation associated with certain cultural groups. The desired society would be reached in the presence of cultural inclusivity and equal visibility (UNRISDP, 2009). Immediate and comprehensive adaptation actions that target with a particular emphasis ethnic minorities living in rural areas. Caverio (2020)

indicates three concrete policies to this end. Firstly, invest in essential services such as health and education targeting most remote rural areas and marginalized groups. Two conditions should be met. On the one hand, listening to local experts to identify pressing local needs. On the other, ensuring proper management of funds. As it has been proved, agriculture is a strategic sector for most of the vulnerable groups and it is also an area where climate hazards have a stronger impact. Hence, public spending should be dedicated to agricultural policies to provide: dignified work and assistance in the face of climate hazards, but also to strengthen the resilience capacity of the population most affected by ongoing disruptions by issuing mitigation and adaptation policies. Conversely, reforming tax systems is highly recommended. Ensuring sufficient and sustainable revenues to redistribute and better fund basic social services (Cavero, 2020, p. 106).

To be successful, nevertheless, these specific policy responses must become part of a broader development framework that sets the enabling conditions for the empowerment of disadvantaged groups. This will result in transformative change and sustainable development (UNDESA, 2016).

Climate change is a global challenge with local implications. This means that all the efforts dedicated by a single state to mitigate and adapt to its effects should be designed by a higher coordinating level. Although a coordinated global response would be difficult, the reduction of vulnerability towards climate hazards by most vulnerable groups must be a collective effort. The lack of a global government or higher supremacy leaves a power vacuum in which state and non-state actors should join forces to alleviate the effects of extreme events and assist those communities that are more exposed and vulnerable to its effects.

The 2030 Agenda for Sustainable Development offers a roadmap to build a sustainable future in which no one is left behind. Efforts to achieve SDG 11 “reduction of inequalities between and within countries” and SDG 13 “mitigation of climate change” would provide the right path to break the vicious cycle. A vicious cycle may replace the current devastating vicious cycle since the reduction of social inequalities would help to mitigate climate change and the other way around. Rather than following traditional notions of direct intervention, multi-actor dialogue at different levels is perceived as the most convenient channel. Partnerships among different actors to provide knowledge and resources sharing on more resilient territories and enhancing sustainability. In the same vein, it would be desirable to have enough data and indicators on the level of inequalities within countries and punish state practices that raise inequalities.

For better or for worse, global forces are now a major factor in the movement of inequality within and between countries. Climate change is a global challenge with local implications. Getting back to the idea of environmental justice and considering that the people who pollute the least are the ones paying the ones suffering the most the consequences of environmental degradation, could we call upon the international community to intervene to reduce the damages?

Shifting the scope to more localized responses, one issue remains clear: one-size-fits-all policies are not suitable to solve the equation. Still, there are several measures that different tiers of

government can adopt to reduce social inequalities and the exposure to climate hazard, susceptibility to damages, and improve the capacity to recover. Investing in essential services such as healthcare or education, listening to the needs

The magnitude of the problem urges for prompt action before reaching the tipping point in which the vicious cycle becomes a never-ending spiral. No single country is safe of the regressive effect climate degradation exerts on social inequalities. Equality should be a prime concern in climate policy. The vulnerability of certain groups derived from their position in society should be recognized and reversed by social policies at the national level and with the support of multiple stakeholders. The theory has proved that it is possible to fight inequalities by building sustainable societies, time is running to put it into practice.

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The Integral Role of the Coastal Microbiome in Mangrove Conservation

Katelyn Hickman (Utah Valley University, Utah, United States)

Abstract

Mangroves are intertidal forests that bridge the gap between terrestrial and marine environments. They live at the edge of their tolerance in habitats rife with abiotic stressors such as fluctuations in salinity and temperature, yet mangroves are among the most productive ecosystems in the world. They are also among the most vulnerable to climate change and anthropogenic degradation, and are in steep decline globally. Providing important services economically, ecologically and environmentally, mangroves support a plethora of human activities, stabilizing coastlines, supporting marine food webs, sequestering vast amounts of carbon, cycling nutrients, trapping sediment and filtering water. This research examines the existing literature on the microbiome, biochemistry, ecological role, and conservation initiatives surrounding mangroves. My aim is the synthesis of a holistic approach to improving transplantation practices, supporting the success of mangrove reforestation. Mangrove reforestation initiatives are adapting priorities to include conservation and biodiversity, but success rates and longevity of transplants remain low. Inoculation of mangrove seedlings raised in nurseries, away from their natural habitats, shows promise in bolstering the success rates of seedling transplantation. Studies have correlated bacterial and fungal inoculants with increased biomass, increased resistance to stressors, increased root stability, increased plant productivity and reduced uptake of phytotoxic metals. These increases in performance are not attributed to a single microbial species, but rather a combination of bacterial and fungal inoculants. The interactions of these species is not yet well-understood but may hold pertinent insight for the successful reforestation of mangroves, and the rehabilitation of coastal ecosystems across the globe.

Keywords: Mangrove, microbiome, nutrient cycling, reforestation, mangrove management, sustainable development goals

Introductory Information

Mangroves are highly productive intertidal forests that bridge the gap between fresh and salt water and host countless species from every kingdom of life. Survival in these demanding ecosystems is made possible through specialized structures and processes to counteract changes in salinity, temperatures and sea level, among other abiotic stressors. Mangroves provide integral resources and services to both terrestrial and marine ecosystems while hosting a great deal of biodiversity (Allard et al., 2020). The resources and services provided by mangroves are important ecologically and economically to many stakeholders; mangroves are known to directly support over seventy human activities, from commercial forests to coastal fisheries (Kathiresan, 2012). Additionally, mangroves serve as buffers from extreme weather events, act as nurseries during

the early life-stages of various ecologically and economically important animals, filter and purify water, facilitate nutrient cycling and carbon sequestration, provide organic matter that serves as an ecological base for complex marine food webs, and stabilize coastlines (Katherisan, 2012; Holguin et al., 2001).

Mangroves form close relationships with various microbes and these relationships generally support mangrove processes and development, playing an essential role in the productivity of coastal ecosystems (Holguin et al., 2001; Allard et al., 2020). Associated microbial communities play a significant role in the transformation of detritus into nutrients, such as phosphorus and nitrogen, preparing them for uptake by surrounding vegetation that further supports other organisms in the ecosystem (Holguin et al., 2001). In return for these services, mangrove-root exudates serve as nutrition for the microorganisms involved (Holguin et al., 2001). While it is well-known that the coastal microbiome is integral to nutrient cycling and other ecosystem processes in mangroves, the importance of microbial diversity and interaction in seedling development and transplantation is not well understood, as environmental conditions and species' associations make this information highly specific and difficult to ascertain. Seedlings grown in nurseries can be inoculated with growth-promoting microorganisms to support development, and this will likely improve transplantation success rates (Holguin et al., 2001).

Purpose & Relevance

The purpose of this research is to amalgamate the existing literature concerning microbial interactions in mangrove ecosystems, outline the significance of the microbial role in mangrove reforestation, and identify strategies to bolster nursery and transplantation efforts going forward. Mangroves are economically, ecologically, and environmentally important ecosystems. As such, they relate to several of the United Nations' Sustainable Development Goals, including SDG 13: Climate Action, SDG 14: Life Below Water, and SDG 15: Life on Land.

SDG 13: Climate Action

The thirteenth SDG, Climate Action, focuses on mitigating the impacts of climate change globally, and particularly in vulnerable regions. Part of the ongoing strategy includes collecting and distributing funds to developing countries so that they may both adapt to climate change and invest in sustainable development. This is in large part due to the cost and casualties resulting from the deleterious consequences of climate change, which continue to intensify (UNDP, 2022a). By nature, SDG 13 is interdisciplinary and will contribute to the achievement of other SDGs as they are integrated in purpose and strategy. Providing support to developing countries will entail disaster-prevention measures and investment in sustainable resource management, which includes the conservation and restoration of coastal ecosystems. The primary goal of SDG 13 is to contain the increasing global mean temperature to below 2°C, and ideally below 1.5°C. This goal is both urgent and important, as greenhouse emissions are presently 50% greater than they were in 1990 (UNDP, 2022a).

The goals of SDG 13 are particularly relevant to mangroves, as their multi-faceted role includes functions that mitigate the effects of natural disasters and sequester vast amounts of carbon in biomass and sediment—mangroves are among the most carbon-rich forests in tropical regions (Donato et al., 2011). In addition, natural disasters often leave developing countries particularly vulnerable in terms of food security and clean water, both of which are supported by mangroves (Allard et al., 2020). The conservation and continued reforestation of mangroves is essential to achieving SDG 13 and supporting sustainable coastal development, as they cover up to 24 million hectares in 112 countries, with over 41% in south or southeast Asia and over 23% in Indonesia (Katherisan and Bingham, 2001). Mangroves live at the edge of their threshold in high-stress environments, and are particularly vulnerable to shifts in temperature, salinity, and sea-level rise (Wee et al., 2019).

SDG 14: Life Below Water

The fourteenth SDG, Life Below Water, is concerned with understanding and regulating several abiotic factors of the worlds' oceans, such as water chemistry, temperature, and currents. These factors impact biotic components of these ecological regions and, through their role in climate regulation, these factors not only determine the viability of life under water, but also significantly impact life in every ecosystem across the globe (UNDP, 2022b; UN Decade for Ocean Science and Sustainable Development, 2022). Additionally, over 3 billion people rely on coastal or marine biodiversity for their livelihoods, from fisheries to forestry products. Oceans play a significant role in the cycle of atmospheric carbon, absorbing about 30% of anthropogenic CO₂, consequently leading to a steep increase in ocean acidification. Since the industrial revolution, there has been a 26% rise in ocean acidification which produces dire consequences for marine life by making habitats unlivable, altering behavior and interrupting physiological regulatory processes (UNDP, 2022b; Di Santo, 2019). Beyond acidification and abiotic factors, marine life is also threatened by anthropogenic pollution, from microplastics to oil spills. The degradation of oceanic ecosystems threatens the structure, function and benefits of marine systems at large (UN Decade for Ocean Science and Sustainable Development, 2022).

This goal is particularly relevant, given the United Nations Decade of Ocean Science for Sustainable Development, declared from 2021 to 2030. This initiative has been delegated to UNESCO's Intergovernmental Oceanographic Commission (IOC). IOC works collaboratively through its 150 Member States to expand scientific and institutional capacity in order to meet myriad goals laid out by the UN General Assembly, including the Sustainable Development Goals (UNESCO, 2022). It is designed to reverse the decline in ocean health through a global community of expert collaboration.

SDG 14 is relevant to mangroves because they are among the most biodiverse ecosystems on the planet and particularly along the coast. They play an essential role in the life cycles of multiple ecologically and economically important species, acting as feeding grounds, breeding grounds, and nurseries during the juvenile stages of many fish, mollusks and crustaceans (Katherisan, 2012). In addition to supporting early life stages of marine animals, mangroves provide foundational organic matter for complex marine food webs, and cycle nutrients that further support

these webs (Allard et al., 2020). In addition to their roles in ecosystem functioning, mangroves and their associated microbes have been shown to filter water and remediate pollution (dos Santos et al., 2011; Kohlmeier et al., 2005; Valiela et al., 2018).

SDG 15: Life on Land

The final SDG related here is the fifteenth, Life on Land. This SDG addresses plant life from agriculture to forests, relating their benefits for humans as well as their ecological importance. Deforestation and desertification have transformed over 16 million hectares globally, disproportionately impacting marginalized communities struggling with poverty. Over 80% of terrestrial species rely on forests, and reduction in natural habitats further endangers those species beyond reducing food security (UNDP, 2022c). In addition to reversing ecosystem degradation and declines in biodiversity, this goal aims to support global food and water security, protect endangered species, mitigate the impacts of climate change, and help developing countries to adapt to new climatic conditions.

Supporting these goals and others, the United Nations Decade on Ecosystem Restoration aspires to halt ecosystem degradation and engage in restoration and conservation in order to prevent catastrophic climate change. This initiative is led by the UN Environment Programme and the Food and Agricultural Organization of the United States. It incorporates global political approaches in tandem with grassroots conservation to build momentum behind terrestrial and marine ecosystem restoration (UN Decade for Ecosystem Restoration, 2022). Their strategy entails allocating the proper funding for research and action, involving the global community, incentivizing restoration, and inciting cultural and rhetorical changes in the relationship between consumption and conservation.

The conservation and reforestation of mangroves is imperative for the success of SDG 15 as they are among the most biodiverse coastal ecosystems and are foundational to complex marine food webs through the provisioning of food, habitats and growth zones (Katherisan and Bingham, 2001). Mangroves support a diverse array of fauna, from pollinators to zooplankton to burrowing epifauna that underpin coastal fisheries, water filtration and nutrient cycling. The structure of pneumatophores creates an enclosed habitat, attracting vulnerable species to seek refuge in the roots of the mangal, furthering the protection of threatened and endangered species (Katherisan and Bingham, 2001). Beyond fauna, the mangal supports various flora, fungi and surrounding ecosystems such as seagrasses, which rely on shade and filtration from mangroves to thrive (Katherisan and Bingham, 2001). The management of mangroves is complex and requires knowledge about both ecological and social interactions, as they are dynamic environments with a range of specific challenges (Dahdouh-Guebas et al., 2020).

Methodology

The synthesis of this information is the result of an extensive literature review, incorporating scholarly research and web pages from official organizations such as the United Nations. Using databases such as EBSCO, Google Scholar, Science Direct Journals, BioOne and JSTOR, I

applied filters for peer-review on articles and books. The sources that I focused on included primary and secondary research where biotic and abiotic factors were measured and assessed relative to individual mangroves or mangrove ecosystems. The outcomes ranged from discovering the function of secondary metabolites in fungi to measuring water quality downstream versus upstream of ecosystem disturbance events. Analyses were conducted and results contrived via laboratory work, bioinformatic analysis, field measurements, and other approaches. Upon collection of well-cited, key sources covering mangroves broadly, as notated on ResearchGate, I scoured each article's references for further information on the given area. While sourcing web pages, I only selected sites directly affiliated with the organizations discussed and ensured that the page ended in ".org" or ".edu". Articles and book chapters were obtained in November of 2021 and January, February and March of 2022, while websites were accessed in March and April of 2022. I then analyzed these sources and categorized the material into sections to facilitate clear communication of my findings. Priority was given to sources that were well-cited and had already undergone peer-review. This may impose several limitations due to bias, recentness of publication and positionality of researchers, as the opportunity to publish and timelines for publication are not universal.

Why do Mangroves Matter?

Human Importance

With such a broad and foundational role in coastal ecology, mangroves have a notable influence on human communities, marine ecosystems and organisms, and the environment at-large. Mangroves provide numerous resources that support human activities—while many of these resources are primarily utilized by coastal communities, they have traction in communities across the globe. These resources have a significant impact on the economy; they may include timber, charcoal, fish, molluscs, crustaceans, medicinal extracts, livestock feed and more. The estimated value of one hectare of mangrove forest ranges from \$2,000 – \$9,000 annually, although this fluctuates based on location and management (Katherisan, 2012).

Mangrove trees are often used as timber or charcoal, as the wood is known for its durability and caloric density—charcoal from mangroves is roughly five times more efficient than Indian coal, among other alternatives. Leaves and other debris are used by local communities for roofing, baskets, bottle stoppers, and other products (Katherisan, 2012). There are many cultural and medicinal uses of mangroves and mangrove-dependent species in Indigenous cultures, with extracts shown to treat myriad pathogens in humans, animals, and plants (Katherisan and Bingham, 2001). A few of these products are targeted toward ailments such as epilepsy, high blood pressure, leprosy, rheumatoid arthritis, and may even have applications for incurable viral infections like AIDS (Katherisan, 2012).

In addition to supplying resources to build and support coastal communities, mangroves play an important role in food production. These forests serve as grazing grounds for local livestock, including goats, sheep, camels and buffalo. They also provide seeds that act as feed for fisheries in areas such as West Bengal. Outside of industrial fisheries and agriculture operations, one

hectare of mangroves yields as much as 767 kg of wild fish and crustaceans: systems categorized as “high-producing” generally yield around 500 kg or more (Katherisan, 2012). Managed mangroves can produce up to \$11,300 per hectare annually, which is on par with yields from intensive shrimp farming (Primavera and Esteban, 1991). In many areas, mangroves are significant for apiculture, supporting the production of honey and wax. For example, Siddiqi et al. 1997 estimated that approximately 185 tons of honey and 44.4 tons of wax are harvested annually from the western mangrove forests in Bangladesh, as cited by Katherisan 2012.

Ecological Importance

The ecological importance of mangroves is paramount, as these trees form the foundation for the mangal. Mangrove trees, in concert with the fungi, bacteria, plants, and animals that they host, constitute the “mangal”—the mangrove swamp. “Mangrove” is generally used to refer to an individual tree, whereas “mangal” refers to the entire mangrove forest community. Mangals are responsible for nutrient cycling, coastal protection, provision of breeding and feeding grounds for marine life, water filtration, ecosystem productivity and carbon sequestration (Allard et al., 2020; Katherisan, 2012; Miryeganeh and Saze, 2021).

Mangroves and their associated microbes play an integral role in moving nutrients with low mobility, such as phosphorus, which is accomplished with the assistance of Arbuscular Mycorrhizal fungi (AMF) (D’Souza, 2016). These fungi play a significant role in carbon and nitrogen cycles, and also reduce the uptake of phytotoxic heavy metals (D’Souza, 2016; Willis et al., 2013). Mangrove soils have notable metal-binding capacities due to the presence of microbial communities, and can act as heavy metal sinks until disturbance causes them to shift to heavy metal sources (Katherisan and Bingham, 2001). Beyond cycling nitrogen and phosphorus, bacterial and fungal communities associated with mangroves break down detritus, transforming it into organic matter that serves as the basis for complex marine food webs (Katherisan and Bingham, 2001).

Lateral roots from mangroves stabilize the soft, silty sediments and reduce coastal erosion, while simultaneously acting as a buffer against natural disasters such as cyclones, wave action and tides, tsunamis, flooding, and sea level rise (Katherisan and Bingham, 2001). One study even found that the buffer provided by mangals was significant enough to reduce the effects of a Category 5 storm to a Category 3 storm (Liu et al., 2013).

The mangal swamp traps sediments, effectively filtering the water to produce a clear environment for fish; they host myriad organisms capable of filtering pollutants, such as bacteria or bivalves (Yam et al., 2013). In addition to filtration of sediments and pollutants, mangroves provide protection from UV-B radiation to mangal inhabitants. Mangroves have a high tolerance to UV-B radiation and are adapted to hot, arid climates: their foliage produces flavonoids that screen out UV radiation, protecting the ecosystem from the deleterious effects of exposure (Katherisan and Bingham, 2001).

Environmental Importance: Carbon Sequestration

Finally, mangals impact the environment significantly, as they are key players in the carbon sequestration and are integral to complete calculations of oceanic and global carbon budgets (Cameron et al., 2019). Beyond contributing to the cycling and provision of organic carbon, mangroves and their associated microbes sequester 50 times the amount of carbon as other tropical forest ecosystems and lead in coastal ecosystem sequestration, storing 2.4 times the amount of carbon as salt marshes and 5.2 times the amount stored from seagrasses (Katherisan and Bingham, 2001). This carbon storage takes place both above- and below-ground, with high ratios occurring in the first few meters of below-ground sediment, which is rich in organic matter, dominates tropical coastlines and is often referred to as “mangrove peat” (Katherisan and Bingham, 2001). The anoxic conditions of these sediments trap carbon for longer time periods than terrestrial forest storage, with carbon stores 3 to 5 times greater than their terrestrial counterparts (Cameron et al., 2019).

Beyond providing basal nutrients for their relative ecosystems, mangroves also play a disproportionate role in carbon sequestration and atmospheric exchange, as opposed to terrestrial ecosystems (Donato et al., 2011; Cameron et al., 2019). Carbon sequestration occurs through accumulated biomass as well as long-term soil storage, with anoxic soil conditions allowing for storage timescales exponentially greater than terrestrial counterparts, when undisturbed (Cameron et al., 2019). Mangrove forests store more carbon in their soils per hectare than most any other ecosystems, particularly in terms of long-term carbon storage (Donato et al., 2011). This carbon sequestered in marine ecosystems, commonly referred to as “coastal blue carbon,” is a significant factor in discussions of climate change, and conservation of these ecosystems should be considered seriously when attempting to reduce greenhouse emissions (Allard et al., 2020; Cameron et al., 2019; Donato et al., 2011).

Mangroves remove carbon dioxide from the atmosphere through photosynthesis and utilize microbial communities to fix more carbon than tropical oceanic phytoplankton (Cheung et al., 2018; Katherisan and Bingham, 2001). Bacteria consume most of the carbon in interstitial waters, metabolizing it as biomass, storing it in the sediment, or mineralizing and releasing it as dissolved organic matter (Holguin et al., 2001). Environments with high carbon-concentration result in increased biomass—mangroves have a significantly higher ratio of aerial biomass to below-ground biomass than upland forests (2.5:1 from 4:1), improving soft sediment stabilization (Katherisan and Bingham, 2001). The above-ground biomass of mangroves is estimated around 3,700 trillion grams (Tg) of carbon, sequestering 14 – 17 Tg of carbon annually. Organic matter-rich soils at depths ranging from 0.5 m – 3 m account for between 49% and 98% of mangrove carbon storage (Katherisan and Bingham, 2001). Global primary production by mangroves is estimated at 218 Tg annually, and is a significant contributor to oceanic carbon by export, sediment burial and mineralization of fixed carbon (Katherisan and Bingham, 2001). More than 50% of carbon sequestered by mangrove vegetation is unaccounted for, predominantly due to the underestimation of mineralized carbon. Most mineralized carbon is transferred from mangroves to marine environments as dissolved inorganic carbon (Bouillon et al., 2008).

When mangals are converted to aquaculture ponds, the disturbed sediment releases sequestered carbon for atmospheric uptake. Mangrove deforestation accounts for about 10% of deforestation emissions globally, despite covering only 0.7% of tropical forested areas. Carbon fixed in coastal vegetated habitats is 180 times greater in magnitude than that of deep-sea sediment, and accounts for 50% of the organic carbon buried in marine sediments, even though these habitats only occupy 0.2% of coastal cover (Katherisan and Bingham, 2001). The disturbance of the immense carbon sinks may provide some explanation to this seemingly disproportionate difference in greenhouse gas emissions from deforestation of mangals as opposed to other forest types (Katherisan and Bingham, 2001; Donato et al., 2011)

Ecology and Biology of Mangroves

Mangroves occur between 30° north and 30° south, distributed circumtropically throughout 112 countries. They prefer loose, alluvial soil rich in humus and thrive in locations where freshwater inflow supplies nutrients and silt, (Katherisan and Bingham, 2001). Mangroves are regularly subjected to extreme stressors, such as high salinity, high temperatures, intense UV radiation, strong winds, variable tides and anaerobic soils. To adapt to these challenges, mangroves have evolved morphological and physiological adaptations unlike those seen in any other plants (Katherisan and Bingham, 2001; Miryeganeh and Saze, 2021).

Morphologically, mangroves have several different types of “roots”: the trees employ lateral roots to anchor themselves in the fine, muddy sediment and exposed, aerial roots known as pneumatophores to participate in gas exchange and to produce viviparous propagules (Katherisan and Bingham, 2001; Miryeganeh and Saze, 2021). While the anatomical details of root structure and function vary between species and habitats, the general structure of mangrove roots is consistent. Rather than sending deep roots to penetrate loose, anaerobic soils, mangrove roots disperse a broad network of lateral roots for stability according to Emilio et al. (1997), as cited by Katherisan and Bingham (2001). Miryeganeh and Saze (2021) conducted a study on mangroves in Japan seeking to correlate phenotypic expression of structural traits to environmental conditions and found morphologically distinct populations of the same species, with shrub-like morphology on the oceanside and tree-like structures on the riverside.

Physiological adaptations to stressors are multi-faceted, and can be traced to the existence and expression of specific stress-response genes (Miryeganeh and Saze, 2021). The efficiency of mangrove stress response to both biotic and abiotic stressors may be affected by microbial community composition on the given mangrove (D’Souza, 2016; Soldan, 2019). Among abiotic stressors, high salinity is one of the most challenging for plants to accommodate—there are approximately 10,000 tree species adapted to the transitional ecosystems between non-saline water and land, compared to only 80 tree species inhabiting saline intertidal zones (Miryeganeh and Saze, 2021). Salinity can fluctuate wildly in the intertidal regions that mangroves inhabit, both seasonally and daily from variations in rainfall, temperature, and sea level oscillation (Miryeganeh and Saze, 2021). To survive high variability in salinity, mangroves have special features that allow them to uptake water against great osmotic pressure. They then excrete excess salts through their leaves to maintain internal osmotic homeostasis (Katherisan and Bingham, 2001).

The molecular mechanisms behind salt-tolerance are not fully understood due to a lack of reference genomes for mangroves, but *de novo* RNA-Seq assembly provides a feasible understanding through an extensive search of transcriptomes to identify expressed genes (Miryeganeh and Saze, 2021). The phenotypic expression of stress-resistance genes fluctuates based on species, location, and conditions: structural changes in biomass, height, and root configuration can be traced to DNA methylation patterns and fluctuating conditions (Katherisan and Bingham, 2001; Miryeganeh and Saze, 2021).

The Microbial Role in Nutrient Cycling

The importance of nutrient cycling in coastal ecosystems (or any ecosystem, for that matter) cannot be understated: mangroves are essential in transforming nitrogen and phosphorus, as well as supplying organic matter to complex marine food webs (Allard et al., 2020; Holguin et al., 2001).

The composition of a microbial community suggests a great deal about an ecosystem, particularly in relation to soil and fungal-bacterial ratios. Arbuscular mycorrhizal fungi (AMF) are notable factors in the development and direction of microbial community structure (D'Souza, 2016). The composition of these communities fluctuates in accordance with traceable spatiotemporal patterns that correlate to several abiotic and biotic factors, such as seasonality, tide, salinity and vegetation (Cheung et al., 2018). A study sampling the Mai Po wetlands in Hong Kong found the dominant fungal phylum during the dry season to be Ascomycota, while Basidiomycota dominated during the wet season; bacterial communities were dominated by the phyla Bacillota (former name: Proteobacteria) and Bacteroides, regardless of season (Cheung et al., 2018). Bacteria demonstrated greater richness and beta diversity during the wet season, much of which can be explained either by temperature, archaeal diversity, or fungal diversity (Cheung et al., 2018). Fungi followed similar patterns as bacteria and were also most heavily influenced by temperature and microbial diversity. In terms of composition, archaea contrast against bacteria and fungi in their ability to resist the abiotic stress of temperature fluctuation, as their diversity distribution was unaffected by these fluctuations (Cheung et al., 2018).

Vegetative material from mangroves is decomposed by myriad microorganisms and converted to detritus before the enclosed nutrients become bioavailable for other organisms, from plants to filter-feeding invertebrates. The decomposition begins as soon as the fungi and bacteria residing in the sediment are able to colonize the leaf-litter, with each kingdom playing distinct roles based on their enzymatic capacities (Holguin et al., 2001). The result is detritus, organic matter rich in energy that is actively undergoing decomposition. This detritus serves as a direct food source for roughly one-third of coastal organisms and an indirect food source for many more species important to coastal fisheries (Holguin et al., 2001).

Bacteria are essential to this process of nutrient transformation: they fix nitrogen, make phosphorus available to plants (a common limiting factor), decompose organic matter through sulfate-reduction in anaerobic soils, and fix carbon through photosynthesis. High rates of nitrogen fixation are correlated to the detritus produced from mangrove vegetation (Holguin et al., 2001).

Fungi are essential in these processes, facilitating bi-directional transport of nutrients through hyphal networks. Carbon fixed by the host through primary production is assimilated into the mycelial network, while soil-derived nutrients are transported to the host (Willis et al., 2013). Mangrove-associated fungal communities, particularly AMF, have an enhanced ability to capture and store carbon as biomass, producing more carbon per unit than their bacterial counterparts (Strickland and Rousk, 2010).

While many fungal species have been detected in the decomposition of mangrove detritus, little is known about their role and function in the ecosystem, outside of taxonomic placement. It is clear that they play an important role in the early stages of decomposition, breaking down lignin and cellulose which prepares the detritus for secondary colonization by bacteria and yeasts to further the process of decomposition (Holguin et al., 2001). The fungal participation in early-stage decomposition may be due to a high tolerance of phenolic compounds that inhibit the growth of secondary colonizers. Beyond decomposing cellulose and lignin, these fungi have demonstrated proteolytic, pectinolytic and amylolytic activity, according to Raghukumar et al. (1994), as cited in Holguin et al. (2001). Identified species in this role belong to the phylum Ascomycota and appear to predominantly colonize this detritus at or below tide-level, although they are predominantly limited to the outer layers of detritus due to their high oxygen consumption (Holguin et al., 2001). The impact of microbial location and diversity on interactions between kingdoms leads to the question, “What types of interactions are ongoing between these communities, and how do those interactions impact the ecosystem at-large?” Interaction between microbes can be traced through co-occurrence networks, among other analyses, to delineate the ecologically meaningful interactions between members of the represented microbial kingdoms (Cheung et al., 2018). These analyses also provide information about the functional roles or potential ecological niches of the relative communities. For example, a study by Warmink et al. (2010) conducted a series of tests on a group of bacterial species in concert with saprotrophic fungi, discovering that select fungal hyphae play a role in transporting bacterial species to novel environments for colonization. Many of these novel environments were deep layers of anoxic sediment that bacteria had limited access to; thus, bacterial migration facilitated by fungi is a key piece of information when it comes to determining the ecological success in the given species of soil bacteria (Warmink et al., 2010).

Anthropogenic Degradation of the Mangal

The destruction of mangrove forests is widespread and occurring at an alarming rate: the main processes contributing to this degradation are coastal development, pollution and climate change (Allard et al., 2020; D’Souza, 2016). While mangroves have evolved spectacular adaptations to deal with their stressful environments, they often live at the edge of their tolerance, leaving them particularly susceptible to disturbances such as those created by anthropogenic activity (Katherisan and Bingham, 2001; Wee et al., 2019). These ecosystems are among the most vulnerable to climate change, particularly to the challenges presented by sea-level rise, as the pressures of development and pollution pose additional stressors and constraints on their habitat and range (Donato et al., 2011; D’Souza, 2016). Over the past five decades, up to half of global mangrove cover has declined due to development and aquaculture (Donato et al., 2011). Efforts are underway to reforest mangroves, restore degraded ecosystems, convert fisheries and

aquacultures to sustainable practices, regulate coastal development, and involve local communities with conservation (Holguin et al., 2001; Allard et al., 2020).

Land-use change is one of the greatest contributors to anthropogenic carbon dioxide emissions, second only to fossil-fuel combustion (Donato et al., 2011). Land-use change can take many forms, ranging from development of urban areas for residential use or tourism to industrial uses, such as conversion from mangal to aquaculture ponds. Mangroves mediate acidity changes in the soil and, when they are deforested, bacterial colony diversity has been shown to decline as the primary source of carbon from mangrove vegetation is removed (Holguin et al., 2001). Even the extent of mangrove coverage can be maintained while quality continues to degrade, as has been the case in the Sundarbans. In response, Bangladesh has adopted and innovated mangrove management strategies to account for the conservation and enhancement of biodiversity (Iftekhhar and Islam, 2004).

Inoculation & Nursery Strategies

Selecting the proper species' of bacteria or fungi to inoculate a mangrove seedling is a process not yet well-understood, as the ideal inoculants will depend on a slew of abiotic factors, such as geographic location or salinity stress (Soldan et al., 2019). Biotic factors will also play a role, as microbial community composition vary by mangrove species. Plants and microorganisms have evolved together since time immemorial, and plants discharge root exudates to attract the proper endophytic organisms—these organisms are often transmittable to the plant's progeny, demonstrated through their presence in seeds and seed coats (Holguin et al., 2001; Soldan et al., 2019). In some mangroves, inoculation has been linked to drastic increases in photosynthetically derived carbon exudates and nitrogen fixation (Holguin et al., 2001). This process is important to plant development as many of these are plant growth promoting (PGP) organisms, and particularly important for mangroves due to the extreme environments they inhabit—they host halotolerant and halophilic bacteria by necessity, to support them through the relative abiotic stressors (Soldan et al., 2019). AMF specifically have been shown to influence response to climatic fluctuations, increase tolerance of plants and increase plant productivity (D'Souza, 2016). As soil constituents, AMF are integral to the cycling of carbon and nitrogen and promote selective uptake in plants to reduce phytotoxic heavy metals (D'Souza, 2016). They also assist mangrove pneumatophores in supplying oxygen to the sediment (Holguin et al., 2001). Inoculation is an integral step since PGP bacterial endophytes support root establishment by enhancing root length, exerting positive effects under salt-stress and increasing biomass during developmental periods (Soldan et al., 2019).

In an attempt to discover the most effective method for discerning and isolating the proper bacterial strains, Soldan et al. (2019) sampled various mangrove populations, testing multiple parts of the plant and sediment for community composition. The most populous phyla of bacterial endophytes discovered in the root propagules included Bacillota, Firmicutes, Actinobacteria and Bacteroidetes. These phyla are known to associate with the seeds of multiple plant species, were widespread in mangrove tissues throughout the plant, and dominate in both soil and marine ecosystems (Soldan et al., 2019). They speculate that mangroves recruit bacterial endophytes

from sediment environments rather than the water, and demonstrated through high-throughput sequencing that these associations were mutually beneficial, supporting mangroves in light of abiotic stressors including osmotic stress, high temperatures, and high salinity (Soldan et al., 2019).

Nurseries & Reforestation

While selecting the proper inoculant is crucial, there are several other factors that impact transplantation success rates. The selection of proper mangrove species, transplantation site, and microbial inoculation strategies are essential to ensure the success of mangrove seedlings and bolster reforestation efforts (Allard et al., 2020). The general, long-term survival rate of mangrove transplantation is low, between 10 – 20%—the greatest successes have arisen from strategies that engage local community members in conservation and upkeep of the mangrove forests (Primavera and Esteban, 2008). Intentional inclusion of genetic diversity in the species selected for transplantation is crucial—*Rhizophora*, the current “flagship” species for reforestation efforts, is ideal for a few locations but doesn’t possess the phenotypic plasticity necessary to succeed in all coastal regions (Primavera and Esteban, 2008; Wee et al., 2019). Thus, a variation of species and hybrids, tailored to the conditions of a given location, will be integral to widespread success in mangrove reforestation.

As many hybrids are indistinguishable from the parent species at face value, molecular techniques that provide genetic identification are invaluable in distinguishing the best species for a given location (Wee et al., 2019). These molecular screenings would be best conducted by large nurseries supplying seedlings, or by outsourcing the sequencing work for verification before embarking on a transplantation project (Wee et al., 2019). Transplantation techniques must be interactive and adaptive to their geographic location if these practices are to be successful (Dahdouh-Guebas et al., 2020).

While the mobilization of sequestered carbon isn’t clearly understood, current evidence suggests the conversion of mangroves to clearings, aquaculture, drainage, or coastal development decreases the soil’s carbon-content significantly (Donato et al., 2011). The sheer amount of carbon sequestered in mangrove soils and ecosystems provides ample motivation for the conservation of mangroves, outside of their ecological, economic, and intrinsic value, and they have been increasingly attracting attention in international policy (Cameron et al., 2019). Wee et al. (2019) has suggested ecologically meaningful, defined, conservation units as a contributing solution to the degradation of mangroves. These conservation units could be based on genetic connectivity, or declared by creating new Ramsar sites or marine protected areas based on mangrove density, which may prove useful in stifling their rapid degradation. Either way, in order for this level of conservation to be successful, a widespread phylogeographic analysis of mangrove species and hybrids would need to be completed, entailing large-scale genotyping achieved through international collaboration (Wee et al., 2019).

Research Findings

Mangroves act as unique nurseries to many ecologically and economically important species by providing physical protection, nesting grounds and accessible food sources. They protect communities from natural disasters and stabilize coastlines against erosion; mangroves filter seawater contaminated by terrestrial runoff, pollution, effluent, and industrial waste. The mangrove microbiome cycles nutrients such as nitrogen and phosphorus by converting leaf-litter into detritus, supplying organic matter to large and complex marine food webs. The microbiome also sequesters carbon in biomass and soils, and supports mangroves in light of biotic and abiotic stressors. Mangrove ecosystems are under acute stress and are increasingly threatened by anthropogenic activities, namely, land-use changes to aquaculture and palm oil plantations, coastal development and pollution.

There are a number of reforestation initiatives taking place across the globe, with varying success levels. The most successful strategies incorporate community partners who live in close proximity to mangroves and can assist in their maintenance. Additionally, studies show that mangrove seedlings grow faster, larger, and are more resistant to stressors when inoculated with select fungal and bacterial species. Some of these microbes, notably AM fungi, are transmitted to progeny through seeds, alluding to evolutionary links between plants and fungi and affirming the notion that their relationship is mutually beneficial. As most species are particularly vulnerable in early life stages, and mangroves are particularly susceptible to stressors, the support that inoculation confers is significant when seeking to increase the success rate during transplantation of seedlings from nurseries to mangrove habitats. Thus, further investigation into specific inoculant species pairing (between mangrove, fungi and bacteria) will illuminate best practices for mangrove reforestation going forward.

Research Limitations & Future Recommendations

There were several factors that limited the findings of this research, one of them being a lack of time sufficient to delve into the literature. Another is a mere lack of information surrounding the nuanced role of the microbial community in the health and viability of the mangal. Fungi are understudied and poorly understood, and particularly so in marine environments. The various types of fungi present in this system, from yeasts to mycorrhizae, may play more or less significant roles than our estimates and studies can account for—further research must address these concerns. The lack of information on fungal communities partially extends to bacterial communities, although bacteria are more broadly documented and understood (Lee et al., 2020). Thus, part of the information presented on fungal-bacterial interactions is speculation.

Further research would benefit from sampling plans that span and compare geographically diverse mangrove ecosystems, sampling microbial communities across mangrove structures in a variety of climatic conditions including varying tides, seasons, and disturbances. This combination of biotic and abiotic data will constitute a more holistic picture, and may account for some confounding factors that currently blur the nuance in microbial interactions. Beyond a sampling plan, bioinformatic pipelines can delineate the molecular data to discern and compare fungal and

bacterial presence and construct phylogenetic data for both the mangroves and the microbial communities. This genomic information could be further used to determine common motifs for predictive protein modeling that may present useful information about secondary metabolites and, thus, potential ecological niches.

Conclusion & Originality

In order to prevent the complete degradation of mangroves, and to begin restoration of the millions of hectares of deforested mangroves, we must employ targeted and strategic practices for cultivating the appropriate mangrove seedlings in nurseries, inoculated with the appropriate microbes, and involving the correct community partners. The appropriate seedling species will depend upon the abiotic conditions present, and will account for genetic diversity and phenotypic plasticity, avoiding hybrids that struggle with fertility. The appropriate microbe inoculation strategy will be both species- and location-dependent, as varying species have varying nutrient requirements that are further affected by abiotic, environmental conditions. Finally, the correct community partners will include scientists, investors and conservationists, but it will also include local community members who live in proximity to these ecosystems, understand their importance, and are willing to contribute to the upkeep and maintenance.

The complexity of mangrove ecosystems is not well-understood, including the multi-faceted roles they play by providing and facilitating a multiplicity of integral ecosystem processes. In large part, the lack of knowledge surrounding mangrove ecology stems from a lack of knowledge about the coastal microbiome, from community assembly to composition to microbial interactions (Allard et al., 2020). However, we have many pieces of the puzzle and scientists, activists, farmers, locals and others are collaborating to discover sustainable, successful, interdisciplinary methods that can protect and restore these vital ecosystems.

It has been shown that microbial diversity supports mangrove seedlings during development by assisting in root stabilization, increased biomass, increased plant productivity, increased resistance to stressors, and decreased uptake of toxic compounds (D'Souza, 2016; Holguin et al., 2001; Soldan et al., 2019). There is also ample evidence to suggest that microbial interactions work synergistically to support mangrove health, process nutrients in various stages, facilitate transport to new microhabitats for colonization, and ward off disease (Cheung et al., 2018; Katherisan, 2012). The key to bolstering transplantation success rates lies in fabricating specific strategies based on geographical locations and abiotic conditions of the target environment, then tailoring the inoculant and development strategy to those parameters (Holguin et al., 2001).

This research provides significant insight into the functioning of the mangal and the role of the mangrove microbiome, integrating this information with the end goal of conservation and ecosystem restoration. The conservation of mangroves will be essential to meeting Sustainable Development Goals 13, 14 and 15 as mangroves are integral stakeholders in the global carbon budget, and provide myriad resources and functions to support life both below water and on land. Mangrove conservation also falls in line with the goals of the UN Decade of Ocean Science for

Sustainable Development and the UN Decade on Ecosystem Restoration, and can provide integral insight into the management and rehabilitation of coastal ecosystems worldwide.

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Partnering to Reduce Inequalities, Attain Peace, Justice and Build Strong Institutions in Cameroon

Atangcho Akonumbo, Albert Mbiatem, and Emile Sunjo
(University of Buea, Cameroon)

Abstract

This study examines the role of Sustainable Development Goal 17 on partnerships in reducing inequalities, building strong institutions and attaining peace and Justice in Cameroon. Partnerships have been increasingly considered to be crucial in implementing Sustainable Development Goals (SDGs). 19 targets have been identified by the United Nations (UN) on goal 17. This study essentially relies on target 17.17 meant to encourage effective partnerships. Meeting this target can potentially contribute to reducing inequalities in particular, building strong institutions and attaining peace and justice in Cameroon. Local, regional and international partnerships have been put in place to address questions of inequality, peace and justice and building strong institutions found respectively under goals 10 and 16. Cameroon, seven years into the SDGs agenda, is yet to show a clear path to the realization of goals 10 and 16. These challenges can be attributed to the limited success in putting in place effective partnerships envisaged by target 17.17 of Goal 17. Peace, security and justice in particular have experienced significant challenges in recent years and inequalities have been on a rise. Using a qualitative case study research design, this study sought to examine the relevance of partnerships in the attainment of SDGs 10 and 16; understand the effectiveness/ineffectiveness of partnerships on the achievement of the Goals based; and explore the best strategies for the implementation of partnerships that may contribute to the attainment of SDGs 10 and 16 in Cameroon. It reveals that much still needs to be done for goals 10 and 16 to be satisfactorily realized in Cameroon. It also shows that partnerships are indispensable for the attainment of goals 10 and 16 in Cameroon and that to be effective, they must involve the active participation of beneficiaries. Finally, the study demonstrates that an advance in one of the three goals contributes to progress in the others.

Keywords: Partnerships, Sustainable Development Goals, Inequalities, Peace, Justice, Institutions

Introduction

Partnerships have been considered to be vital in realizing the Sustainable Development Goals (SDGs) (MacDonald et al 2018; United Nations 2020 58). Partnerships in the SDGs context are captured by goal 17 that recognizes multi-stakeholder partnerships as important vehicles for mobilizing and sharing knowledge, expertise, technologies and financial resources to support the achievement of the sustainable development goals in all countries, particularly developing countries such as Cameroon. The SDGs were adopted in 2015 by the United Nations to address 17 most urgent challenges to sustainable development in the world. The SDGs are a collection of

17 global goals set by the United Nations (UN) to be implemented by the year 2030. The goals cover the following areas: Poverty, Hunger, Health, Education, Gender Equality, Energy, Economic Growth, Industry, Inequalities on all levels, Sustainable Communities, Responsible Consumption, Climate Change, Marine Life, Environment, Social Justice, and Partnership.

Among the SDGs are goal 10 to reduce inequalities; goal 16 to promote peace, justice and strong institutions and goal 17 to strengthen the means of implementation and build effective partnerships for sustainable development. Goal 17 can thus be considered a watershed goal since it is perceived to be necessary for the realization of others, including goals 10 and 16. In addressing the limitations of traditional state-led and top-down development approaches, partnerships have gained ground to become an indispensable paradigm in sustainable development (Stibbe et al, 2018). The scale and ambition of the new agenda requires a revitalized global partnership to ensure its implementation. Cameroon like many other African countries has been a party to the universal call to action to end poverty, protect the planet and to ensure that all people enjoy peace and prosperity by 2030 (UNDP, 2022). In practice however, in spite of the commitment to, and implementation of the SDGs agenda for almost seven years in Cameroon, sustainable development is yet to be a reality.

Cameroon is a country located in Central Africa and has an area of 475,440 km². It is a low income country with a population of 26,545,864 inhabitants and has a moderate population density of 56 people per km². Cameroon is endowed with rich natural resources, including oil and gas, mineral ores, and high-value species of timber, and agricultural products, such as coffee, cotton, cocoa, maize, and cassava. In spite of such natural resource endowments, poverty rate has been on an increase as shown by recent World Bank statistics: rate growing from 24.5% in 2019 to 25.3% in 2021. (World Bank, 2021). Poor governance mainly characterized by corruption hinders the development of the country. The 2021 Transparency International Corruption Perceptions Index ranks Cameroon 144 out of 180 countries, with a score of 27/100 (Transparency International, 2021).

Cameroon remains lowly ranked on development classifications as it continues to encounter numerous challenges on the realization of the goals. It is ranked 150th out of 187 countries on Human Development Index classification (World Population Review 2022). The nineteen targets of goal 17 partnership broken into five categories – finance, technology, capacity building, trade and systemic – have not considerably impacted in fostering equality, peace, justice and strong institutions in Cameroon. After a low performance on Millennium Development Goals (MDGs) – with only two targets (target 1.c and target 6.a) out of seventeen targets concretized –, Cameroon now into the SDGs agenda, encounters operational and functional challenges towards realization of goals.

Cameroon has in the image of most Central African states, been facing wide-ranging challenges relating to economic development, social cohesion, administrative capacity and political governance (Southern Voice 2019). The country which has for over five decades since independence been considered as the island of peace in the tumultuous Central Africa is currently affected by pockets of instability mainly in its regions of North West, South West, Far North, and

East. The country is equally host to societal inequalities between citizens of varied social ranks and such have contributed to the lack of fair access to justice in a context where institutions need to be strengthened. The literature reveals that ineffective partnerships for goals in Africa has been characterised by poor collaboration across societal sectors. Kumar et al argue that, the four major challenges that need to be addressed for achieving the SDGs across the African continent are financial, maintaining peace, measuring progress and accountability (Kumar et al, 2016). Vera discussed the implementation challenges as being linked to limited capacities on national planning agendas, evidence-based prioritisation and sequencing of policy interventions in a way that leverages intersectoral collaborations and minimizes policy trade-offs (Vera, 2018). Another study deplored the lack of confidence in the ability of universities to contribute meaningfully to economic development, which was exacerbated by weak investments in research infrastructures and the pervasiveness of poor governance (Akpezi, 2018). Gender disparity and gender based violence was identified among the most challenging forms of inequality with women encountering disadvantages in access to work, economic assets and participation in private and public decision-making (Esuna and Nergis, 2017).

Over half a decade following the adoption of the SDGs, their necessary interlinkages and interdependencies ascribed to goal 17 remain ineffective in Cameroon, thus the need to fill the gaps on partnership for goals strongly arises. This study examines the extent to which the partnership dimension drawn from goal 17 provides the required interlinkages and interdependencies among goals and specifically with respect to Goals 10 and goal 16. It is fundamentally an assessment on the aspects of inequalities, peace, justice and strong institutions in line with partnership prescriptions. This study seeks to answer the following three research questions: why are partnerships important for the attainment of SDGs 10 and 16? What makes partnerships to achieve the goals – effectiveness/ineffectiveness? What strategies for the implementation of partnerships can contribute to the attainment of SDGs 10 and 16 in Cameroon? The rest of this paper is structured into three main sections as follows: Methodology and Conceptual Framework, Results and Conclusion.

Methodology and Conceptual Framework

The approach adopted for this study was qualitative and inductive. Cameroon was used as a case study because of the rich experience of the country with both international and local partnerships for the SDGs. An interview guide was developed and pre-tested to generate initial data. Pre-testing the interview guide and carrying out a preliminary review of literature, helped in identifying patterns and relationships. This process was useful in developing a conceptual framework for the study as presented in Fig 1 below.

The qualitative approach was useful in gaining an understanding of the views of stakeholders on the importance and motivations for engaging or supporting the use of partnerships in addressing goals 10 and 16. The case study design adopted for this study was particularly useful because the study sought to obtain an in-depth appreciation of the role of partnerships in the attainment of SDGs.

Field data was collected using key informant semi-structured interviews with local community leaders, government officials, senior staff of United Nations Agencies and academics in Buea, Douala and Yaoundé in Cameroon. Participants were recruited using the snowball sampling method. The researchers first carried out interviews with people they already knew. The initial contacts recommended other persons to the team based on their experience and knowledge of partnerships for the SDGs. To ensure that the right data was collected, open-ended questions were developed and pre-tested and reviewed before the effective commencement of the interviews. The interviews lasted between 30 minutes and 1 hour. Data saturation was used as a criterion to determine the number of interviews to ensure that all shades of opinion on the subject were covered. This means that the interviews were conducted up to a point when no new information was being obtained.

Data collected were processed via thematic content analysis. The first step in the process was the transcription of the recorded interviews. The transcription process helped gain familiarity with the data to facilitate the identification of common themes. The transcripts were re-read and significant statements that directly addressed the research questions were underlined and extracted. The meaning of each significant statement was formulated and written down. These meanings were constantly compared with the original transcripts to ensure that they accurately reflected what the respondents had said. The formulated meanings were then organized into clusters and themes. Reliability was ensured by recording interviews and taking notes and reviewing each tape and all notes together with the transcripts to ensure they were accurate. Consistency was sought by ensuring that a guide was developed and pre-tested to ensure that the views of participants were solicited for the same questions.

Fig.1. Conceptual Framework for the Role of Partnerships in the Realization of Goals 10 and 16

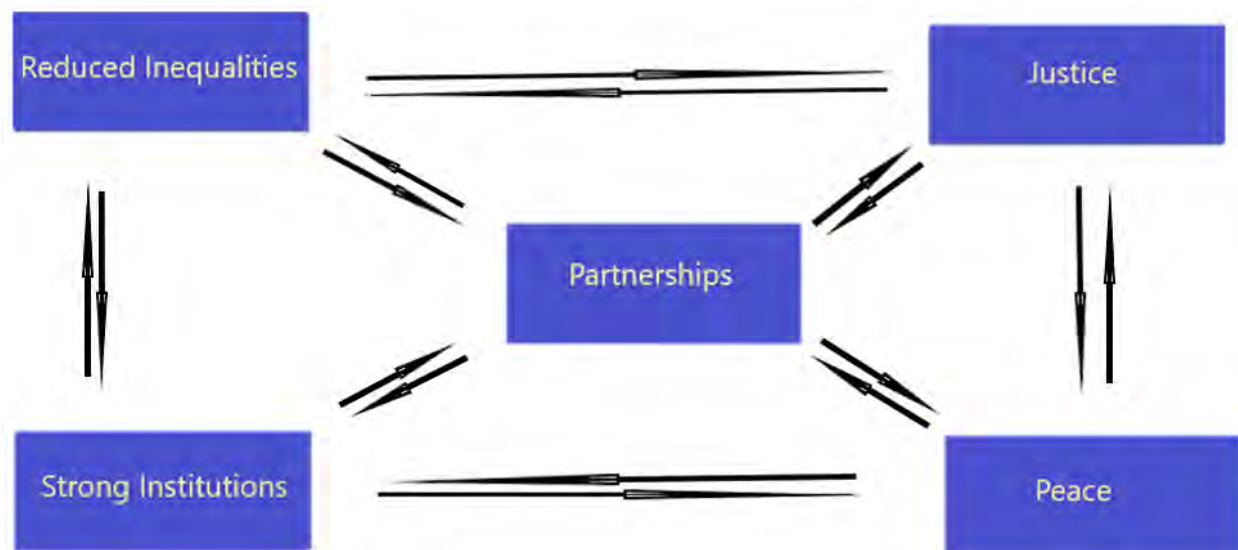


Figure 1 above conceptually visualizes the interactions among goals 10, 16 and 17, by illustrating the central role of partnerships to respond to issues of inequalities, peace justice and institutions.

Partnerships are projected as key means to have the objectives attained. What is essentially drawn from the conceptual representation of figure 1, are the mutual interconnections among activities relating to reduced inequalities, peace, justice and strong institutions. This is to say that, the building of strong institutions, the reduction of inequalities and the attainment of peace and justice are mutually supportive to one another and overall facilitated by effective partnerships. The various meanings given to the concepts – partnerships, reduced inequalities, peace, justice and strong institutions – in line with the three SDGs under study, strongly depict interconnections among the goals.

According to the UN system, partnerships for sustainable development as prescribed by goal 17, are multi-stakeholder initiatives freely undertaken by governments, intergovernmental organizations, major groups and other stakeholders, which efforts are useful to the implementation of inter-governmentally, agreed development goals and commitments. This partnership is mainly guided by three dimensions: exchange, integrate and transform (Stibbe et al, 2018). Goal 10 on Reduced inequalities, calls for efforts towards reducing disparities in income as well as those based on age, sex, disability, race, ethnicity, origin, religion or economic or other status within a country. Also, there are inequalities among countries, including those related to representation, migration and development assistance (United Nations, 2022).

Peace, as reflected by goal 16 is very much aligned with Johan Galtung's positive peace that refers to the integration of human society (Galtung, 1964) mainly guided by the following aspects: structural integration, optimism, prevention and peace by peaceful means. The peace proposed by SDGs is development inclined with much attention given to human and structural development. Justice as captured by goal 16 specifically covers targets 16.3 and 16.C which are: "promote the rule of law at the national and international levels and ensure equal access to justice for all"; and "promote and enforce non-discriminatory laws and policies for sustainable development." The aspect of strong institutions by goal 16 is mainly captured in target 16.6 which refers to "developing effective, accountable and transparent institutions at all levels." Thus the suppression of the over-personalization in policy making, decision making process and public service delivery will contribute to strengthening institutions.

Results

The objective of this qualitative study was to examine the role of partnerships in reducing inequalities, building strong institutions and attaining peace and justice in Cameroon. As represented in Fig 1 above, we sought the views of stakeholders on the relationship between partnerships on attaining goals 10 and 16 of the SDGs in Cameroon. Cameroon ratified in September 2015, at the UN headquarters in New York, the 2030 Agenda for Sustainable Development. The country had previously joined another UN agenda on development known as MDGs.

Participants in the study came from diverse backgrounds. All participants had knowledge or experience of partnerships for the SDGs. Meanings were formulated from the interview transcripts and organized into themes. The analysis revealed main themes that were important in

understanding the role of partnership in attaining goals 10 and 16 in Cameroon. These were: common goals are better achieved through collaboration, importance of partnerships, partnerships should include all stakeholders, their motivations for engaging in them, strategies for effective partnerships to attain the goals and factors that can undermine the success of partnerships. Thus, this section on results will cover the sub-sections: low scale of realization of goals 10 and 16 in Cameroon; reasons why Cameroon needs partnerships to attain goals 10 and 16; challenges to partnerships in achieving goals 10 and 16; strategies for the effective implementation of partnerships to attain the goals in Cameroon.

Low Scale of Realization of Goals 10 and 16 in Cameroon

All participants were of the view that more needs to be done to attain peace, justice, reduce inequalities and build strong institutions in Cameroon⁷². Cameroon was also considered by most participants to have not met the targets set for the Millennium Development Goals (MDGs) agenda that preceded the SDGs⁷³. The literature shows that this low level of realization of the goals is however not unique to Cameroon (Crossette, 2019). It has been observed that most countries, especially in the developing world are lagging behind in efforts to attain the goals.

Under the 2015 agenda for MDGs, Cameroon concretized only two targets out of the seventeen. Cameroon had pledged to specifically track 17 targets and ultimately only materialized two targets. This is target 1.c (“Halve in 2015 the proportion of people suffering from hunger”) and target 6.a (“By 2015, have ended the spread of HIV/AIDS and begin to reverse the current trend”). Indeed, the proportion of the population living below the poverty line effectively fell from 40.2% in 2001 to 37.5% in 2014, registering a drop of 2.7 points for this period (INS, 2015). While the HIV/AIDS prevalence rate has fallen from around 5.5% to 3.0% in 2014 (INS, 2015). A participant from the National Institute for Statistics (INS) made the following observation of the country’s performance: “Yes poverty has certainly declined on 2.7 rate but in terms of mass it has rather increased with the rise in the number of poor people. Models specific to the social context must be adopted.”⁷⁴

This low scale achievement led the country to renew the MDGs for the 2020 deadline. (CAMERCAP-PARC, 2020). At the same time, the country embarked on the new 2030 agenda for SDGs. Cameroon joining the current development agenda without having considerably achieved the goals of the previous agenda, has logically raised many doubts on its readiness and capacity to perform efficiently on SDGs. Besides, Cameroon on its SDG journey has been seriously affected by the COVID-19 pandemic which has unprecedentedly affected the 2030 Agenda. (CAMERCAP-PARC, 2020).

Economic growth in Cameroon since 2010 has not met expectations as projected by the Growth and Employment Strategy Paper. The country has performed well below the 7%, the expected annual average over the period of the strategy for growth and employment, supposed to mark the

⁷² Interviews in Buea, Douala and Yaounde, March 2022

⁷³ Interviews in Yaounde and Douala, March 2022

⁷⁴ Interview in Yaounde, 16 March 2022.

first phase towards the vision of being an emerging country in 2035. (CAMERCAP-PARC, 2020). The SDGs agenda in Cameroon is very much in line with Cameroon Vision 2035 initiated in 2009. The overall objective of the vision is to make Cameroon an emerging country over the next 25-30 years which is the period required to move from one generation to another. The vision also has medium-term objectives, notably: poverty alleviation; becoming a middle income country; becoming a newly industrialized country and consolidating democracy and national unity while respecting the country's diversity. This vision in principles further matches the SDGs in the sense that it promotes the cooperation between the government, civil society, private sector and development partners (Ministry of the Economy Planning and Regional Development, 2009). But in practice, the collaboration between these key sectors is still to meet societal expectations in a context where the government remains every much dominant and as a result the civil society and private sector have limited margin for manoeuvre to influence the development goals.

The 2020 UNDP's Human Development report – a key benchmark in measuring sustainable development – describes the encouraging Human Development Index (HDI) trends in Cameroon from 1990-2019. During this period, Cameroon's HDI value increased from 0.448 to 0.563, an increase of 25.7 percent. Cameroon HDI's score according to the World Population Review is maintained to 0.563 in 2022. Table 1 below reviews Cameroon's progress in each of the HDI indicators. Between 1990 and 2019, Cameroon's life expectancy at birth increased by 5.9 years, mean years of schooling increased by 2.8 years and expected years of schooling increased by 4.1 years. Cameroon's GNI per capita increased by about 15.5 percent between 1990 and 2019. Cameroon's HDI of 0.563 however remained below the average of 0.631 for countries in the medium human development group (UNDP, 2020).

Table 1: Cameroon's HDI Trends Based on Consistent Time Series Data and New Goalposts

| | Life expectancy at birth | Expected years of schooling | Mean years of schooling | GNI per capita (2017 PPP\$) | HDI value |
|------|---------------------------------|------------------------------------|--------------------------------|------------------------------------|------------------|
| 1990 | 53.4 | 8.0 | 3.5 | 3,101 | 0.448 |
| 1995 | 51.6 | 7.5 | 4.2 | 2,400 | 0.432 |
| 2000 | 51.0 | 7.3 | 4.8 | 2,589 | 0.440 |
| 2005 | 52.8 | 8.4 | 5.1 | 2,902 | 0.470 |
| 2010 | 55.1 | 10.2 | 5.3 | 3,056 | 0.505 |
| 2015 | 57.6 | 12.2 | 6.0 | 3,410 | 0.549 |
| 2016 | 58.1 | 12.1 | 6.1 | 3,465 | 0.553 |
| 2017 | 58.5 | 12.1 | 6.2 | 3,487 | 0.557 |
| 2018 | 58.9 | 12.1 | 6.3 | 3,526 | 0.560 |
| 2019 | 59.3 | 12.1 | 6.3 | 3,581 | 0.563 |

Source UNDP, Human Development Report 2020

The increase in Human development measurement does not however imply Cameroon's realization on key constituents of sustainable development. For instance, the minimum wage in Cameroon is very low. That is 36,270 CFA (USD 61.73) francs per month, applicable to all employees in all sectors. (Federal Minimum Wage, 2022).

The 2021 Sustainable Development Goals Report has raised serious concerns on the attainment of goals 10, 16 and 17 mostly in low and middle income countries. On goal 10, the report states that, "inequality persists, whether in income, wealth, opportunities or other dimensions...The pandemic is exacerbating existing inequalities within and among countries and hitting the most vulnerable people and the poorest countries hardest." (United Nations, 2021: 46). It states on goal 16 that, "The world is still a long way from achieving the goal of peaceful, just and inclusive societies... the average prevalence rate of bribery in low income countries is 37.6 per cent, versus 7.2 per cent in high income countries." (United Nations, 2021:59). The report on goal 17 indicates: "The pandemic is further testing multilateral and global partnerships that were already shaky. Although Official Development Assistance (ODA) increased and remittance flows declined less than expected in 2020, Foreign Direct Investment (FDI) dropped by 40 per cent." (United Nations, 2021: 60).

A recent report on countries' performance has captured the different levels of achievement of goals in Cameroon. Almost seven years down the line, only two out of the seventeen goals are on track. That is goal 12 (Responsible Consumption and Production) and goal 13 (Climate Change). For the goals under study, goals 16 and 17 are stagnating meanwhile goal 10 lacks enough statistics on its performance. Cameroon on attaining SDGs is ranked 134 out of 165 countries with a score of 53.5 (Jeffrey et al, 2021).

The country on goal 10 is yet to be effective on income distribution as the Gini coefficient has only been adjusted for top income. It is important to note that the higher the Gini coefficient, the greater the gap between the incomes of a country's richest and poorest people. A country's Gini coefficient is important because it helps identify high levels of income inequality, which can have several undesirable political and economic impacts (World Population Review 2022). A respondent from a civil society organization gave a sad picture of the gaps on incomes:

The incomes of many Cameroonians are close to the minimum wage. Those who do not occupy influential administrative positions only rely on their relatively low salaries while those in charge rely not only on their salaries but also on extravagant allowances. This has continued to widen the gap between the rich and the poor. Recently, the minister of Territorial Administration gave brand new cars to Divisional Officers while teachers on the other hand are unheard when requesting their incomes restored duly and on time.⁷⁵

Another respondent explained the low level of realization in the following words when asked whether there were successful example of partnerships to address goals 10 and 16 in Cameroon:

⁷⁵ Interview in Buea, 2 March 2022.

Not sure there are successful examples which could be cited as we still have visible inequalities and some parts of the country are still not that peaceful. However we see trends towards public collaboration with civil society organizations. We also see a trend of civil society organizations working with one another. External partners often involved in the collaborative path include UN, AU institutions and other international development organizations.⁷⁶

The trends in collaboration mentioned by this participant however show that there are efforts being made to attain goal 17 in Cameroon which can be helpful in effectively addressing goals 10 and 16. The difficulties in identifying successful partnerships to address 10 and 16 pointed to by the participant show that the level of realization cannot be considered significant or visible.

The SDG 2021 report on goal 16 has given a picture of not good performance relating to aspects of peace, justice and institutions. It mainly reveals the country's poor record on access to and affordability of justice, press freedom index, corruption perception index and penitentiary detention. Peace in Cameroon is seriously affected as the current situation contrast with the rather positive feedback of the report on homicide. The Anglophone conflict in the North West and South West regions has led to the rising number of killings since October 2017. In the space of less than five years, death toll has ranged between 4000-12000 (CHRNA, 2021), hundreds of villages have been burnt and pillaged (CHRNA 2021), over 750,000 people have been internally displaced (UN OCHA, June 2021), with a further 60,000 Cameroonian refugees in Nigeria (UNHCR, September 2020), and an estimated 2.2 million people in need of humanitarian assistance within Cameroon as a result of the conflict (UN OCHA situation report July 2021). This crisis in particular has affected the justice system and institutional mechanism with victims of violence not obtaining due reparations.

Reasons why Cameroon Needs Partnerships to Attain Goals 10 and 16

All participants said partnerships were indispensable for Cameroon to achieve goals 10 and 16⁷⁷. The literature reviewed also shows that partnerships are needed for the attainment of the SDGs. There reasons were advanced for the need of partnerships by Cameroon. These were: to avoid duplication and waste of efforts, effectively and efficiently address common goals and sharing experiences on best practices⁷⁸.

According to all participants, partnerships are necessary because common goals are better fulfilled through collaboration. They explained that such goals as peace, justice, reducing inequalities and building strong institutions were of interest to both national and international actors who can best realize them by working together. One respondent in Douala for example said partnerships are needed because:

⁷⁶ Interview in Yaounde, 16 March 2022

⁷⁷ Interviews, Yaounde, Buea and Douala, March 2022

⁷⁸ Interviews in Yaounde, Buea and Douala, March 2022

SDGs 10 and 16 are common problems in many societies, especially in less developed ones such as Cameroon. As such, partnering with countries that have attained at least 70% of SDGs 10 and 16 will help Cameroon to accelerate their attainment by taking advantage of their experiences.⁷⁹

Similarly, another respondent said partnerships are necessary to effectively carry out the volume of work that needs to be done to address these goals. According to this respondent:

There is so much that needs to be done to address goals 10 and 16 that Cameroon cannot do working alone. In addition to working with international partners, stakeholders within Cameroon need to be involved to effectively tackle the problems addressed under goals 10 and 16. This need for broad-based collaboration is important because these issues affect not only people of Cameroon, but also other countries and those who are involved in different relations with the country.⁸⁰

These findings are in line with those found in the literature. (Stibbe and Prescott, 2020) for example see common goals as a reason why partnerships are needed. Both authors however caution that it is not in every case that stakeholders may engage in partnerships because there is a common challenge that should be addressed. According to them, some stakeholders are not natural collaborators that will instinctively act towards achieving common goals. For such actors they contend, “a partnering mindset is something that may need to be actively cultivated” (Stibbe and Prescott, 2020, 47).

Challenges to Partnerships in Achieving Goals 10 and 16

Partnership is designed to facilitate an intensive global engagement in support of implementation of all goals and targets bringing together government, private sector, civil society, UN system and other actors and mobilizing all available resources (United Nations, 2015). Partnering to achieve goals is a fundamental prescription of the 2030 agenda. In Cameroon, partnership to reduce inequalities, attain peace and justice, and build strong institutions has for the past seven years since SDGs adoption in 2015 encountered numerous challenges as collaborative efforts among stakeholders are yet to show a clear path in achieving goal 10, 16 and 17.

Participants for interviews largely raised the aspects of structural deficiencies affecting mostly vulnerable strata of the population in Cameroon. They are of the opinion that, amidst infrastructural and security deficiencies in Cameroon, inequalities have deepened for vulnerable populations having at their disposal weaker health systems and facing existing humanitarian crises. Refugees and migrants, as well as indigenous peoples, older persons, people with disabilities and children are particularly at risk of being left behind. And hate speech targeting vulnerable groups is rising.⁸¹ Participants also described as difficult the journey to achieve peace

⁷⁹ Interview in Douala, 12 March 2022

⁸⁰ Interview in Yaounde, 16 March 2022.

⁸¹ Interviews in Douala, Buea, and Yaounde, March 2022.

given that Cameroon is currently affected by pockets of instability in four out of ten regions of the country.⁸²

The inequalities were very striking on health aspects as a respondent from the Ministry of Health laid emphasis on the lack of access to health facilities: “Despite collaborating with good number of international partners, access to health facilities remains extremely difficult among low income Cameroonians and those living in remote or rural areas. Urban areas equally encounter serious medical equipment challenges.”⁸³ Recently in March 2022, a mainstream media in Cameroon revealed the reproachable medical care given to quarantined cholera patients in public medical centres. It reported on medical equipment shortage in terms of beds, drips and other essential equipment to administer treatments to patients in Limbe Mile1 and Bota Hospitals⁸⁴

The security crisis in the northern regions of the country with the Boko Haram phenomenon, the socio-political crisis in the North-West and South-West regions transformed into a secessionist crisis and the uncontrolled influx of Central African refugees, all constitute the pockets of instability in Cameroon. (CAMERCAP-PARC, 2020). For almost five years, the crisis in the two Anglophone regions, threats posed by Boko Haram in the northern regions, and conflicts in the CAR and the DRC have been creating and posing obstacles to peace and internal security. This situation greatly weighs on state budget and funding that can be allocated to development projects.

Implementation challenges are largely presented from governance and institutional capacity perspectives. The lack of clarity around ratification, reporting, accountability mechanisms, and roles and responsibilities is a result of poor governance and weak institutionalization. (Belay, 2019). In many countries, capacity needs and gaps represent a critical obstruction to meaningful SDG 16 implementation and follow-up. These capacity issues are often, though not exclusively, felt in countries that are post-conflict, transitioning out of conflict, fragile, or least developed. Issues such as social cohesion, illicit financial flows, corruption and many forms of discrimination remain grave challenges. (High Level Political Forum, 2019).

A civil society organization respondent described challenges ascribed to goals 10 and 16 as closely interrelated and linked to cause-effect analogy:

The country is rife with inequalities between sexes & gender; exercise of authority between the arms of governance (Executive, Legislative, Judiciary); various professional corps, tribes, regions, people with disabilities or vulnerabilities and others as the case may be. The exercise of authority is not democratic, not transparent and often corrupt. These inequalities directly impact peace and the quality of institutions which has resulted in the national conflicts as with the Separatist movement, intertribal wars, injustice and abuse of human rights.⁸⁵

⁸² Interviews in Douala, Buea, and Yaounde, March 2022.

⁸³ Interview in Yaounde, 15 March 2022.

⁸⁴ Equinox TV news, 25 March 2022.

⁸⁵ Interview in Buea, 17 March 2022.

Another respondent, from a civil society organization described the challenges pertaining to goal 16 from a peace, justice and institutional perspectives:

In the Cameroonian context, SDG 16 is based on the understanding that conflicts, insecurity, weak institutions, and limited access to justice are threats to sustainable development. Crisis in 2016 in the CEMAC zone, leading all the countries to a program of economic reforms under supervision by the IMF and other partners. In addition to the so-called objective reasons, it is our duty to recognize the weaknesses of our essentially extroverted economic model, with a trade balance structurally in deficit for more than a decade, the weak competitiveness of the Cameroonian economy to which is added poor governance, in particular in the public sector with its corollary that is Corruption. All this environment was not already very conducive to a resumption of growth in the country and sub-region.⁸⁶

Similarly, a respondent from the Ministry of Water Resources and Energy insisted on the so far poor performance of goal 16 in Cameroon amidst partnership:

“I strongly believe more has to be done to attain these goals and most especially goal 16. I say so because we are in constant quest for peace in our country, our judicial system is very corrupt, thus, the exacerbation of the unjust Cameroon in which we live. Our institutions are mere window dressing. A good goal 16 will solve goal”⁸⁷

According to a respondent in charge of cooperation at the ministry of Agriculture, the predominance of the government on partnering with local actors does not ease collaboration.⁸⁸ The required collaboration between the government, the civil society, the private sector and citizens has been described by most interviewees as lacking necessary mutuality. The government dominates the interactions with the other sectors thus leaving them limited margin for manoeuvre to influence SDGs and their implementation.

The challenges as discussed above in an indication of the remaining long journey for Cameroon in using goal 17 to attain goals 10 and 16. Thus, strategies to respond to the challenges linked to inequalities, peace, justice, and institutions must be centered on effective implementation of partnerships

Strategies for the Effective Implementation of Partnerships to Attain the Goals in Cameroon

The partnership journey starts with building an understanding of an overlap of alignment of interest among the partners which allows them to together build an overarching vision – the big picture change that the partnership wants to contribute to. (Stibbe et al, 2018). A successful sustainable development agenda entails partnerships between governments, the civil society and the private sector. These inclusive partnerships built upon principles and values, a shared vision,

⁸⁶ Interview in Yaounde, 16 March 2022.

⁸⁷ Interview in Yaounde, 16 March 2022.

⁸⁸ Interview in Buea, 7 March 2022.

and shared goals that place people and the planet at the center, are needed at the global, regional, national and local level (SDG Tracker, 2020). Participants were of the view that an inclusive and participatory strategy that ensures local ownership or leadership is necessary for the effective realization of goals 10, 16 and 17 in Cameroon.

The importance of an inclusive and participatory strategy to partnerships was emphasized by all participants. The participants believed that beneficiaries are seldom involved in the setting-up of partnerships, the definition of issues to be addressed by the partnerships and decisions regarding the resources required and how projects are to be implemented. Partnerships set-up this way according to most participants, tend to serve the interests of the donors or the government and as such, make it unlikely that problems such as inequalities and the near absence of peace that are felt more by communities will be effectively attended to.⁸⁹ One respondent from an international governmental organization in Yaoundé for example said:

Partnerships need to be based on the needs expressed by the beneficiaries to succeed. The only way to ensure the needs of intended beneficiaries will be effectively expressed, is to involve the supposed beneficiaries in the partnership from the very beginning when the partnership is being set-up. To guarantee such active participation of beneficiaries, it is essential their needs are clearly expressed in policies designed to achieve goals 10, 16 and 17.⁹⁰

The above statement is much line with the statement of a respondent at the Ministry of Economy, Planning and Regional development:

The relative growth paths for each country should be implemented so that developed countries can assist less developed countries specifically with their shortcomings. Adopt a growth path specific to concerns of the countries in need. Adopt path which would guarantee a sustainable development in line with endogenous means.⁹¹

Still in the same vein, a participant of the Ministry of Secondary Education suggested inclusive education strategies to accommodate everyone in schools: “Creation and running of schools that take into account the needs of all including that of disabled persons in the construction of school infrastructure; provide persons with disabilities with appropriate materials for their education.”⁹²

The top-down approach to attaining the goals is therefore one of the main obstacles to their realization. The criticism of this approach in the literature shows that many authors such as Manning (2009; 2010) and Hák et al. (2016) recommend the participatory strategy that participants believed will be more useful. Decisions regarding partnerships, the attainment of peace and justice, the reduction of inequalities and the development of strong institutions thus need to be made with adequate knowledge of the context so that grassroots support is obtained and the right issues are addressed.

⁸⁹ Interviews in Douala, Yaounde and Buea, March 2022

⁹⁰ Interview in Yaounde, 16 March 2022.

⁹¹ Interview in Yaounde, 17 March 2022.

⁹² Interview in Yaounde, 17 March 2022.

Conclusion

The aim of this study was to examine the views of stakeholders in Cameroon on the role of partnerships in attaining goals 10 and 16. To achieve this aim, the research focused on understanding the reasons why different actors in Cameroon including the government prioritize partnerships, what motivates them, the challenges they face and the strategies that can be used to overcome them.

The study reveals that partnerships are indispensable for the realisation of common goals such as peace, justice, reducing inequalities and building strong institutions. Without partnerships, participants believed it would be difficult to realise the goals. The reasons advanced as to why they are important or why Cameroon needs partnerships to attain goals 10 and 16 included increased agency to address these goals for the government and increased legitimacy for international partners to operate in, or access some communities in Cameroon which would otherwise be inaccessible. The results also show that the attainment of goals 10 and 16 would create a space that is conducive for the initiation and development of effective partnerships. The relationships between goals 10, 16 and 17 is therefore one of complementarity.

In spite of the importance of partnerships, the study shows that there are important challenges that need to be overcome for Cameroon to effectively benefit from the opportunities they offer in its bid to realise SDGs goals 10 and 16. The design of the partnerships has been a major challenge to ensuring success. Poignantly, participants believed that current partnership structures have failed to ensure participation of beneficiaries in decision making and that communication with beneficiaries in the conception and implementation processes was also limited.

In spite of the contributions of this study, it has some methodological limitations. As with other case studies, the sample includes only participants within a very specific context. The generalization of conclusions from this study should thus be made with reservations. It is necessary to undertake more research and extend the sample to other countries. The study has nonetheless answered some interesting questions. It has shown how differences in views have not undermined interest in and engagement in partnerships to achieve SDGs 10 and 16, although their achievement and sustainability were not investigated in this study.

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Authorizing the Use of Visual Force: Strategic Analysis and Examination of Incriminating Visual Images Presented at the United Nations Security Council

Dr. Maayan Amir (Ben-Gurion University of the Negev, Israel)

Abstract

With its aegis of maintaining international peace and its power to authorize the use of force on a global scale, the United Nations Security Council (UNSC) also provides an arena in which state representatives advocate for various military measures by exhibiting photographic material. Despite the fact that such material has been introduced for these purposes at the UNSC since its inception, systematic research into the principal visual codes and values that legally define the types of photographic material presented at the UNSC remains absent. This paper aims to fill the gap by analyzing the history of visual presentations, focusing on the strategy of incriminating states or non-state fighting frictions by weaponizing photographs submitted as evidence of atrocious international law infringement to justify military operations, or in blatant support of war efforts. Combing through the timeline of visual presentations in the history of the Council, our point of departure is the Syrian Civil War (2011–ongoing) to draw comparisons with two other cases: one in 1947, when the Dutch government submitted photographs as evidence against the Indonesian Republic troops; and another in 1961, whereby the Portuguese government presented photographs to incriminate the national movement's fighters in Angola. In these cases, the modus operandi reveals itself to be an imperial tool at the service of colonial purposes. The article's goal is to draw attention to the frequent abuses of imagery presented at the UNSC, and to shed light on the recurring pattern of misusing visuals for the purposes of justifying war.

Keywords: Visual Evidence, Visual Lawfare; United Nations Security Council; Syrian Civil War; Indonesian National Revolution; Angolan War of Independence

Purpose

The proposed research aims to contribute to our understanding of how photographic material presented at UNSC is employed to justify military actions. Despite the fact that such material has been introduced for these purposes at the UNSC since its very beginnings, by and large there is still a lack of systematic research into the principal visual codes and values that legally define the various types of photographic material presented at the UNSC. This paper aims to fill the gap by analyzing the history of visual presentations, focusing on the strategy of incriminating states or non-state fighting frictions by weaponizing photographs submitted as evidence of atrocious international law infringement to justify military operations, or in blatant support of war efforts. The article's goal is to draw attention to the frequent abuses of imagery presented at the UNSC sessions, and to shed light on the history of a recurring pattern of misusing visuals for the purposes of justifying war.

Design/Methodology/Approach

Combing through the timeline of visual presentations deployed this way in the history of the Council, our point of departure is the Syrian Civil War (2011–ongoing). We draw comparisons with two previous cases dating from as early as 1947, when photographs were submitted by the Dutch government as evidence against the Indonesian Republic troops, and then a second instance from 1961, whereby the Portuguese government presented photographs to incriminate the nationalist movement's fighters in Angola. The analysis combines original archive work, viewed against the backdrop of the growing scholarship at the intersection of law and image, in particular those that address the role of photography in the context of international law. The research follows references to the presentation of visual evidence in both written and visual records in the UNSC archives, as well as the respective national archives of the cases in question. The findings are understood in light of today's knowledge of the respective history of the episodes they claimed to attest to, and provides a methodical extraction of the conclusions, broadening the spectrum of interpretation of evidence presented in case.

Research Limitations/Implications

Despite its significance to international history, the video recordings of the sessions in which the visual imagery was presented are missing from the UNSC archives. To address the limitation, the present research includes a comprehensive study of the saved meeting records, and traces the material—wherever possible—to the respective national archives, where photographs related to the period in question were unearthed, some still in the envelope sent to the residing ambassador, and captioned with his official UNSC address. In addition, as the history of visual presentations in the Council has yet to be researched in full, an overview of existing literature studying colonial practices of documentation in general—and in relation to the specific imperial powers involved in the cases under examination—was undertaken to corroborate the analysis of the evidence presented.

Originality/Impact of the Paper

This article takes a close look at an often-used strategy by which photographs of atrocities and other imagery are co-opted at the UNSC to incriminate a declared rival in war crimes and in other infringements of international law, so as to advance legal justifications for military campaigns. Combing through the timeline of the use of visual incriminating evidence in the history of the Council, the *modus operandi* reveals itself to be an imperial tool at the service of colonial powers that exploit such photographic imagery, applying Laws of War terminology within the forming international legal forum. Even though such a strategy can often be detected and exposed, this tactic seems to have been adopted not only to confirm a legal basis for imperial military power projected beyond state borders, but has continued to emerge among diverse disputes in which states have contributed and developed an aggressive visual legacy under the apparent tutelage of the UNSC and its expanding archive of visual records that claim to reflect crimes against humanity and deprivation of human rights. The research and conclusions presented here are

intended to provide a practical language of interpretation for how this tool has been deployed at the UNSC, the aim being to close a seventy-six-year gap of silence on such maneuvers.

Authorizing the Use of Visual Force: Strategic Analysis and Examination of Incriminating Visual Images Presented at the United Nations Security Council

“Look at [these] pictures,” implored the then American ambassador Nikki Haley during her speech at the United Nation Security Council (UNSC) emergency meeting held on April 5, 2017 (Haley in UNSC, 2017, p. 17), a day after a reported chemical attack on the town of Khan Shaykhun carried out in Syria, indicating dozens of civilian casualties, while naming the Al-Assad regime as the perpetrator (Krishnan, 2017, p. 138). After holding up two enlarged (unattributed) color images she indicated as child victims of the devastating chemical substance, the ambassador added: “We cannot close our eyes to those pictures,” petitioning the council not to remain passive before the evidence: “If we are not prepared to act ... we will see more conflict in Syria; we will see more pictures that we can never unsee” (Haley in UNSC, 2017, pp. 17, 18).⁹³

By then, the multi-sided Syrian Civil War (2011–ongoing) that was entering its sixth year of brutal battles fought between the Bashar Al Assad regime (supported by Russia and Iran) and multiple opposing forces (some with various intermittently direct and indirect backing by Western and other countries in the region) already exposed the Syrian people to almost all possible acknowledged, deliberate, and indiscriminate wartime violations (Van Schaack, 2016; Tan and Perudin, 2019; Muzzall et al., 2021; Öztö and Efeğil, 2021, pp. 37–38). While the United Nation Security Council remained deadlocked in decision on international law enforcement, if we reconsider the ambassador's presentation, we can begin to observe how the UNSC saw the birth of a parallel field of conflict in which visual documentation is weaponized as evidence of war crimes in order to legitimize subsequent military actions. The American ambassador sought to harness visual proof of violations of international law of war, in order to support and secure a mandate for a retaliatory act that consisted in the subsequent US missile attack carried out a mere two days later. Led by the Trump administration, the strike was the first to openly target Syrian government forces since the outbreak of the devastating war (Kube et al., 2017).

⁹³ My gratitude goes to my brother Micheal Amir for his inspiring and valuable insights. I gratefully acknowledge the assistance of Eden Ashkenazy for all her contribution to the project and to Zohar Iancu for her kind help in facilitating the archive work in Lisbon. A special thanks to the Tamar Golan Africa Center at Ben-Gurion University of the Negev for their support.



Image 1: Former Permanent Representative of the United States Nikki Haley presenting photographs, which she depicts as children who suffered from a chemical attack in Douma, Syria, during the 7915th UNSC Meeting, 5 April, 2017. Credit: UN Photo/Rick Bajornas.

With its aegis of maintaining international peace worldwide, and power to authorize the use of force on a global scale, historically the UNSC also provides an arena in which representatives of individual states can champion arguments for diverse military actions (United Nations Security Council). The myriad ways international law's rhetoric was misused—from its application as mere “lip service” (Glick, 1995), “a (vocabulary for) politics” (Koskeniemi, 2011, p. v.), with the potential to utterly confuse “military with the humanitarian ... the hero with the victim... cure with care” (Debray in Salvatici, 2019, p. 3) to its outright deployment as a “weapon of war,” a practice now termed “lawfare” (portmanteau of *law* and *warfare*), both in the context of the United Nations and beyond—has generated a rich and expanding scholarship (Glick, 1995). In the past, the privileged statutes of the written word and spoken testimony in international law often eclipsed the crucial role of visuals in the discipline (Charlesworth, 2021, p. 173; Biber, 2007, p. 17). Continuing in reference to the significant read from the scholar Roland Bleiker (2001, p. 510) which urges for a needed “aesthetic approach” to international relations, to replace the formerly dominating mimetic understanding of images employed to address the “inevitable difference between the represented and its representation [as] the very location of politics” the following essay embarks to find cracks in the “just” war façade. Dusting off these historic cracks and shining a light on a specific dangerous method practiced within the UNSC, whereby images are exploited in order to sanction the escalation of violence, is more urgent than ever for the United Nations’ goal to promote

“Peace, Justice and Strong Institutions” in the current decade, which is already riven by diverse international conflicts (United Nations Department of Economic and Social Affairs, “SDG16”).

By analyzing the category of visual documentation against a language invoking international law, this article aims to contribute to our understanding of how photographic material presented at the UNSC is employed to justify a broad spectrum of armed operations. The focus is the strategy of incriminating states or non-state fighting frictions by exploiting photographs submitted as evidence of war crimes to justify military actions, or in blatant support of war efforts. Despite the fact that this type of material has been presented for these purposes at the UNSC more or less since its establishment, by and large there is still a lack of systematic research into the principal visual codes and values that legally define this type of photographic material. This paper begins to fill the gap by analyzing the history of visual presentations deployed in this way, comparing two previous historical occurrences using the very same maneuver in which incriminating photography is weaponized to “vindicate” lethal violence by reframing it within the bounds of international law. The research draws on a case from as early as 1947—the second year of the UNSC’s operation, which held its first meeting on January 17, 1946 (UNSC, “What is the Security Council?”)—when photographs were submitted by the Dutch government during the Indonesian War of Independence (1945–1949) (Scholtz, 2018, p. 1) as evidence of atrocities being committed against civilians by the Indonesian Republic’s troops. The photographs were intended to legitimize the Dutch military’s own incursions aimed at suppressing the struggle, in order to maintain their colonial rule in the wake of the era of decolonization (Schrijver, 2000, p. 26). The second instance dates from 1961 against the backdrop of the worsening situation in Angola, when photographs were presented by Portugal’s government as proof of war crimes committed by the nationalist movement’s fighters during the first year of the Angolan War of Independence (1961–1974) (Wheeler and Opello, 2010, p. 45).

The overview of available material is by no means comprehensive, and in fact the visual evidence of these international crimes is missing from the UNSC archives. Despite its significance to international history, the material had to be traced at least in part to the respective national archives, where photographs related to the period in question were unearthed, some still in the envelope sent to the residing ambassador, and captioned with his official UNSC address. Nevertheless, this paper chooses to follow the evidence presented by our select examples, from which we can deduct and highlight an emerging pattern by which such material was employed to serve colonialist purposes. Acknowledging the facts which history provides only due to a shift of the previous imperial order in the two cases sampled for this discussion, we can see evidence of the misuse of photographs documenting war crimes to justify ensuing political violence, the moment the terms “war crimes” and “crimes against humanity” were asserted through the photographic documentation of the Nazi camps presented as evidence in the post-World War II International Military Tribunal (United Nations, “War Crimes”; United Nations, “Crimes Against Humanity”).

The goal of the article is to draw attention to potential abuses of such imagery at the UNSC sessions, and shed light on the recurring dubious pattern whereby states conceal their own military actions and violations behind images of atrocious acts which they claim represent war

crimes and international law infringements committed by the enemy, and even use such documentation to justify augmenting the forces deployed. The research and the conclusions presented here are meant to provide a practical language of interpretation of how this tool has been deployed at the UNSC, the aim being to close a gap of seventy-six years of silence on such maneuvers. Once identified, all the more so, within the provided historic continuum revealed in this paper, states can potentially be discouraged to resort to such warmongering disguised as legal pretext, and if not, at least their visual claims can be more easily deaden and when possible counteracted, exposed, neutralized and prevented from display.

The first part of the article delves into the emergence of photographic technologies and the laws of war codifications to highlight the direct and immediate relationship between the developing products and their application to justify proceeding with violent actions in response to conflicting agendas. In part two we will follow the evidence cementing the strategy of using pictures of atrocities during an on-going conflict to justify military objectives in the international legal forum of the UNSC to its early appearance already in the second year of its establishment. While in the case of the post-World War II military tribunals, photographic evidence was admitted *after* the conclusion of the military conflict it was derived from, in the case discussed in which photographic evidence was presented by the Netherlands, we find evidence of an early if not initial use of such material *during* armed conflict. In the third part of the article, we observe the emergence of an enhancing tactic to strengthen the impact of the weaponized photographic evidence that is exhibited in the international forum. The prevention of the exposure and distribution of visual evidence by other parties concerning or disconcerting to the subject at hand. By adding and implicating such containing tactics, this action manages to obfuscate the situation, with clarity provided only by the existing evidence and incriminating context presented.

Greatly differing from the kind of documentation put forward at the Nurnberg trial, in which the evidence exhibited provided a distinct and immediate understanding of the scale of the crime committed, we discover that the visual evidence in the UNSC mostly requires a contextual explanation to determine the necessary proof. Going over the specific photographs used in the Angola case study we can observe the emergence of illustration to exemplify evidence. Following the references to the strategy in written and visual records, viewed in light of today's knowledge of the respective history of the episodes they claim to attest to, the article before you provides a methodical extraction of the conclusions, broadening the spectrum of interpretation of evidence presented in each case.

The Genesis of Picturing Laws of War Violation

The codification of the Laws of War evolved in tandem with diverse photographic practices that internalized them as a system of representation in the endeavor to capture violations of all natures; this data gathering had varying and, in some cases, overwhelmingly conflicting objectives. As a so-called “universal language” (Sander, 1978, p. 676) photography’s unmatched potential to implicate others in acts of violence led to imagery being presented as evidence of war crimes and of unprecedented atrocities, strategic lexemes for legitimizing claims in the international domain. Today, photography and the Laws of War are global phenomena, however,

it is widely accepted that both bear the nineteenth-century European trademark (Marien, 2006, p. 1).

A pinnacle in the field of law and the attempt to mitigate wartime violence coincided with a breakthrough in the field of the image and the attempt to tether real occurrences to a form of durable representation. While laws of battlefield conduct have been traced far back to ancient cultures, the development of modern laws of armed conflict date to the mid-nineteenth century, when the former prevalent battlefield customs and constraints began to crystallize into broad principles that were codified and expanded through both international treaties and domestic legislation. States embarked on drafting a new canon of humanitarian values to be incorporated within their military rules; these efforts were accompanied by the scattered emergence of multinational treaties, which culminated with the Hague Regulation IV of 1907 (Solis, 2016, p. 7). Concomitantly, over that period the newly invented technology of photography emerged as a “privileged kind of evidence” (Mnookin, 1998, p. 4), and was gradually accruing recognition as evidential material admissible to western courts.⁹⁴ As theorist and critic Allan Sekula (1986, p. 7) astutely pointed out, photography surfaced as a unique mode of representation: “designed quite literally to facilitate the *arrest* of their referent” (emphasis in text). Similarly, crime-scene photography designed to capture traces of the offense within the physical environment so as to channel “a direct ... transfer of facts to the courtroom,” initiated a process of standardization for evidentiary use (Bell, 2018, p. 78). The evolving technology was quickly adopted by law enforcers and individuals alike as an effective tool for systematic criminalization, and case by case incrimination (Sekula, 1986, p. 5; Mnookin, 1998, p. 12).

At the same time, concerns over the misuse of the persuasive power of this “new juridical photographic realism” (Sakula, 1986, p. 5) lent the image’s oral framing a decisive role in criminal prosecution as a whole (Mnookin, 1998, pp. 12–14). Within the legal arena, speaking for photographs and verbally attesting for their credibility was granted a substantial weight, tying a Gordian knot between the image and its declared elucidation. Even though the evidentiary legal status invested therein never remained static—and could be perceived differently depending on the court—at least until the mid-twentieth century the accompanying interpretative testimony preserved a lasting effect on the way the photo was apprehended (Mnookin, 1998, p. 43).⁹⁵ Moreover, while photography was quickly embraced for securing definitive convictions, its dual capacity to simultaneously function “*honorifically* and *repressively*” (Sakula, 1986, p. 6; emphasis in text) made it also exploitable for more morally dubious justifications of violence, some of which required juggling the war/peace binary. Scholarship has shown how from early on, the medium was instrumentalized also in the field of international relations (Kennedy and Patrick, 2014, p. 1). Photography historian and political theorist Ariella Azoulay (2019, p. 5) asserts that photography emerged and “developed as an imperial technology”; “it didn’t halt [the imperial/colonial] process of plunder that made others and others’ worlds available to some, but rather accelerated it and

⁹⁴ Mnookin’s text refers specifically to the United States. For the use of photographic evidence outside the US, see for example Carter, 2010.

⁹⁵ On the impact of words in trials, see Mnookin, 1998, pp. 55–57. On the significant role the interpretative framing of the image played also within international law context, see for example the discussion on the crucial role of film captions in the Nuremberg trials in Douglas, 1995, pp. 473–474.

provided further opportunities to pursue it.” She continues, “the camera made visible and acceptable imperial world destruction and legitimated the world’s reconstruction on empire’s terms” (Azoulay, 2019, p. 7). The deployment of photographic evidential imagery during wartime as a tool of incrimination of the opponent for unfair conduct at the service of the interests of the accusing party to the fighting, can be found already in the context of the American Civil War (1861–1865) (Collins, 2013). At the hands of proponents for the humanitarian cause, building on the nineteenth-century sense of the term as “a philosophy of advocating or practicing compassionate action,” photography was adopted as a means to “reveal the barbarism of warfare” (Lydon, 2018, pp. 2, 6).

Since the late nineteenth century, within the framework of what is now called “humanitarian photography” (Fehrenbach and Rodogno, 2015, p. 1), all kinds of photographic aids—including incriminating evidential imagery—were mobilized for varied humanitarian causes across the globe to denounce particular acts of aggression but also more mundane crude horrors perpetrated as part of any dominant repressive rule (Fehrenbach and Rodogno, 2015, p. 12). Such conventions of representation were affected by and corresponded with dominant trends in print journalism, political propaganda, and commercial emphasis that privileged sentimentalism, among others (Fehrenbach and Rodogno, 2015, p. 11). Not to underestimate the overall historical significance of these campaigns, in some cases, argue historians Heide Fehrenbach and Davide Rodogno (2015, p. 6), photographic imagery was more of a “*moral rhetoric* masquerading as visual evidence” (emphasis in text). Nevertheless, photography was not merely illustrating pre-defined universalizing concepts or fixed legal categories within international law, but rather played a role at the very establishment of the legal framework of human rights, and impacted perceptions of “humanity” as a whole (Lydon, 2018, p. 1).

Sharon Sliwinski (2006, p. 91) and Adam Hochschild (1999, pp. 215, 112) unraveled how the evidential imagery of atrocities was subsequently recruited to denounce “crimes against humanity” even before such evidence was in legal use within an international tribunal. This leap came as part of a campaign that began in 1904 against Leopold II of Belgium to condemn the heinous violence inflicted upon the natives of his private colony in the Congo (Linfeild, 2010, p. 48; Hochschild, 1999, p. 191; Swilinski, 2006, p. 92 n. 6). Toward the end of the second half of the twentieth century, in the aftermath of World War II (1939–1945), the arsenal of photographic evidence—which by then steadily expanded to include moving images thanks to the evolving technology of film (Amir, 2022, p. 93; Delage, 2014)—unprecedented visual evidence of the German Nazi party’s atrocious crimes became fundamental to mobilizing criminal international law. The staggering power of the images from the Nazi death camps, propounds media scholar Sharon Sliwinski (2009, p. 24), “can be thought of as the pre-legal or perhaps the pre-political affective climate that galvanizes human rights discourse.” In the post-World War II International Military Tribunal (IMT) in Nuremberg (1945–1946) followed by the International Military Tribunal for the Far East (IMTFE) in Tokyo (1946–1948) initiated by the victorious Allied Powers charging representatives of the political leadership of the defeated countries with war atrocities, visual evidence was first to be “[i]ncorporat[ed] ... at the international level” (Duffy, 2018, p. 780; Dittrich et al., 2020). The trials which relied on international law to prosecute war crimes and crimes against humanity, provided a valuable framework for current international criminal law that is still

being built upon today.⁹⁶ The Nuremberg trials, writes legal scholar Douglas Lawrence, heralded the translation of “images of atrocity into a coherent legal idiom” (Douglas, 1995, p. 454). Photographic evidence provided “a visual register of atrocity” (Douglas, 1995, p. 465)⁹⁷ in the trials, and were considered a milestone in the doctrine’s development and “[a] turning point in the enforcement of international law” (Carter, 1948, p. 370; Tomuschat, 2006). To an extent, it was at the time of the establishment of the United Nations in October 1945 in the aftermath of the war (United Nations, “History of the United Nations”) that photography proved to be particularly effective in representing violations, or as media scholar Susie Linfield observes (2010, p. 37) “to show how those *without* such rights look, and what the absence of such rights does to a person” (emphasis in text), a development that seems to have reached its apogee in the realm of international law.

The United Nation’s ambitious aim to develop and enhance international law, and specifically the UNSC mandate to deliberate and decide on law of war violations (United Nations, “Global Issues: International Law and Justice”), had turned it also into an arena in which photographs from different parts of the world were advocated by the state representatives as evidence of international law infringements. Visualizing violent conflict in the language of international law—in which the impact (and relevance) of imagery is typically characterized in terms of war crimes and violations recognized internationally as particularly grave—therefore instigated a broad array of attempts to exhibit photography when seeking convictions in the international context, and as a legal pretext, an element that could be also harnessed as “accuse or excuse” (Machiavelli, 2006, p. 5) by warmongers in support of their military pursuits.

Crossing The Ring: The Emergence of Visual Evidence in Legal Context to Justify the Military Actions of the Dutch in Indonesia at the Wake of the National Revolution

If we trace back through the strategic use of photography as a means to implicate the adversary in violations of the law of war as a tool to justify military actions, a vast repertory of which is lodged in the UNSC archive, the trail leads as far back as the Council’s second year of operation, and specifically to the documentation of abusive colonial treatment at the service of crude imperialist pursuits. After World War II, in the period between 1945 and 1949, a “nationalist revolution” (Hess, 1987, p. 289) took place in Indonesia, heralding a significant step forward in the process of decolonization after more than three centuries of Dutch rule (Schrijver, 2000, p. 26). During World War II the Netherlands lost its control over the Southeast Asian colony—then known as “Dutch East Indies”—to Japan, but was able to retain its holdings of the area in 1945, upon the war’s termination (Bridges, 1947, pp. 158–159). Nevertheless, lacking previous economic and political potency (Van Der Eng, 1988, pp. 336–337), Indonesian nationalists operating swiftly in the last days of the Japanese occupation, were able to achieve territorial control over parts of the country proclaiming “the independence of the Republic of Indonesia.”

⁹⁶ See for example: Tomuschat, 2006; Dittrich et al., 2020.

⁹⁷ While Douglas focused on film, other scholars pointed to the significant impact of photography (see for example Milton, 1999).

This unilateral declaration was met with fierce opposition from the Dutch, who sought to crush the struggle for independence with military force. In 1946, extensive international diplomatic efforts culminated in the signing of Linggadjati Agreement, the first Dutch recognition of the *de facto* autonomy of the Indonesian Republic. Still, armed exchanges continued, and in the subsequent year the Dutch launched another major military campaign under the banner “Police Action” (Hess, 1987, pp. 275–276). In reality, the easily recognized colonial terminology that sought to camouflage oppressive war between a foreign conqueror and the indigenous population behind a frame of intra-state legislation and order-keeping mission, reflected the Dutch intention to regain its colonial control—in clear violation of the territorial division specified in the accord (Hess, 1987, p. 278).⁹⁸ While the Dutch offensive did in fact expand its territorial holding, it concurrently diminished its already dwindling international support, however, including that of the United States (Hess, 1987, pp. 276–277).

On August 1, 1947, the newly established institution of the United Nations Security Council (UNSC) passed a resolution calling the parties to cease fire and resolve the conflict “by arbitration or by other peaceful means” (UNSC, 1947a, p. 6; Schrijver, 2000, p. 26), opening a “Committee of Good Offices to facilitate negotiations” (Cochran, 2016, p. 99). Despite the call’s worldwide reverberations, on the ground it was left unanswered. In a Council’s meeting held on October 3, 1947, the Netherlands government was firmly denounced for its “aggressive actions” (Gromyko in UNSC, 1947c, p. 2489); an urgent resolution was tabled, along with a call for the UNSC’s “immediate intervention” (Gromyko in UNSC, 1947c, p. 2492). The choice of words was not only couched in a language of persuasion, but also contained assorted legal rhetoric. A year prior to the meeting, in the aftermath of World War II, “the launching or waging of aggressive wars” by any state or individual became punishable (Sayapin, 2014, p. xviii). Entrusted with the “responsibility for the maintenance of international peace” (United Nations Security Council), the UNSC was established as the United Nation’s cardinal organ to determine the presence of an “act of aggression,” and were such acts identified, decide on the measures to be taken in response, to the extent of authorizing the use of force (United Nations Security Council). Nevertheless, the founding document failed to furnish a legal definition, nor to provide a systematic account of the many diverse forms of aggression and their relation to peace maintenance (MacQueen, 2006, p. 54).

To rebut the allegations, the representative of the Dutch, Mr. Van Kleffens sought to fill the void by verbally reframing the Dutch operations as acts of protection toward the population, but also—most importantly for our discussion here—by allocating an ever-greater role to photographic proof. The Dutch, states Van Kleffens (UNSC, 1947c, p. 2493), retain that they are “forced to resist [Indonesia’s] Republican violence.” Their military operation is motivated by a “feel[ing] of responsibility” toward the locals, who “look to [the Netherlands East Indies Army] to free them from depredation and violence” (Van Kleffens in UNSC, 1947c, p. 2496). Threatening that a withdrawal on their behalf would precipitate “considerable and unnecessary loss of human lives” (Van Kleffens in UNSC, 1947c, p. 2501), he appealed to the members’ moral compass, propounding that to impose such a demand is no less than “the most cruel thing that anyone can

⁹⁸ On the vocabulary of “Small War,” see Barkawi, 2016.

ask the Council to do” (Van Kleffens in UNSC, 1947c, p. 2501). The Dutch justificatory scheme of rationalizing imperial violence as an act of protecting the indigenous population from their fellow “savages” as part of a “civilizing mission” directed at those who are unable to govern themselves has been underscored and discredited in a wealth of post-colonial critique, and subsequently in discussions of international law’s very foundations.⁹⁹ Notably, the Dutch representative in question sought to frame the colonists’ actions accordingly within the newly established institution by deploying hard visual evidence. To conclude his indictment, Mr. Van Kleffens had a rather more pressing proposal for the Council, which he presented as a scheme for international war violation record-keeping, an obligation to keep the international justice narrative straight within the UNSC’s growing archive, stating that:

The world has seen enough, these last few years, of atrocity pictures. Far be it for me to indulge in morbid sensationalism. At the same time I believe that the council should have in its records a collection of photographs depicting atrocities committed by troops and bands of the Indonesian republic, which collection I should now present to the Secretariat (Van Kleffens in UNSC, 1947c, p. 2501).

The visual analogy proposed by Mr. Van Kleffens—as if professing the need to subordinate any excessive *sentimental* reaction to the visual evidence of the atrocities in favor of legal *reasoning* based on war-crime evidence—sought to mobilize the moral values recently evoked by the images perceived as a triumph in the face of atrocity (Zelizer 1998, p. 136), not for the purpose of bringing war criminals to trial upon the termination of the conflict, but rather to legitimize the imperialist war under way.¹⁰⁰ The State representative turned to the media of photographic evidence to project the Dutch military power across space and time. In the short term the photographs were geared to justifying the overseas colonial war machine in operation, and in the long term, they provided a depository of legal aid designated to neutralize future threats, an alibi that will serve to exonerate political and military leaders in future courts now safeguarded in the UNSC archive.

Concluding his claims with the photographs—rather than with a proposal to bring the war to an end—the only closure he suggested on the meeting’s agenda on his behalf was the submission of the alleged incriminating visual evidence, meant to decide the battle on the international legal field thereafter. Even though the visual evidence that was used in this case is missing from the UNSC archive, there is proof establishing historically the use of this strategy. An example of the birth of a tactic that disguises the visual presentation in the very same terms of international laws in order to attain a military objective. In the “Inventory of the Archives of the Netherlands Permanent Representation to the United Nations in New York, 1946–1950,” the remaining photographs from the same year are both aerial and close-range shots, mainly showing a destroyed dike and flooding, indicating the Republican forces’ responsibility for the bombing in the area of Surabaya in East Java (Nationaal Archief). The photographs coincide with the Dutch allegations, brought before the UNSC against the Republican forces over the weaponization of

⁹⁹ See for example: Spivak, 2003; Anghie, 2005, pp. 8–9; Mégret, 2009; Mutua, 2002, p. 31.

¹⁰⁰ Though there was much international scrutiny following the first “police action,” Dutch military presence in Indonesia only grew during this period (Cochran, 2016, pp. 99–100).

water supply, warfare identified with “deprivation (too little water) and inundation (too much), oriented toward strategic and tactical ends” (Grech-Madin, 2021, p. 84).¹⁰¹ Studying the visual evidence in the Dutch archive, this article implies missing photographic evidence, given the time of the event described. In the found visual evidence we can identify the need to establish the presence of a powerful military force tasked with the destruction and obliteration of critical elements of human subsistence. In the photographs we see in detail the aftermath of this man-made devastation, but we also notice the importance of manually intervening with the visual content, highlighting specific points in the photographs, and attaching referenced explanations of what is actually portrayed. The legality of this case pivots on the massive damage already caused, necessitating the intervention of a militarized force to ward off further calamities caused by human intervention. This kind of evidence instrumentalization resonates with anthropologist Ann Laura Stoler’s (2002, p. 92) more general observations on the Dutch colonial archive’s “cultures of documentation.”¹⁰² Where the “conditions in which events were investigated, recorded, and constituted as evidence” were “‘historiographic operations’ that set the terms for new repressions, subsequent violences, and renewed commitment to retaliating against what were perceived as counterinsurgent acts” (Stoler, 2010, p. 187). Under the colonial laws, information was to be selectively stored and often outright fabricated: “[i]t was in factual stories that the colonial state affirmed its fictions to itself, in moralizing stories that it mapped the scope of its philanthropic missions” (Stoler, 2002, pp. 90, 97–98.). Studying photographs of atrocities taken by the Royal Netherlands East Indies Army already during the Atjeh War (1873–1908), Paul Bijl (2015, p. 44) identifies a persistent adherence to an imperialist framing “which was the only frame [the army] had at its disposal: it did not have language available to discuss the massacres in any other way.” In another arena of amateur photographs taken by Dutch soldiers serving in Indonesia during the very same period of the war for independence, historian Susie Protschky emphasizes that soldiers self-presented their military activity as a “humanitarian intervention” (Lydon, 2018, p. 41), demonstrating how “photographic humanitarian claims have been articulated by those on the wrong side of history” (Lydon, 2018, p. 41).

Shifting back to the legal arena of the UNSC and the attempt to incriminate the liberation struggle, it is Frédéric Mégret’s (2009, p. 265) warning of the danger that threatens those who find themselves on “the ‘wrong’ side of the laws of war” which gains additional relevance. In retrospect, in his visual appeal, Mr. Van Kleffens left the colonial mark on the first chapter of an unfolding international visual history in which grave conflicts were to be defined and contested in terms of their il/legitimation under international law. This moment represents a historic example whereby we come to see how the UNSC—an institution with the declared objective to secure international peace—subsequently heralds a first-of-its-kind platform in which alleged visual evidence of war crimes was to be displayed on the record. Specifically, visual evidence submitted by state members of the international system—originally declared as an incriminating exhibition of atrocities for the sake of peace and order—came to be instrumentalized to justify military agendas.

¹⁰¹ On the Dutch allegation, see UNSC, 1947b, p. 16.

¹⁰² Her research focuses on roughly the 1830s to 1930s.





The dwellings can't stand the
rising waters...



Images 2-4: The entire remaining photographs from 1947 in the "Archives of the Netherlands Permanent Representation to the United Nations in New York, 1946–1950." Credit: NL-HaNA, PV United Nations, 2.05.59.03, inv.nr. 3582.

Unmasking the Evidence of Inhumanity: The Portuguese Attempt to Frame the Angolan War of Independence

Framing visual imagery as evidence for crimes recognized by international law as a means to justify subsequent military actions, may be complemented by a forceful blockade on extraction any other visual evidence from site. The power to control visibility when engaging in an armed conflict, observes visual culture theorist Nicholas Mirzoeff (2005, p. 77), renders it another resource of warfare: "The war image in particular comes guaranteed by the full faith and credit of the sanctioning government that allows it to be seen." When such visual policing ensures the selective display of incriminating photography, strategically the evidential imagery is presented not only to defend the accusers' warmongering, but also to conceal their crimes. Broadly speaking, the one-sided conviction in inhuman armed conduct by means of criminalizing

photography includes a denial of access to and the cover-up of the full picture, preventing any possibility of counter-visual evidence.

In the history of European colonialism, the notorious ability of the Portuguese to thwart the production and distribution of self-incriminating visual evidence of the grave war crimes they committed in the course of Angola's War of Independence is recognized as without parallel (Ramos, 2017b, p. 114). Measures to assert monopoly over visual evidence ranged from the prevention of image creation in the first place, enforcing a blanket media embargo that forbade the admission of journalists to the region, to the extent of the incarceration of a political leader, who was charged with possession of photographic proof and entailed the deliberate destruction of film rolls to ensure the pictures never leaked out of the country (Ramos, 2017b, p. 114). The armed anti-colonial struggle in Angola to free the country from Portugal's stranglehold imposed on southern West Africa for five hundred years, began in a more focused way in January 1961, after the Portuguese authorities brutally suppressed a mass protest against forced work conditions, resulting in the death of thousands (Meijer and Birmingham, 2004, p. 11; Ball, 2017, p. 16). On February 4, an attempt carried out by nationalist youths to release political prisoners from Launda jails failed, triggering further Portuguese retaliation that ultimately marked the onset of the Angolan War of Independence (Alves, 2017, p. 235).¹⁰³ The spreading guerrilla resistance in the country was mainly led by three nationalist groups: MPLA, FNLA, and UNITA, whose actions were accompanied by diplomatic efforts for international support for the liberation drive (Meijer and Birmingham, 2004, p. 13; Ramos, 2017a, p. 254), and specifically in the halls of the UN (Santos, 2012), where a milestone General Assembly declaration for granting independence to colonial countries and Peoples had passed only a year before, was bolstered by a further resolution (no. 1541 (XV)) that enabled to classify all Portuguese colonies as non-self-governing, and consequently their formal delegitimization in the eyes of the UN Council (Santo, 2012, p. 250). Despite the intense violence and reported wide-scale killings, the art historian Afonso Ramos argues that at the time:

[I]f visual validation [was] needed for an event to be considered an atrocity, nothing took place in Angola other than the victims of anticolonial attacks revealed in millions of images captured by official order as the country was closed off to external eyes. By contrast, the un-imaged instances of retaliation, including decapitation rituals, napalm bombings, mass killings, forced disappearances and torture, held little to no currency. The former had eyewitnesses, the latter amounted to hearsay (Ramos, 2017b, p. 114).

Thus, while photography already marked the potential toward a more inclusive politics of representation (Benjamin, 1969, p. 23), the recently declared entitlement of the right to independence and self-determination bestowed upon the Angolans (McWhinney, 2008, p. 2) in visual terms were utterly erased.

¹⁰³ Angola refers to the war as the Luta Armada de Libertação Nacional, or Armed Struggle for National Liberation (RNA, 2022).

This radical power asymmetry was replicated in a UNSC meeting held on June 7, 1961, convened against the backdrop of the escalating war and deteriorating situation (UNSC, 1961).¹⁰⁴ What was surprisingly almost symmetrical within this fundamentally imbalanced access to visual evidence, was each side's mutual accusations as regards to war crimes and human rights violations. Accusations of crimes against humanity, genocide, aggression, victimizing women and children, sexual abuse, and assorted destruction, were not only historically put forward against imperial Portugal's gross crimes and atrocities committed routinely for half a millennium, but were also brazenly pointed back against the Angolans' national movements struggling for liberation, which—according to Portugal—represented no less than “a diabolical inversion of situations” (Garin in UNSC, 1961, p. 33; Frankel, 1961, p. 5). Speaking last after his colleagues, who unanimously condemned Portugal's crimes and their false justification, Mr. Garin, the Portuguese ambassador, sought to structure his legal arguments by denying the fact a war of independence had even taken place (UNSC, 1961). Instead—and to avoid any confusion—he repeatedly portrayed the national movements liberation efforts and their people in terms of “international terrorists,” “agents of disorder ... commanded from the outside” (Garin in UNSC, 1961, p. 25) by “Communists, extremists and anarchists,” who aim for “the prosecution of schemes of subversion” (Garin in UNSC, 1961, p. 24). By Garin's reckoning, due to the rebels' deliberate, indiscriminate, and criminal attacks on the defenseless population—“both white and colored” (Garin in UNSC, 1961, p. 25)—the Portuguese were in fact engaged in protecting not only the people of Angola and their property, but the entire “free world” (Garin in UNSC, 1961, p. 24).

The allegations of atrocity involved hideous details focused in a bid to criminalize the liberation struggle with as many possible charges recognized under international law. To show the “naked evidence,” Garin (UNSC, 1961, p. 25) presented the council with numerous “photographs illustrating this tale of human degradation. [A] demonstrat[ion of the] gruesome terrorism that no decent man can look at without a deep feeling of horror,” while making others available for their display at the end of the session. The assorted visual evidence provided to the UN Ambassador from the Portuguese Tourist Information Bureau includes close up and medium-shot photographs of mutilated bodies (mostly white), long and medium-shots of a burning village, photos of a hamlet and other dwellings (such as *senzalas* or slaves quarters) in ruins (the first is captioned to incriminate “UPA terrorists”—see Image 4), some photos of improvised obstacles meant to block vehicles transport lines (e.g., holes dug in the roads, tree-trunks placed as barriers, or partial damage caused to a ford supported by logs), close-ups of an urban coffee house (*tasca*) and a kids clothing boutique with punched holes in their glass facades, and another captioned image of wooden rifles described as “imported Czechoslovakian rifles taken from captured UPA terrorists leave little doubt as to the inspiration behind the Angolan ‘revolution’” (see Image 5). The photographs were meant to confirm the ambassador's argument that the government's efforts fell within the scope of a necessary “defensive action,” a “reestablishment of order by the Portuguese” (Garin in UNSC, 1961, p. 33), and other pretexts mentioned above to vindicate the colonialists' “lawful military operation.”

¹⁰⁴ At the time of the meeting, Portugal was still preventing the UN inquiry sub-committee from entrance to the region (Ramos, 2017a, p. 255).

Although some of the photos seem to correspond with forensic conventions of representation, the evidence mainly proves a one-sided presentation that nevertheless fails to incriminate beyond doubt the national movements in all the verbally specified crimes and violations. Indeed, in some cases the evidence sowed doubt, and in others bluntly contradicted the ambassador's prior declaration that the "[r]elations with our peoples overseas were always characterized by a sense of human equality" (Garin in UNSC, 1961, p. 28).¹⁰⁵ Part of the presentation meant to serve as incriminating visual evidence of war crimes and related allegations, is the singular photo of the attire and mask purportedly used by the national movements, resonating one the ambassador declarations before his visual display that: "The terrorists have shown an unbelievable ferocity and savagery. ... attack[ing] under the influence of drugs. ... wear[ing] certain charms which they are told make them immune to bullets. Thus, they are no longer human beings" (Garin in UNSC, 1961, p. 25) (see Image 6). This particular image does not provide proof of war crimes or any other recognized infringement under international law, but rather exemplifies the use of a form of visual evidence that requires an interpretive explanation. Placing this image in sequence with other visuals to demonstrate legal claims, attests to the lingering colonial mindset.

Added to the documented "war crimes" is the evidence of inhumanity and the characters of the national movement freedom fighters attaching an additional statement meant to influence the UNSC's decision. The ploy backfired because the presentation of an artisan mask as a marker of native "barbarity" revealed the sick underbelly of colonial decadence, whereby it felt qualified to interpret this image as justification for its repressive control over the native populations. The photo in question has no relevance to any violation of international law, and its use at the Council hearing lays bare the deeply rooted colonialist preconceptions regarding their subjects. Using this photo excavates a conclusion rooted in colonialism beyond the scope of international law, claiming inhumanity and not crime against humanity to justify the legitimacy of using military force.

The power of photography to exceed the function of mere proof, maintains legal scholar Katherine Biber (2007, p. 14), renders it: "[m]ore than an object, the photograph becomes a discourse, a belief-system, a code for evaluating and attributing conduct. ... The photograph becomes a taxonomy of knowledge and, by extension, a system of power." With this in mind, we can grasp the way the incriminating display proffered by the Portuguese ended up functioning as a double-edged sword. Through this combined activity, covering counter-evidence from the battle zone and presenting selected visuals to fuel the armed struggle against international law's violation, we see however, how in wartime evidence of atrocities may end up disguised behind a mask that is *de facto* presented instead.

¹⁰⁵ The photographs attest to the unequal forms of armament, showing how the rebels fight with stones and wooden weapons to hinder the fully armed Portuguese troops commanding the roads in motorized vehicles, while compelling the indigenous military forces to clear the way for passage. Photographs intended to reveal property damage instead show only white people, either owners or customers sitting in cafés, along with other clues of occupation hegemony that postcolonial critique has exposed in full.



Image 5: Envelope that holds the photographs brought to the UNSC by the Permanent Mission of Portugal to the United Nations, sent by the Portuguese Tourism Information Bureau. Credit: Questões Portuguesas, Fotografias de Angola, 1956-1967. AHD-NME, D3M1P1Cx.3 ONU.



"WE WILL KILL THEIR WIVES AND CHILDREN..." A village, formerly occupied by loyal Angolese tribesmen, shown gutted after an attack by UPA terrorists. UPA leader, Holden Roberto threatened these and other tactics to any who sided with the native Angolans.



"UPA-LUMUMBA..." Imported Czechoslovakian rifles, taken from captured UPA terrorists, leave little doubt as to the inspiration behind the so-called Angolan "revolution."



MARKS OF THE TERRORISTS...the cap, and armband of the communist-inspired UPA terrorists taken from prisoners in the San Paulo prison in Luanda, Angola. Together with secret charms and razor-sharp catana knives, the whole operation is designed to strike terror in the hearts of white and loyal black alike.

Images 6-8: Photographs sent to the UNSC for the use of Ambassador Garin, supplied by the Portuguese Tourism Information Bureau. Credit: Questões Portuguesas, Fotografias de Angola, 1956-1967. AHD-NME, D3M1P1Cx.3 ONU.

Concluding Remarks

This article takes a close look at an often-used strategy that co-opts photographs of atrocities and other imagery to incriminate a declared rival in war crimes and other international law infringements so as to advance legal justifications for military campaigns at the UNSC. Combing through the timeline of the use of visual incriminating evidence in the history of the Council, this analysis starts with the American superpower professing to possess such a visual indictment of Bashar al-Hassad (and his allies) in order to justify US intervention in the civil crisis under way in Syria. Winding backwards to early occurrences of this method, and by examining the evidence revealed in this article, we come to notice the murky undercurrent of self-appointed colonialist legal entitlement, culture, and perception in the ways the incriminating evidence is presented and asked to be viewed by the Council. By reconstruing the evidence in this way, the *modus operandi* reveals itself to be an imperial tool at the service of colonial powers that exploit such photographic imagery to criminalize subordinated indigenous peoples in their struggle for independence, applying laws of war terminology within the forming international legal forum to enhance and justify continued imperialist control. As photographic documentation of grave atrocities assumed the status of evidence in the international courts after World War II, cynical reasoning was applied to harness their gruesome effect and justify further colonial oppression, the scheme being to copy-and-paste the imperial visual archive into the constitutive international repository for war abuses. The historic cases under discussion took place in times when the old colonial order was increasingly discredited within the legal political *lingua franca*, while in parallel, accusations of international war crimes began to acquire viability. Viewed from a critical distance, we can identify the motives behind these presentations to underscore the dubious pattern established within dominating justificatory schemes found in the rhetorical toolkit of imperialist enterprise.

The visual evidence tailored to foment real-time support for military operations can potentially serve as an extenuating alibi for future legal procedures at international level. Critically, the accuser may find ways to monopolize visual evidence at a wider level by covertly blocking any counter-visual testimony from the sites of conflict.

Even though such oblique strategies can often be detected and exposed, this backroom tactic seems to have been adopted not only to confirm a legal base for imperial military power projected beyond state borders, but has continued to emerge among diverse disputes in which states have contributed and developed an aggressive visual legacy under the apparent tutelage of the UNSC and its expanding archive of visual records that claim to mirror inhuman crimes and deprivation of human rights. An alarming instance is the furious visual battle around the Syrian civil war, in which a range of tools and circumstances were initiated by governments so as to ensure their control over the visual evidence presented at the UNSC and achieve legal justification for the use of military force—such expedients were exercised not only by the American and Russian superpowers, but also on numerous occasions by the Syrian ambassador to incriminate the opposition forces (Amir, 2022).



Image 9: Former Permanent Representative of the Syrian Arab Republic to the United Nations Bashar Jaafari presents a photograph described as that of a victim in the bombing of a school in Aleppo, Syria, during the 7817th UNSC Meeting, 21 November, 2016 . Credit: UN DGC, AV Library.

As the deployment of incriminating photographs becomes strategic in reference to international law, this article is part of a wider effort to address the evolving types of such visual exploitation at the UNSC and beyond that the cases discussed here bear the hallmark of this strategy. Aspiring to serve in a broader context, my research tackles what I propose to call “Visual Lawfare,” namely the weaponization of visual documentation used to provide evidence in order to either prove due compliance or to expose violations of international laws of warfare aimed at facilitating military objective (Amir, 2022). While visual lawfare’s manifestations may vary, becoming more sophisticated with time and technological developments, by investigating earlier attempts to weaponize photographic visual evidence at the UNSC, the present article seeks to highlight the dangers of losing sight of the roots of the argument in question. Today the ever-growing dependence on visual evidence has escalated in influence over humanity throughout all media, a shift defined as a “pictorial turn” (Mitchell, 1992). While some categories of human interests started developing and using their own contextual language strategies and definitions in order to increase the effectiveness of understanding images as weapons of wars in a broader sense—from their operative role in facilitating military attacks and overseeing campaigns, to the planned use of their symbolic power to influence perceptions and behaviors in line with warfare’s strategic ends (Virilio, 1989, p. 1; see also Farocki, 2004; Mirzoeff, 2005; Mitchell, 2011)—regarding the UNSC we find a lack of such a “language” in the context of international law and violent conflict.

This state of affairs leads us in the meanwhile to use the perspectives borrowed from different categories as we try to compensate for the variances and elicit the interpretation required here.

Notably, the principle of admissibility of evidence applied by the UNSC is not explicitly cited among the council's Rules of Procedure (United Nations, 1983): this lax approach has turned the council into a promiscuous platform where visual evidence is frequently misused and abused. This escalation calls for well-defined tools to reduce the gulf between the visual imagery presented as evidence of breach of international law, and the degree and quality of proof such visuals actually possess: we need to examine the legal and extralegal apparatus and conventions of the visuals justifying warfare, and match this with codes that adequately define incrimination. This would also entail evaluating Tagg's (2009, p. xxvi) claim that:

not that law and photography are duly exposed as the docile instruments of an exterior power but, on the contrary, that, in the performative force that animates these spectacles, the language of law and the language of photography are violently instated and, in the same instant, instrumentalized, cut to size and imposed as a uniform code, a universal contractual language, a means of communication that expels the remainder, yet whose mastery is always ruled out of court.

"Photography," as Azoulay (2021, p. 81) reminds us, "is an apparatus of power that cannot be reduced to any of its components: a camera, a photographer, a photographed environment, object, person, or spectator." As the world earnestly strives to maintain peace and uphold justice through established international law, my contribution addresses the need for a rigorous assessment of the true evidentiary value of visual artifacts presented as qualifying proof of events that influence legal decisions regarding current and future armed conflicts and humanitarian intervention. Moreover, under the circumstances, the UNSC is becoming the preserver of this dreadful visual history, a law-bound guardian of evidence of atrocity and of the imagery that claims to expose it.

While human history is fraught with international conflicts, we come to acknowledge the necessity of a rethink if not a comprehensive reform in authorizing the use of visual data as a determining factor in qualifying or disqualifying certain acts of warfare. Indeed, the strategy hereby outlined has deep and sordid roots. While their removal now would neither eliminate nor fully compensate for past colonial and other, more recent injustices, as we have seen, what is urgent is the very act of their identification and close examination to prevent their roots from any further growth and diffusion. The UNSC provides a rare forum in which powerful state members assy to contain their antagonism and engage in civilized dialogue. However, it has also become a showroom in which gruesome images are regularly weaponized against the institution's own mandate and objectives, with the intention of legitimating acts of belligerence. For this reason, it is imperative we neutralize this form of instrumentalism, and the sooner we do so, the better. Today more than ever, given the rise of increasingly sophisticated political disinformation campaigns and the burgeoning information wars—half-truths and fictions promoted by representatives of the law (McIntyre, 2018, pp. 18, 24)—the responsibility of the UNSC is to improve its visual gatekeeping and prevent confusion caused by unchecked visual displays. Considering that the technology of disinformation is ever evolving, the UNSC should develop tools and practices to prevent the misleading use of visual evidence presented as a way to secure the approval of lethal force. Announcing and publicly displaying the UNSC's abilities to be alerted, aware and ready to address possible

manipulation via visual content, supports the goal to promote the rule of law by setting the standard as an international authority overseeing international disputes. Given the unstoppable advances of technology, the UNSC must uphold its own strengths and leadership by refining independent tools and mechanisms that remain unaffected by interested parties. The present research offers a possible path to be taken to guarantee the UNSC's pledge to secure sustainable peace, accountability, and justice around the planet.

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Building Strong Anti-Corruption Institutions for Sustainable Development: Enhancing Peace, Justice, and Public Trust in Public Policy Process

Dr. Biswajit Bandyopadhyay (India)

Abstract

Building accountable, transparent, effective and inclusive institutions is a great challenge both in developed and developing countries resulting to increase conflict, corruption, insecurity and weak institutions thereby limited access to justice. Public trust is important for successful policy-making process. The implementation of governmental policies and programmes depends upon the behavioural responses from the citizens. The United Nations has published 17 Sustainable Development Goals and framed universal agenda not to leave behind. The SDG 16 clearly mentioned to decrease corruption and bribery substantially, building strong and peaceful institutions and provide equal access to justice among citizens. Despite corruption control strategies for prevention of corruption as one of the most important factors causing obstacles to good governance and declining the level of trust towards public institutions including anti-corruption agencies. At this instance, the research questions are:

- i) How far anti-corruption institutions are performing their functions efficiently and effectively for implementation of 'Zero Tolerance Policy' as announced by the Government of India and State Governments with the expectations of general citizens?
- ii) What are the major challenges faced by anti-corruption organizations to control corruption and building effective, transparent and inclusive anti-corruption governance in Sustainable Development Framework?

The study analyzes how anti-corruption institutions accomplish goals for trust, peace and access to justice among citizens and employees based on sample survey from citizens and police officials posted in anti-corruption agencies. The study has analyzed present status of intervention in functioning of anti-corruption institutions and developed models to strengthen anti-corruption institutions in policy-making process for combating corruption.

Keywords: Anti-Corruption Institutions, Good Governance, Inequality, Public Policy, Public Trust, Sustainable Development

Introduction

In the twenty-first century, distrust in government and its institutions is one of the major challenge in both developing and developed countries. The implementation of government policies entirely depends upon the reaction and responses from the public. Trust is important as it raises

competitiveness by reducing transaction costs. It is an outcome of institutional performance. Building high-trust in government and inclusive public institutions increases the efficiency and effectiveness which is beneficial for stability, peace and development of a nation (Cheema, 2010). The United Nations Convention Against Corruption (UNCAC, 2005) has mentioned in its Article 5 for effective and coordinated anti-corruption polices to fight against corruption.

The United Nations (2015) has published new Sustainable Development Goals after replacement of Millennium Development Goals. There are 17 goals and 169 targets to formulate the new universal agenda 'no one is left behind' signed by the member countries. The SDG 16 has clearly highlighted to decrease corruption and bribery substantially, promotion of rule of law, establishment of efficient, effective, transparent, accountable, responsive, participatory public institutions in public policy-making processes at all level of governance, strengthening national institutions and providing equal access to justice among citizens. During and after Covid-19 pandemic, corruption has become most serious factors causing major obstacles and hindrances to good governance resulting to decline the level of trust, peace and justice towards public institutions around the world and also in India (United Nations Conference, 2021). According to Neo and Chen (2007), if the previous policy choices fail due to environmental changes, the institutions and policies remain irrelevant and ineffective to achieve desired long-term goals. Human resource development challenges in developing countries are closely connected to the effectiveness of governance. Russell (2004) has pointed out that trust level among citizens on public institutions has been declining around the world in the new millennium. According to World Inequality Report (2018) income inequality has increased rapidly in North America, China, India and Russia and moderately grown in Europe since 1980's. As per surveys carried out by Edelman in 28 countries including India, it is revealed that due to misinformation on Covid-19 pandemic and economic crisis, people have widespread mistrust on their societal institutions and political leaders around the world (Edelman Trust Barometer, 2021). According to Blind (2010) corruption is the most important variable contributing to decrease the level of confidence and trust in governance institutions. Transparency International Report (2020) reveals that the Asia-Pacific region including India is stagnating to fight against corruption due to lack of laws and enforcement mechanisms and weak democratic institutions.

During the past few decades, the institutions of governance are improving the living conditions of masses, however the recent scams in administration have compelled the citizens to fight against corruption. The institutions of governance, instead of checking corruption are felt to be directly or indirectly involved into corrupt practices in administration. Corruption has impact on the development activities and becomes a cause of citizen's grievances. It is revealed from study that public personnel get protection under the constitution, the common people has not been protected except by judiciary. But judiciary or judicial process in India is very costly and time consuming, the Ombudsman institutions called as Lokpal and Lokayukta, Central Bureau of Investigation, Central Vigilance Commission and Anti-Corruption Agencies can look after the matters of corruption and favouritism more efficiently. There is a widespread perception that these public institutions have not been considered trustworthy so far. Hence, to examine whether the anti-corruption institutions in India are performing their role and functions efficiently and effectively as per the expectation of general citizens' and challenges facing for implementation of 'zero

tolerance policy' towards corruption in sustainable development framework, the research has been conducted.

The study will be aimed to analyze the major risk areas which are obstacles for building effective, efficient and strong anti-corruption institutions in public policy-making processes for combating corruption in India taking reference with empirical survey conducted in State of Himachal Pradesh, situated in the northern part of the country. The purpose of the study is to discover how far the "Zero Tolerance Policy" on corruption announced by the Government of India is put from papers to the reality on ground in the states. The present study is conducted on the State Vigilance and Anti-Corruption Bureau in the State of Himachal Pradesh which is investigating the complaints registered against public servants and also private individuals who have indulged the corruption under the provision of Prevention of Corruption Act, 1988 framed by the Government of India.

The research analyzes to measure the level of performance and assesses the effectiveness of Anti-Corruption strategies for strengthening the governance of anti-corruption institution for enhancing trust, peace and justice among citizens drawing on evidences from empirical survey from different groups of citizens and police officials of Anti-Corruption Agency who are handling the matter of corruption cases. The research identifies the relevant factors/ indicators which are covered in the major risk areas for combating corruption. Further, the anti-corruption models have been constructed to help for fighting against corruption based on the evidences from the empirical evidences from public and police officials of Anti-Corruption Institutions in public policy-making process for combating corruption from India and around the globe in different socio-economic, political, administrative environments.

Research Design

The study is designed to systematically organize, present and analyze the research inputs explaining the objectives, hypotheses, sampling techniques, research tools and methods applied for data analysis as follows:

Objectives of the Study

- To present the status of intervention on functioning of Anti-Corruption Institutions.
- To analyze and measure the level of trust and distrust among public and employees in Anti-Corruption Institutions.
- To develop models for strengthening Anti-Corruption Institutions in sustainable development.

Hypotheses of the Study

Null Hypothesis (Ho)

Socio-political, economic and administrative environment has not significantly associated with trust and satisfaction of citizens and police personnel in terms of building strong, peaceful and access to justice for all on Anti-Corruption Institutions for combating corruption in public policy-making processes.

Alternative Hypothesis (Ha)

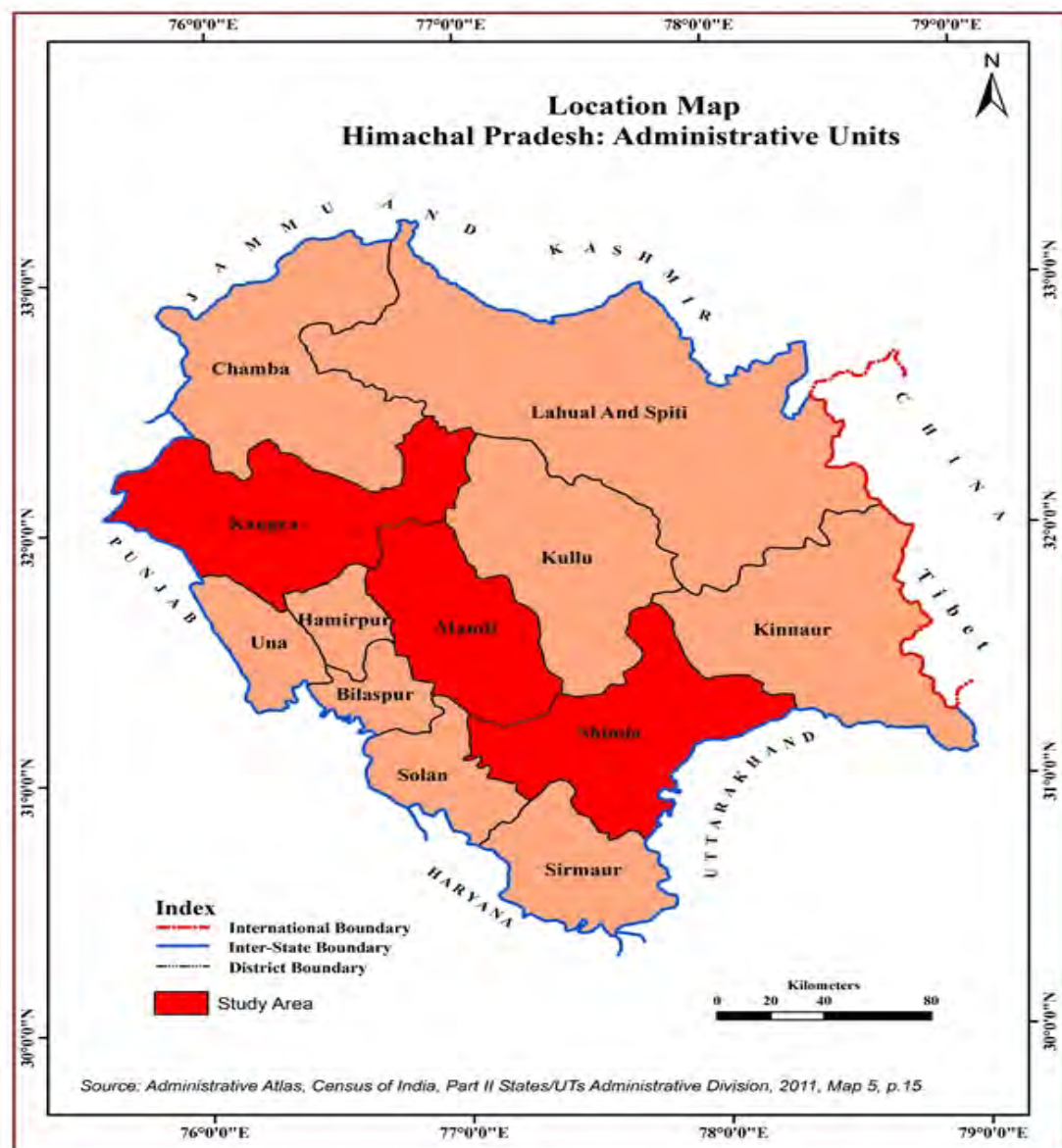
Socio-political, economic and administrative environment has significantly associated with trust and satisfaction of citizens and police personnel in terms of building strong, peaceful and access to justice for all in Anti-Corruption Institutions for combating corruption in public policy-making processes.

Research Methodology

The present study was conducted in three districts of the state of Himachal Pradesh which is situated in northern part of India. The universe for the present study comprised of general public and police personnel who are handling the matters of corruption cases. The respondents consist of student, government employee, businessman, agriculturist, advocate and journalist. Secondary sources of data have also been used. A simple random sampling procedure has been adopted for selection of respondents from general public and police personnel of Anti-Corruption Bureau who are investigating the cases of corruption. Stratification has also been done. Self-structured questionnaire was prepared on five-point likert scale. Data has also been collected through interview schedule, observation methods and informal discussions.

The primary data was collected from 360 general public from three districts in the State, 120 from each district. Further, 85 police officials, from highest to lower ranks who are dealing with corruption cases in Anti-Corruption Bureau were taken as a sample respondents. There are 12 districts in the state of Himachal Pradesh. Three districts - Shimla, Kangra and Mandi have been taken for this study because the registered number of corruption and trap cases is higher as compared to other districts. The data obtained from different sources have been tabulated on MS Excel and analyzed by using SPSS version, 20 (Field, 2011). The study areas are shown in figure 1.

Figure 1: Selection of Districts Indicating Study Areas of Three Districts in State



Analysis of Data and Findings of the Study

In order to analyze the present status of intervention on functioning of anti-corruption agencies, to develop anti-corruption environment, good governance and efficient public policy models have been built for strong anti-corruption institutions to enhance not only high-trust in Anti-Corruption Institutions but will improve the rule of law, peace and justice among the citizens. In the present research, the descriptive and inferential statistics have been applied to analyze the results of the data as discussed under:

The Major Risk Areas for Building Strong Anti-Corruption Institutions

Trust is an essential ingredient for successful public policy-making process. The OECD (2019) evidences show that the high level of values in governance such as integrity, openness, fairness and honesty are important predictors for trust amongst citizens. Similarly, competence in governance and its reliability and responsiveness in delivery of public services are crucial for developing trust in institutions (Fukuyama, 2004, Hetherington, 2005, Kim, 2010, Brillantes and Fernandez 2012, Kettl 2015 and 2017). Surveys have revealed that corruption is a major factor declining the trust in government and other public institutions (World Bank, 2021). Shockley-Zalabak et al. (2010) have pointed out that building trust and distrust among citizens, the causes of distrust to be identified first, then to make visible corrective strategies for re-building the trust. In this regard, to obtain the perception of public and police officials, the data has been collected through questionnaire with five point likert scale and their responses are tabulated in table 1 for interpretation as under:

Table 1: Descriptive and Inferential Statistical Analysis regarding Major Factors Responsible for Building Strong Anti-Corruption Institutions in Public Policy-Making Process: Responses of Public Respondents

Public Respondents N =360

| | Extent to its Effects | | | | | | | | | | | | |
|--|-----------------------|----------------|--------------------|----------------|-------------|--------------|------|-------|-------|------------|-------|------------|----------|
| Statement/ Variables | Very High Extent | High Extent | Moderate Extent | Some Extent | Not At All | Total | Mean | S.D | C.V | Skw | Ku | χ^2 | P. Value |
| Public Service Delivery obstacles due unsympathetic & discourteous behavior of Police officials | 103 (28.6) | 107 (29.7) | 68 (18.9) | 61 (16.9) | 21 (5.9) | 360 (100) | 3.58 | 1.228 | 34.30 | -.479 | -.853 | 68.38 9 | .001 |
| Unawareness about rules and regulations causes the lack of Public Participation and Cooperation | 180 (50.0) | 82 (22.8) | 36 (10.0) | 34 (9.4) | 28 (7.8) | 360 (100) | 3.97 | 1.296 | 32.64 | - 1.083 | -.070 | 228.3 3 | .001 |

| | | | | | | | | | | | | | |
|--|---------------|---------------|--------------|---------------|---------------|--------------|------|------------|-------|------------|-------|------------|------|
| Political intervention in functioning of Anti-Corruption Agencies | 222 (61.6) | 92 (25.6) | 10 (2.8) | 22 (6.1) | 14 (3.9) | 360 (100) | 4.35 | 1.058 1 | 24.32 | - 1.838 | 2.632 | 452.8 8 | .000 |
| Participation of Civil Society for building strong Anti-Corruption Institutions | 214 (59.4) | 102 (28.3) | 16 (4.4) | 24 (6.7) | 04 (1.2) | 360 (100) | 4.38 | .9279 | 21.18 | - 1.675 | 2.287 | 432.3 3 | .000 |
| Press distorts the factual position during reporting corruption matters | 09 (2.5) | 34 (9.4) | 05 (1.4) | 168 (46.7) | 144 (40.0) | 360 (100) | 1.75 | 1.040 | 59.42 | 1.552 | 1.657 | 106.6 4 | .001 |
| Lack of Political Will for creation of Separate Independent Anti-Corruption | 78 (21.7) | 204 (56.7) | 71 (19.7) | 07 (1.9) | 0 (0.0) | 360 (100) | 3.98 | .0701 9 | 17.63 | -.313 | -.019 | 226.5 6 | .000 |

Note: Data collected through questionnaire, Data in bracket denotes percentage.

S.D - Standard Deviation, C.V - Coefficient of Variation, Skw - Skewness, Ku – Kurtosis, P. Value – Probability Value

Participation and Cooperation of Citizens on Implementation of Anti-Corruption Policies by the Anti-Corruption Institutions

With regard to cooperation and citizens' participation to implement anti-corruption policies, it is found that people are ready to cooperate with the police officials of Anti-Corruption Agencies during the time of investigation to some extent particularly students and journalists are eager to cooperate officials of ACB However, public does not cooperate with the police officials because of unawareness about rule, regulations and functioning of anti-corruption machineries decreasing the trust level towards the Anti-Corruption Agencies.

Behaviour of Police Officials towards Citizens

The study has revealed that behaviour of police officials is not considered well with the citizens and due to rude and discourteous behaviour of police officials, public is hesitant to cooperate with Anti-Corruption Bureau and to approach Anti-Corruption Institutions for help.

Fear of Harassment and Unnecessary Questioning at Police Stations

According to the research, due to fear of harassment and unnecessary questioning by police officials, public does not want to approach to anti-corruption institutions. Hence, there is low level of transparency, integrity and confidence on the administration of Anti-Corruption Bureau. Further, police officials are also found to be considered corrupt by the public. The study supports that absence of competence, honesty, integrity, peace and justice lowering the level of trust in Anti-Corruption Institutions.

Political intervention on Anti-Corruption Institutions

A high level of political intervention in Anti-Corruption Agencies is found to hamper implementing the anti-corruption polices freely and fairly. Corruption among politicians is considered much higher.

Role of Press for Combating Corruption

The study finds that press distorts the facts and does not perform independent role regarding matters of corruption and it is biased not justifying as one of the prime pillars of democracy.

Lack of Political Will for Creation of Separate Independent Anti-Corruption Institutions

The study finds political leaders are not willing to establish separate anti-corruption institutions free from political interference. The political party came into power at national and state levels are changing the administrative structure to achieve their political gains resulting weak democratic institutions and lack of law enforcement mechanisms. Anti-corruption agencies created at national and state levels are not in exceptions. This finding has also been supported by the Transparency International Report 2018. Hence, lack of political will for creation of separate anti-corruption institutions is the main barrier for building strong anti-corruption institutions, formulation and implementation 'zero tolerance policy' on corruption from the state. On employing Chi-square test, the value of Chi-square found as 226.566 is significant at five percent significance level and null hypothesis is rejected.

Reasons for Increasing Challenges before Police Officials of Anti-corruption Institutions

After analyzing different factors affecting building effective and efficient anti-corruption institutions among citizens towards anti-corruption institutions in public policy processes, an initiative is being taken to find out the level of trust and distrust among police personnel of Anti-Corruption Bureau and they are facing challenges so that a balance opinion could be sorted out for developing suitable measures from public and employees responses and to assess the effectiveness of anti-corruption polices for combating corruption.

Shockley-Zalabak et al. (2010) have observed that trust is related directly to the confidence, faith and belief among employees and overall performance, organizational efficiency and effectiveness. Employees can be retained if the employers provide maximum welfare benefits which in turn, enhance trust and satisfaction towards organizations. Building trust begins with an assessment of communication practices, policies and processes demonstrating satisfaction of employees for their well-being. Covey and Merrill (2006) refer genuine caring as a motive, which according to them inspires trust coupled with an agenda of mutual benefits. According to them trust is a measurable accelerator to performance in institutional frameworks. In order to measure the satisfaction and trust of police officials from different ranking backgrounds, stratified random sampling method has been adopted as mentioned in the research design. 85 police personnel were selected as sample respondents who are directly dealing with the matter of corruption cases. The analysis is drawn as under in Table 2.

Table 2: Descriptive and Inferential Statistical Analysis regarding Factors Responsible for Challenges before Anti-Corruption Institutions: Responses of Police Officials

Police Respondents N = 85

| Statement / Variables | Extent to its Effects | | | | | | | | | | | | |
|---|-----------------------|--------------|-----------------|--------------|-------------|-------------|------|--------|--------|-------|-------|----------------|---------|
| | Very High Extent | High Extent | Moderate Extent | Some Extent | Not At All | Total | Mean | S.D | C.V | Skw | Ku | χ^2 Value | P-Value |
| Trust level among Police Officials about Working environment and conditions of work | 0 (0.0) | 15 (17.6) | 43 (50.6) | 22 (25.9) | 05 (5.9) | 85 (100) | 2.80 | .79881 | 28.528 | -.339 | -.200 | 36.553 | 0.01 |

| | | | | | | | | | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|-------------|------|------------|------------|-----------|------------|------------|------|
| Inequalities and disparities of salary and wages | 08 (9.4) | 26 (30.6) | 03 (3.5) | 35 (41.2) | 13 (15.3) | 85 (100) | 2.77 | 1.29 44 | 46.6 22 | .260 | - 1.307 | 41.0 59 | 0.01 |
| Lack of public cooperation and participation | 25 (29.4) | 19 (22.4) | 11 (12.9) | 29 (34.1) | 01 (1.2) | 85 (100) | 3.44 | 1.26 77 | 36.7 81 | -.040 | - 1.573 | 29.6 47 | .000 |
| Political Interventions in functioning of ACB | 28 (32.9) | 20 (23.5) | 17 (20.1) | 20 (23.5) | 0 (0.0) | 85 (100) | 3.65 | 1.17 06 | 31.9 94 | -.211 | - 1.438 | 3.14 1 | .370 |
| Pressure from Civil Society in Anti-Corruption Agencies | 03 (3.5) | 03 (3.5) | 05 (5.9) | 39 (45.9) | 35 (41.2) | 85 (100) | 1.82 | .953 40 | 52.2 84 | 1.63 0 | 3.05 6 | 79.0 59 | .000 |

Note: Data collected through questionnaire, Data in bracket denotes percentage.

S.D - Standard Deviation, C.V - Coefficient of Variation, Skw - Skewness, Ku – Kurtosis, P. Value – Probability Value

Trust and Satisfaction of Employees on Anti-Corruption Institutions

The study finds that police officials of Anti-Corruption Bureau are satisfied moderately with the conditions of service and the working environment. A major proportion of police personnel (41%) are not satisfied with salary structure and wages are being provided to the anti-corruption agencies. Further, there is moderate level of stress among police personnel and they are respected moderately by the societies. The study finds that police personnel are facing hardship to comply the order of higher authorities and superior officers. But a majority of police officials (65%) are unsatisfied with welfare measure provided by the government

Strategies for Building Trust in Public Policy-Making Process

On analyzing the competence, efficiency and effectiveness of anti-corruption institutions, it is found that police officials posted in Anti-Corruption Bureau are unsatisfied with the arrangement on temporary transfers from state police to ACB. They are dissatisfied with the selection procedure. Further, they have moderate level of pressure from political leaders and interference

in the process of recruitment of police personnel which is decreasing the level of trust towards Anti-Corruption Agencies.

Political Interference on Working of Anti-Corruption Agencies

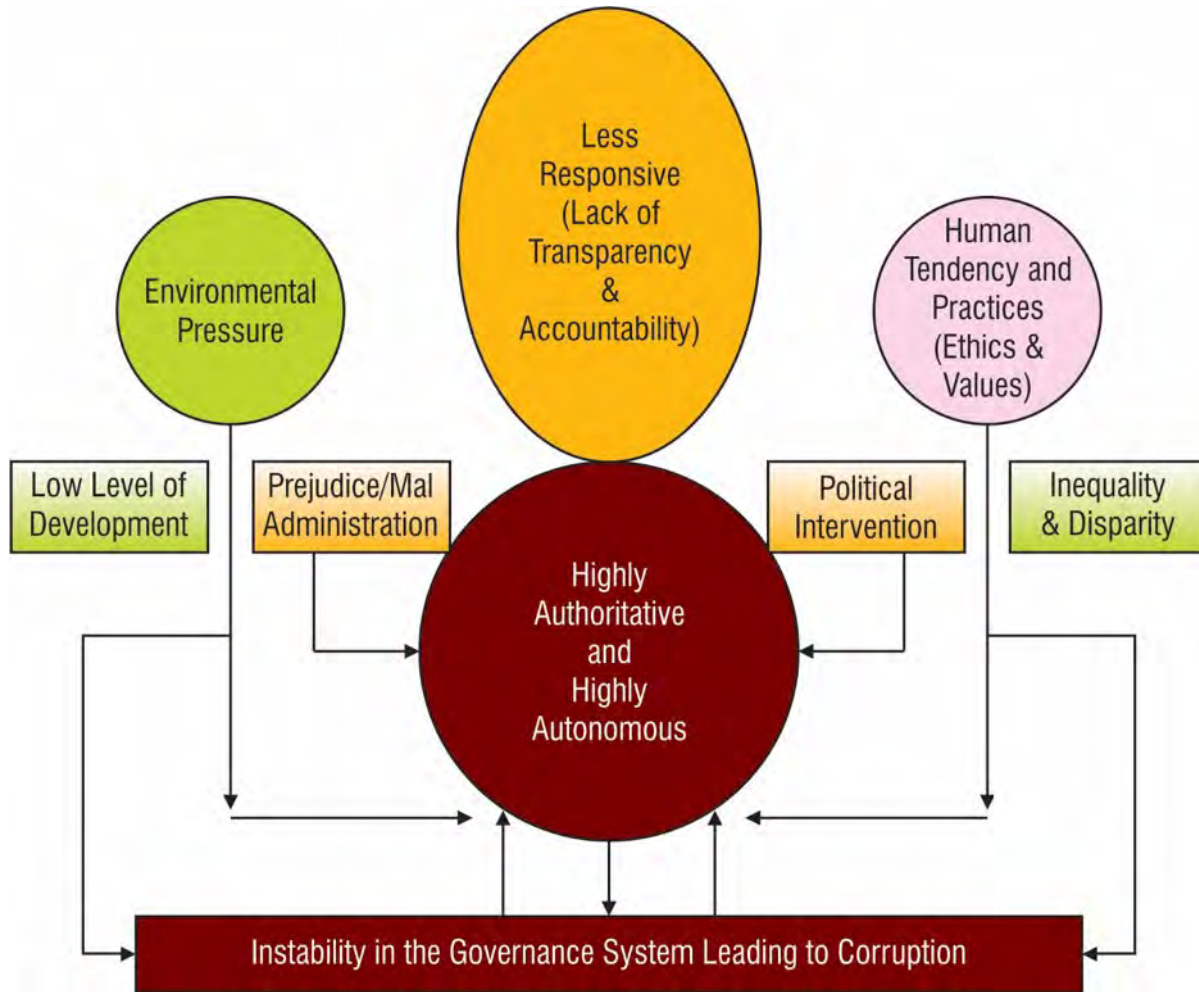
According to the findings of the research politicians in high proportion are involved in corruption and since they have access to political parties and sometimes governance, they influence the system meant for interventions. It affects functioning of police personnel.

Trust and Satisfaction of Police Officials

Police officials are found not highly satisfied with regard to the conditions of services and the working environment of Anti-Corruption Bureau causing frustration also from pressure of the civil society.

Model Building for Combating Corruption in Public Policy-Making Process

India is role model for the countries across the world including developed nations as India is the country of spiritual richness, humanity, discipline, integrity and all other values considering human beings as humans. In India, the democratic set-up enshrined in the Constitution is a blessing and regulatory system is well defined. In the existence of such an enriched system people of the country have a moral duty to prove example of good citizens world-wide. Unfortunately, the system of implementation is not performing its role with honesty and lapses or confined interests come as barriers paving the way to excel in leading and establishing trust and at this juncture, it is the moral duty of researchers to brain storm to recommend measures for checking on the lacunae. The research is endowed to recommend measures in this direction. It is obvious that the scenario of distrust and corruption examined in this study is a matter of concern but the similar situation may prevail in all developed and developing nations for which primary researches are needed to be conducted and the models recommended in this study can have overall generalizations. Public trust will be developed when the government officials demonstrate the integrity, honesty and moral leadership and institutionalize the ethics and values through the process of people participation and cooperation. The present analysis reveals that trust and satisfaction of citizens and police personnel are low towards anti-corruption agencies. To develop performance, image and status of Anti-Corruption Institutions in public policy-making processes the following models have been developed for combating corruption and building strong anti-corruption and high-trust.

Figure 2: Instability in Governance System and Corruption Model

The study has been emerged that corruption is actually the outcome of symptoms which prompt a person to be corrupt. The degree of corruption depends upon the degree of presence or absence of these instabilities in the system of corruption. The model (figure 2) is shown how corruption is jeopardizing and what conditions prevent corruption in the system of governance.

Quantitative Indicators of Corruption

Six major parameters were examined for testing the hypotheses by using multiple methods including Chi-square, ANOVA, F-Test and other descriptive quantitative techniques etc. to analyze the status and extent of corruption concerned with varied nature. Based upon the results of the quantitative techniques, a framework of models has been set-up. Some of the major quantitative findings related with the parameters which have established the bases for construction of the models and drawing recommendations are as discussed below:

Transparency and Accountability

Since the mean score of the opinion of public respondents on variables regarding unable to lodge corruption cases to Anti-Corruption Bureau due to afraid of police officials (3.44), fear of harassment (3.70), suspicious working of anti-corruption agencies (3.64), loss of prestige in society (3.46) and lack of awareness about rules and regulations of anti-corruption agencies (3.97) were found more than three in five point Likert scale, it indicates that the public agrees about these facts. The results are also supported by the values of χ^2 relating to afraid of police officials (41.639), fear of harassment (103.750), suspicious working (103.611), loss of prestige (48.972) and unawareness about rules and regulations (228.333) signifying that the opinion of the respondents is not equally distributed.

Further, on analyzing the feedback of public respondents relating to the extent of participation and cooperation on Anti-Corruption Institutions, the mean scores are 3.69 and 3.70 respectively with negative values of Skewness (-.693 and -.576 respectively) reflecting that public does not prefer to reveal identity and also the way of questioning by the police officials. Chi-square test of goodness of fit analyzed as 148.361 and 96.750 respectively reject the null hypotheses and thus responses are not equally distributed. Thus, there is fear of revealing identity and the way of questioning by the police personnel in police station are the major reasons for non-cooperation and non-participation of public with the officials of Anti-Corruption Bureau.

The result of Post-hoc test (Tukey's HSD test) applied on the variable on non-involvement of citizens with the anti-corruption agencies because of rude and unsympathetic behaviour of police personnel on the three districts of primary survey indicates that the mean value of Mandi district is 3.8583 being higher than Kangra (3.8033) and Shimla (3.0833) districts and the standard deviation being 1.42948, 1.05556 and 1.00667 for Shimla, Kangra and Mandi districts respectively. The mean difference between two groups viz. Kangra and Shimla and Shimla and Mandi districts is similar that is, -.77500 found as significant at one percent significance level. While comparing Kangra and Mandi districts, the mean difference is worked out -.05000 being insignificant. This shows that behaviour of police officials of Mandi and Kangra district is very rude and discourteous as compared to their behaviour in Shimla district. Hence, it is proved from above statistical analysis that due to lack of transparency and accountability in the system of governance of Anti-Corruption Institutions, public is reluctant to participate and cooperate with the Anti-Corruption Bureau.

Economic Inequality and Disparity

Regarding identification of inequalities and disparities to determine the level of satisfaction of personnel serving in the Anti-corruption institutions, the mean value is calculated 2.77 with Standard deviation and Co-efficient of Variation score disclosing variation in responses of police officials. The positive value of Skewness indicates that responses are inclined on the lower level of scale and the value of. Chi-square (41.059) is significant at one percent significance level which concludes that a large number of police personnel are not satisfied with salary and wages to some extent as compared to the Group 'A' officers.

With regard to satisfaction for creation of separate anti-corruption cadre in place of temporary arrangement from State police department to Anti-Corruption Bureau, the result of Chi-square test (2.011) is insignificant due to which the null hypothesis is accepted. Thus, from the quantitative analysis it is analyzed that the views of police officials irrespective of their ranking backgrounds are not distributed similarly regarding temporary arrangements/transfer growing frustration among police personnel of Anti-Corruption Bureau.

Political Intervention

The mean value of the views of public respondents regarding political interventions in the functioning of Anti-Corruption Institutions found as 4.35 which is much higher than standard score at 5 point likert scale. On police official survey, the mean value is calculated as 3.65. Standard deviation and skewness in both surveys have revealed that distribution of views of the respondents is shifting to higher side of mean. The Kurtosis value also supported the results. The χ^2 value found as 452.88 and 3.141 respectively are significant and insignificant which signifies that views of respondents are similar as well as dissimilar among public and police officials regarding political intervention on Anti-Corruption Institutions respectively. Thus, this statistical analysis has proved that political intervention is higher in public institutions as well as anti-corruption institutions creating a strong barrier in effective and inclusive public policy-making processes as well as policy implementation.

Further, on applying Tukey's HSD test, it is found that majority of the public respondents of Shimla district reported that political interferences have declined the level of trust followed by the responses from Kangra and Mandi districts. The standard deviation values are .88861, .89814 and .96667 for Shimla, Kangra and Mandi districts respectively. Mean differences of responses between Shimla and Kangra is .24167 and Kangra and Mandi is .04167 which indicates insignificant result at five percent significance level. While comparing Shimla and Mandi, mean difference is worked out as .28333 which is found significant with five percent level of significance. The results reveal that majority of the public in all the districts under study, highly agreed that political interferences have declined the level of trust towards Anti-Corruption Institutions.

On applying Chi-square test, the calculated value (9.470) is found significant at five percent level of significance which accepts the null hypothesis. Thus, respondents reported similarly irrespective of their occupational backgrounds.

Prejudices and Mal Administration

While considering the variable regarding fear of harassment by police officials Anti-Corruption Bureau, the mean value of female (3.8065) responses is higher than the male (3.6879) respondents being neutral to high. The standard deviation for male and female responses is worked out 1.19479 and 1.14289 respectively. The calculated value of T-test for equality of means (-.716) is insignificant at five percent significance levels. This shows that opinion of male and female respondents prevailed similarly regarding this statement.

As regard helping nature of police officials of Anti-Corruption Bureau, it is revealed from the analysis that the mean score of male and female responses is calculated as 2.7181 and 2.9677 and the standard deviation is .99209 and 1.10093 respectively being considered neutral with high inconsistency. While applying T-test, the value is -1.768 as insignificant at five percent significance level indicating that responses of the both genders are similar over the issue.

On employing Chi-square test relating to the conditions of modern equipments, the value of Chi-square found as 76.532 which is statistically significant with one percent level of significance. This indicates that responses of the police personnel are not similar on the statement regarding condition of equipments in Anti-Corruption Bureau i.e. police stations are not equipped with updated equipments.

Regarding Anti-Corruption Bureau working with inadequate number of police officials to deal with the corruption cases, the χ^2 value (2.466) found as insignificant which accept the null hypothesis. Thus, it can be exhibited that the strength of police officials in Anti-Corruption Bureau is inadequate to cope up with the existing workload.

Institutional Development

In order to find out the requirement of specialized and additional training consideration of ethical training and the quality of training for individual effectiveness as per suitability of institutional needs, the Chi-square value (2.594) reveals as insignificant at five percent significance level which signifies the views of police officials are similar about the specialized including initial and in-service training for efficiency and successful development of anti-corruption agencies irrespective of their raking backgrounds.

On analyzing the pressurization of civil society in governance of anti-corruption agencies, the value of mean score calculated as 1.8235. Standard deviation and coefficient value disclosed high variation in the responses. The skewness value has been found positive in this case. The χ^2 value found as 79.059 which is significant. this concluded that the civil society is being pressurized to somewhat level in the governance of anti-corruption agencies which had downgraded the level of trust among police officials.

The press is distorting the factual position at the time of reporting corruption cases, the results as per mean score of responses of the public respondents is calculated as 1.75. The standard deviation and coefficient value disclosed high variation in opinion of the respondents. The value of skewness found as positive. Significant χ^2 value (106.646) has been revealed from this analysis. It concluded that sometimes the press distorted the facts when reporting the matter of corruption.

On analyzing the responses of police officials, majority of police officials (55%) has reported to some extent level the press distorted facts regarding the action taken by the anti-corruption agencies. The mean value is calculated as 2.70. The skewness and standard deviation value calculated as .782 and 1.280 respectively. The value of skewness shows as positive. The χ^2 value

in both cases have been found significant. It analyses that distortion of facts by the press during reporting the matters of corruption cases to some extent agreed by both public respondents as well as police officials of anti-corruption agencies.

Trust and Distrust

The Post-hoc test (Tukey's HSD test) has been applied on the variable relating to corruption crippling the public life, the mean score in Mandi district is worked out 4.8083 followed by Shimla computed as 4.8000 and Kangra as 4.7583. The standard deviation is found .49536, .64815 and .56947 for Shimla, Kangra and Mandi districts respectively. The difference in the mean score of these three districts is worked out .04167, -.00833 and -.05000 which is statistically insignificant and revealing similar views of public towards this statement. It shows that majority of the respondents reported corruption crippling public life to very high extent.

Further, while considering the statement that is corruption among officials, it is found that mean value of responses from Kangra district (3.6583) is higher than Mandi (3.5667) and Shimla (3.4583) districts. On applying Tukey's HSD test mean difference of the responses of Shimla and Kangra district is (.20000) found significant at five percent significance level. While comparing the mean differences between Shimla and Mandi (-.10833) and Kangra and Mandi (.09167) districts the values are insignificant at 5 percent level of significance which reveals similar opinion of public relating to corruption among officials. It is revealed from the above analysis that there is high degree of officials' involvement in corruption which is matter of great concern as it indicates declining of trust among public towards Anti-Corruption Institutions.

As per the statement regarding role and performance of Anti-Corruption Bureau in curbing corruption and building trust among people, mean score of male responses (2.3490) is slightly higher than the female (2.3387) responses but is around 2.3 being at lower side at the five point scale. The standard deviation for male and female responses is worked out .95294 and .78810 respectively which indicates inconsistent response. On applying T-test, its calculated value (.079) is insignificant with five percent significance level. Thus, it can be concluded that performance and role of Anti-Corruption Bureau in curbing corruption and building trust among people to some extent level is reported similarly by all respondents irrespective of their gender.

Regarding overall performance, image and status of Anti-Corruption Institutions, the Chi-square value (15.165) found as insignificant and the null hypothesis is accepted. It can be concluded that performance, image and status of Anti-Corruption Institutions are considered by all ranks not up to the mark to meet the targets or performance standard for combating corruption.

Based upon the above quantitative results, it has been identified that in terms of the above mentioned variables, there is existence of corruption and as a consequence, low level of trust. Keeping this in view, the models have been constructed by taking these variables as the bases.

The model on Instability in the system of Corruption is conceptual based on present research as it is revealed that the institutional inefficiency influences the environmental settings as it is

reflected in terms of low trust on economic development, increases inequality and disparity, encourages political intervention, lack of accountability and transparency in administration as well as prejudiced administration. These symptoms are directly or indirectly involved in relation with public trust, peace, stability and access to justice in governance. Corruption has also damaged the value system in the areas where the decision making process is involved.

The present research has analyzed multiple variables to be responsible for combating corruption. The study finds that corruption leads to misappropriation of public money, cripples the administration in a country and it leads to poor implementation of government policies and programmes. The factors responsible for corruption are like public not raising voice against corruption, and people afraid of harassment by the police personnel followed by lack of awareness about the procedure to lodge complaints, rude and discourteous behaviour of police officials, long and lengthy procedure for finalization of cases, public perception that no action is being taken by Anti-Corruption Bureau, inaction regarding complaints on corruption and being threatened by the politicians and mafias.

It is found from the survey that people are not willing to lodge complaints in Anti-Corruption Bureau due to fear of unnecessary questioning by the police officials. There is low level of transparency, integrity and trust on the administration. Further, due to rude and discourteous behaviour of police officials, people are hesitant to cooperate with Anti-Corruption Institutions for help when they are in need. Anti-Corruption Bureau has decreased the trust on Anti-Corruption Institutions in the State.

Press has failed to help maintaining good relationship between public and police officials of anti-corruption institutions. There exists communication gap between press and anti-corruption bureau. Most of time, the press distorts the facts of ACB actions. Lack of political will for creation of separate anti-corruption institutions is the main barrier for making and implementation 'zero tolerance policy' on corruption.

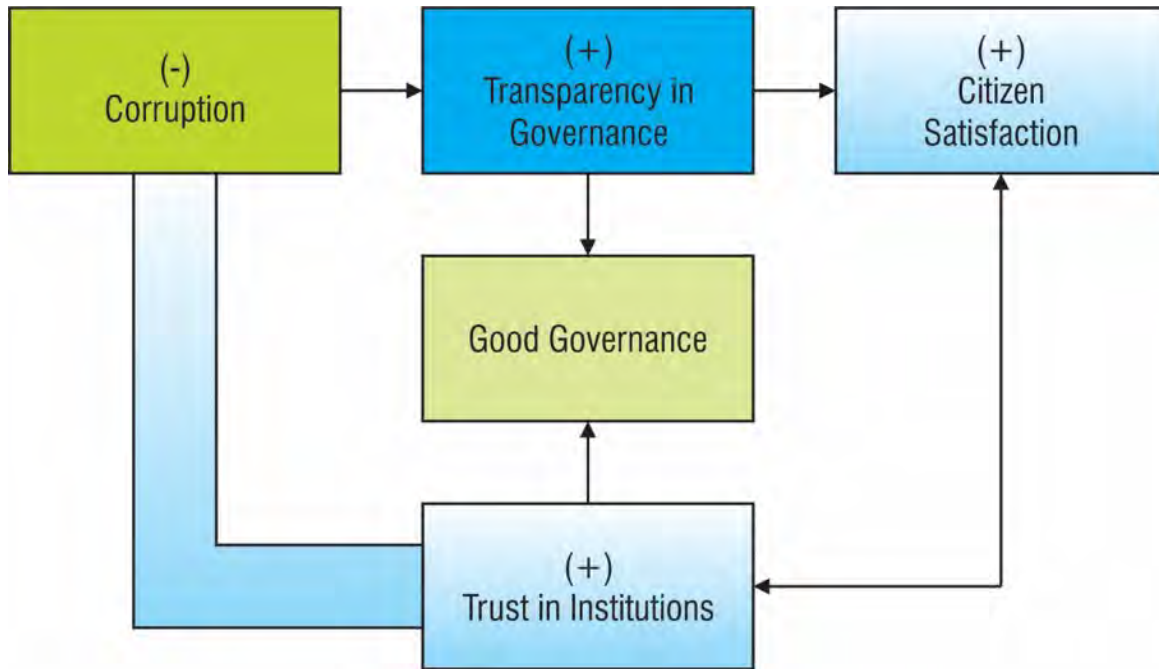
Multiple Comparison Post-hoc Test (Tukey's HSD test) applied on the major variables for analyzing trust and distrust among the general public indicated that public hesitates to lodge complaint to Anti-Corruption Bureau because of fear of police officials though having difference in opinion. Regarding fear of harassment and suspicious nature of working of police also a significant difference has been noticed in the views of public.

On the other hand, police officials of Anti-Corruption Bureau are satisfied moderately with the conditions of service and the working environment. There is also exists a moderate level of stress among police personnel which causes difficulties during working in Anti-Corruption Bureau and moderate level pressure from political leaders and interference in the process of recruitment of police personnel decreasing the level of trust towards Anti-Corruption Agencies.

The empirical analysis has revealed that dissatisfaction with regard to the conditions of services and the working environment of Anti-Corruption Bureau are creating frustration among police officials. The frustration is also comes from pressure of superior officers and civil society.

Dissatisfaction with regard to the conditions of services and the working environment of Anti-Corruption Bureau are creating frustration among police officials. The frustration also comes from pressure of superior officers and civil society. Corruption, trust and good governance have a firm bondage. The following model depicts the co-relation:

Figure 3: Corruption, Trust, Transparency and Good Governance Model



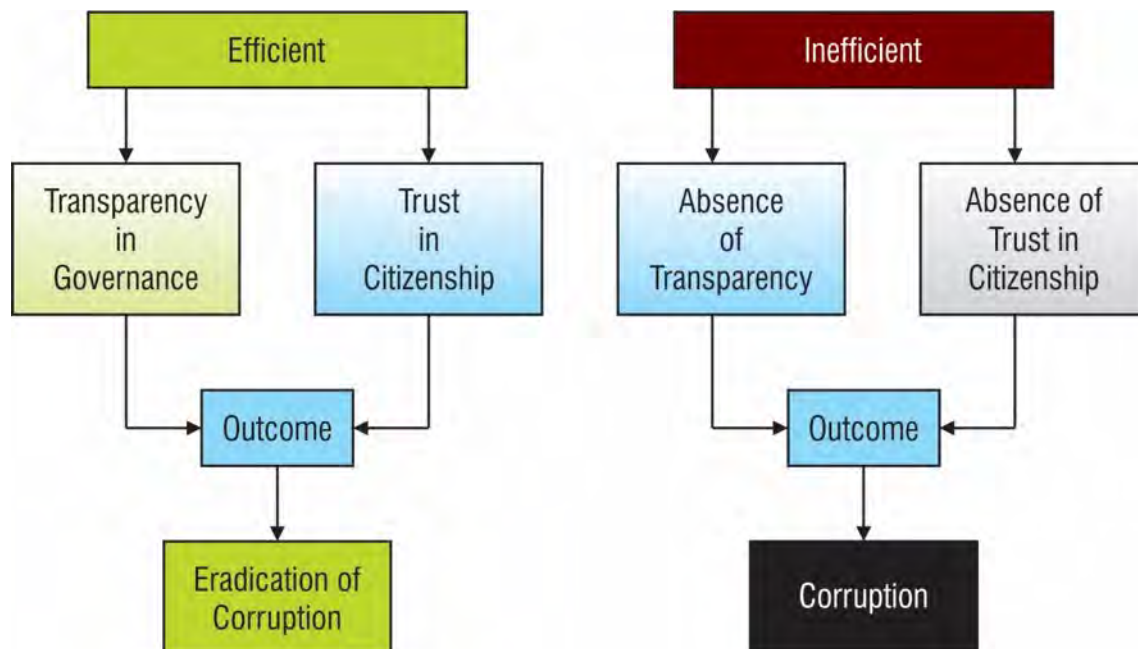
In view of above, the empirical analysis has revealed that satisfaction and trust among the different groups of public and employees towards anti-corruption institutions is far from satisfactory due to various socio-political, economic and administrative dimensions in public policy-making processes. Public cooperation and participation in the process of combating corruption is low due to lack of awareness about rules and regulations, fear of harassment, rude and discourteous behaviour of police officials and fear of revealing identity. Sometimes, corruption cases are not even registered by Anti-Corruption Bureau and even if they are registered, complainants get threats by the criminal groups particularly when protection is not provided to them by the Bureau. Hence, there exists a lack of transparency, accountability, efficiency, effectiveness, honesty and integrity on the part of Anti-Corruption Institutions. A huge communication gap arises between general citizens and police officials of Anti-Corruption Bureau. Sometimes, press distorts the real facts about corruption cases to the general public and also fails to maintain good relationship between the public and Anti-Corruption Institutions. The civil society and organizations are not appropriately institutionalized and are politically fragmented and rather weak. The political leaders and higher officers are highly interfering on the matter of corruption cases and influencing the Anti-Corruption Institutions to achieve their personal gains. Majority of employees are not highly and very highly satisfied with the working environment and job satisfaction in the Anti-Corruption Institutions. The dissatisfaction has created low level of morale among employees because of poor staff strength, infrastructures, welfare amenities, good

conditions of service, modern equipments, poor salary structures, lack of training facilities, without any recruitment process, political and bureaucratic interference in anti-corruption institutions. The budget allocated by the government to the Anti-Corruption Bureau is also insufficient to meet the development needs.

Robust, Resilient, Effective and Strong Anti-Corruption Institutions in Public Policy-Making Process for Combating Corruption

Statistically, the hypotheses framed that socio-political, economic and administrative environment has significantly associated with trust and satisfaction of citizens and police personnel in terms of building strong, peaceful and access to justice in Anti-Corruption Institutions for combating corruption in public policy-making processes, proved as significant. The research has proved that the above factors are influencing the anti-corruption institutions for combating corruption. Further, anti-corruption institutions are not contributing to build trust among public and employees towards eradication of corruption. The study also finds that there is lacking of competence, openness, honesty, integrity, efficiency and effectiveness and the poor working environment is affecting internal discipline and morale of police officials. Moreover, Anti-Corruption Institutions are facing problems of funds to meet the expenditure on legitimate needs of police officials. The research findings in terms of factors of efficient and in-efficient public policy-making are depicted in the model as under:

Figure 4: Efficiency and Inefficiency Model in Public Policy Making Process



In view of the above, for re-building effective, efficient and high-trust institutions of governance including anti-corruption institutions dealing with corruption matters by ensuring the features of ethics and values, simplification of rule and regulations, stringent punishments, comprehensive

legislation which is impersonally implemented by an independent anti-corruption institutions to minimize corrupt behaviour among civil servants and the citizens to develop the integrity, credibility, accountability, transparency, fairness, efficiency and effectiveness. Implementation of 'Zero Tolerance Policy' towards corruption from India is the prime necessity and the present research is made to suggest measures in this regards.

Apart from model buildings, the following measures are suggested to develop performance, image and strong Anti-Corruption Institutions and building high-trust among citizens and employees for enhancing peace and justice for all in public policy-making process.

- The Anti-Corruption Institutions need to be strengthened to provide sufficient young, honest, dedicated, efficient, educated and directly recruited personnel to investigate the sensitive matters of corruption cases. Police stations of Anti-Corruption Bureau have to be strengthened and developed though efficient, effective, directly recruited officials having credibility, competence, and integrity.
- Adequate budgets should be provided to modernize the Anti-Corruption Institutions with sophisticated weapons for quickly detecting the crime and corruption as the groups of criminals may possess superior weapons against the police personnel. Modern vehicles' should also be available for official duties.
- To check political intervention in the functioning machineries of institutions of governance, it is suggested that politicians, parliamentarians, and legislators should be under the ambit of code of conduct. Hence, conduct rule should be framed immediately for the above functionaries on the pattern of Civil Service Conduct Rules.
- Specialized training including ethical training should be imparted immediately to change the behaviour of police officials so that public may interact and discuss the corruption related matters with them.
- Working conditions and work environment needs to be improved in anti-corruption agencies. This will help to increase trust and satisfaction among police personnel of anti-corruption agencies. To meet the need of residential and office accommodation especially for lower and middle ranking police officials, the Anti-Corruption Bureau should approach the Government to provide sufficient funds to undertake necessary construction work.
- It is strongly recommended that one single independent Anti-Corruption Agency should be established at the national and state levels instead of multiple anti-corruption agencies free from political interventions for combating corruption from the country.

Research Limitations/Implications

In order to know about the reliability of the research, it is important to state the extent of limitations under which it has been carried out. The limitations of this study have been pointed as follows:

- i) The sample size for the questionnaire is limited to 360 public respondents and 85 police officials from three districts. Though the findings of this study may not have universal applicability in different cultural contexts, however, the anti-corruption strategies adopted by the UNDP and OECD for fighting corruption are relevant among all developing nations.
- ii) Incomplete, misleading and wrongly filled information of some questions or non-responses could not be avoided. These types of incomplete and wrongly filled questionnaires have been sorted out by the researcher with the extra efforts.
- iii) A large number of police officials initially shown their unwillingness and hesitated to disclose the information regarding the weak points and level of performance of their own anti-corruption institutions in the course of collection of primary data through interview schedule in the form of questionnaire and informal discussion.
- iv) Further, police respondents of different ranking backgrounds of anti-corruption bureau are found to be reluctant may be due to administrative reasons. On receipt of direction from the Head of Office, the researcher could convince the police officials, irrespective of their ranking background, to fill up the questionnaire though hesitant officials did not disclose correct information.

Originality/Value

The present research is mainly based on quantitative data. The data for this study has been collected from different groups of public respondents and police officials of State Vigilance and Anti-Corruption Bureau using a survey method, instead of secondary data. Hence, this study will be realistic attempt to help policy-making process to devise solutions to combat corruption and building strong anti-corruption institutions to ensure trust, peace and access to justice in public policy-making process.

Conclusion

Good governance is indicative of corruption free environment and countries world-wide are prioritizing to combat corruption. In context to India, as per the reports of Transparency International India ranks at 86th position with 4 CPI score till 2020. Despite of regulatory reforms and executive initiatives, there exist disparities and inequalities which are responsible for lust of power, undue earnings and other different kinds of corruption barring transparency in the system of governance resulting losing trust, conflicts and limited access to justice. Combating of corruption and building strong anti-corruption institution is examined in terms of rule of law, regulatory quality, political intervention, absence of violence, government effectiveness and control of corruption. Based on corruption status the grey areas are to understand instability in the system of corruption, bondage between corruption, trust, good governance, peace, justice and need for designing robust, resilient and effective anti-corruption policies.

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Issues in Refugee Adaptation After Resettlement

Natasha Byrd (Utah Valley University, Utah, United States)

Abstract

Refugees are individuals who have been displaced forcefully or are fleeing war and conflict in their home country to find safety elsewhere. Causes of conflict and individual situations vary from place to place, but regardless of the specifics in consequence of these changes, many refugees lose the sense of their identity. This paper will detail the hardships refugees face when integrating into a new culture. Before they leave for a new country, refugees experience trauma, which could be anything from wars, injury, sexual abuse, physical abuse, or political conflict. As they arrive in a new country and are relocated in a city, refugees continue to confront complex challenges such as cultural adaptation, affordable housing, mental health difficulties, integrating into the education system, finding employment, helping their family adapt, and learning independence in an unfamiliar place, all in relation to UN SDG 16, “Peace, Justice, and Strong Institutions,” and SDG 4 “Quality Education.” This paper explores ideas concerning refugees adapting to a new country, issues of economic class, and ways to help children continue their education. This paper contains information from peer-reviewed articles, and other scholarly references.

Keywords: Refugees, coping strategies, resettlement, cultural adaptation, family, women and children

Introduction

The term “refugee” comes from the “French word *réfugié* meaning ‘gone in search of refuge’—referring initially to the Protestant Huguenots, who began fleeing France after the 1685 revocation” (Skop et al., 2019, p. 603). According to the Immigration Forum, a “*refugee*” is “a person outside the country of [their] nationality, who is unable or unwilling to return to that country because of a well-founded fear of persecution based on [their] race, religion, nationality, membership in a particular social group, or political opinion” (2020). Internally displaced people (IDPs) are forced from their homes; however, they choose not to cross the borders and receive aid from their home government. According to the United Nations High Commissioner for Refugees (UNHCR) IDPs are not able to receive humanitarian aid due to government policy, as a result IDPs are among the most vulnerable (UNHCR.org/en-es/internally-displaced-people). An asylum-seeker is someone who requests sanctuary for international protection, they are interviewed in order to qualify for refugee status (UNHCR.org/en-es/asylum-seeker). In contrast, an immigrant *chooses* to move to another country to make a permanent residence in that country (Nuñez, 2014).

The term “refugee” did not become a legal designation until after World War II. Skop et al. (2019) notes that “[it] was the massive numbers of European refugees, displaced persons, and Holocaust survivors requesting asylum that forced the Western States to reconsider and officially recognize

these individuals” (p. 604). At the time, there was no feasible way of keeping a record of the number of refugees in the world. It was not until the creation of the UNHCR that the UN created a way to keep track of the increasing numbers of refugees (Skop et al., 2019). There are currently 89.3 million displaced people globally, of which are 53.2 million IDPs, 27.1 million refugees and 4.6 million asylum-seekers (UNHCR, 2022), and one percent of refugees are considered for resettlement worldwide (International Rescue Committee, 2021).

This paper features accounts from refugees originating in the Middle East who resettled in Europe, Australia, and the United States, as recounted in academic journals. It also discusses different aspects of Sustainable Development Goal 4 & 16 (SDG 4 & SDG 16). The Global Alliance’s report (2019) is referenced in this work to describe connections to Target 16.2, “Help end abuse, exploitation, and violence against children;” Target 16.3, “uphold the rule of law and provide access to justice”: and Target 16.9, “help provide legal identity for all” (p. 139). These SDG targets demonstrate how each story and subtopic contained in this work relate to anchoring peace, justice, and inclusion with refugees.

In the United States, organizations in each individual state keep track of the refugees and help them throughout the resettlement process. As this research was done in Utah, their organizations include the following: “The Office of Refugee Resettlement, The Utah Department of Workforce Services, Utah State Refugee Services, International Rescue Committee, and Catholic Community Services all partner to provide services to refugees for the first two years of resettlement in Utah” (Colvin, 2018, p. 84). As they arrive in a new country and are relocated, refugees confront complex challenges such as cultural adaptation, affordable housing, mental health difficulties, integrating into the education system, finding employment, helping their family adapt, loss of identity, and learning independence in an unfamiliar place.

Methodology

The method used in this study was phenomenology. Phenomenology is a qualitative narrative approach to data analysis that references real-life accounts of individuals sharing details of their experiences through a series of questions and interviews. Colvin (2018) describes that “it is a philosophical structure that attempts to make sense of interpretation and move beyond the observable to the intentionality of actions. Use of this method focuses less on the interpretations of the researcher and more on a description of the experiences of participants” (p. 90). This method’s purpose is to find a phenomenon within those experiences to demonstrate the findings of the data.

The possible downside and caution for this method is the risk of “researcher-induced” bias. It is the responsibility of the researcher to have clear themes and support from peer-reviewed resources. The challenge for this method is the questions asked to each individual. The questions need to be non-specific to allow freedom of how the participants share their story. The researcher needs to be flexible and let refugees answer the questions freely, allowing individual responses and variability. The limitation of this study is that in order to have in person interviews, researchers need a minimum of five years or more of volunteer work to gain trust of refugees and organizations.

The subtopics were discovered as they were discussed as common themes in various peer-reviewed articles. Those common themes were only a fraction compared to the other topics that could have been mentioned such as sex trafficking, women circumcisions, and conditions inside refugee camps.

Cultural Adaptation

For refugees, their identities are stripped from them, they flee to a new country for safety, and to seek refuge. Once they are resettled, their new life begins. According to McCarthy et al. (2020) “Resettling to a new country is a significant life transition for refugees. The resettlement process involves the admittance of refugees from an asylum country to a host country that has approved their permanent resettlement” (p. 1). This life-changing experience requires them to adapt to new surroundings, systems, and a new culture. Part of that process is learning a new language, adapting to a new socio-economic environment, and feeling the pressure to reunite with their families and start off fresh in a new life (Safak-Ayvazoglu and Kunugroglu, 2021). These pressures include learning new tasks such as: learning to interact with customer service, talking with a doctor or pharmacist, to name a few. With the help of their case worker, refugees will be guided how to navigate their new life during resettlement. This mentorship will help prepare refugees to work on their own.

Being part of the refugee experience is quite complex; some of those challenges include persecution, injustice, and racism. According to Bergquist et al., (2019), “Similar to other groups, the process of managing a contested, marginalized, or misunderstood identity for refugees results in increased vulnerability for negative outcomes. Refugees often face a turbulent transition to a new culture and attaining successful social integration and acceptance is somewhat arduous” (p. 384). The developing ability to integrate into a host culture is challenging at first, and with it comes post-migration stressors.

There is a specific process refugees face when they resettle in the United States. When they arrive, refugees are greeted by their case worker, and they are taken to their affordable new home suited for a refugee family. They get a stipend from the U.S. government that lasts three months—accompanied by a charge to find employment in 90 days (International Rescue Committee, 2021). They need to get help from a resettlement agency to get food, shelter, employment, as well as help with enrolling children into the school system, and enrolling adults in English classes. Utah is the only state that offers agency-led support for two years (Berkley Center for Religion, Peace,

and World Affairs, 2020). After two years—six months to a year in other states—they are then on their own, with assistance of a secondary agency to help these refugees for an additional two to seven years to become citizens of the United States. According to Colvin (2018), “Because Utah and other relocation centers move refugees out of neighborhood centers after two years (other states do so even sooner), identity needs may change over time” (p. 13). Refugees are offered the basic resources needed to adapt to a new country however, they need additional support from their family and community support groups to cope with the challenges they face.

In Western culture, the family dynamic includes the father, mother, and minor children. However, for most refugees, family includes extended members, such as uncles, aunts, grandparents, and cousins. A lot of them take on the responsibility of their parental care. As some refugees and their families get resettled in Portugal from Syria, Barbosa et al. (2019) observe:

Regarding cultural integration, it was interesting to note that most families identified many similar aspects between [the] Portuguese culture and their cultures of origin. [...]. In fact, one of the most salient similarities pointed out was the closeness and hospitality of the Portuguese people and especially within the family, an aspect that was even more stressed by the families who were living in rural areas (p. 74)

These refugee families noticed the importance of family in their new culture, and they felt a glimmer of hope that they could fit right in. Having that knowledge is a way that refugees can start moving forward.

As refugees move forward in their resettlement process, Nurhayat Bilge, from Florida University, notes, “As adaptation occurs, a certain one is losing [their] cultural identity. Certain cultural habits and traditions are altered or replaced, which is the inevitable result of any cross-cultural interaction” (2017, p. 132). With careful mentorship, their case worker will help refugees discover their identity, and work toward their potential.

Education

One of the ways refugees can succeed in their host country is through education, as noted in SDG 4. Education is essential for refugees, whether it comes from formal or informal knowledge about various topics. Children are obviously and deeply affected by the refugee experience. When children come into a new country, their struggles are similar to those of adults’. Nevertheless, “For many young people their journeys to resettlement have been associated with not only violence and uncertainty but also the trauma of loss and feelings of ‘being cast out’ from their home country” (Picton and Banfield, 2018, p. 842). Picton and Banfield continue, stating that educational opportunities for these children are limited and, in some cases, interrupted; as a result, children become illiterate in their own language. Their recommendation for this problem is to include the refugees in their schools. Picton and Banfield state: “School sites in host countries, can offer important opportunities for young, resettled people of refugee experience to learn the language and culture of their new country but to also make connections with others in their new community” (2018, p. 842). Having children go to school is a way to distract them from the life changes they

are experiencing and for them to continue learning something new. This method helps protect them from some conflicts that may arise while integrating into their new country.

Children who live in war-afflicted countries are at higher risk of not getting the opportunity for education. One of those risks includes child soldier recruitment tactics used by various extremist groups in Africa and in the middle east. The Global Alliance Report (2019) mentions in a section related to Target SDG 16.2 that:

The Committee of the Rights of the Child has reported that the recruitment and use of children as child soldiers has doubled or even quadrupled in certain country contexts. Vulnerable children are recruited and used by non-state armed groups and by groups designated as terrorist (p. 103).

These terrorist groups would wait to kidnap children near schools or theaters and lure them away under the promise of providing an opportunity to attend school, only to later learn those schools were actually military camps (Nicolai and Triplehorn, 2003). The risk of being kidnapped is just as high in refugee camps due to walking a long distance to school; in some cases, it is too far for them to get there safely.

Currently, children are typically enrolled in school before the end of their first thirty days as mandated by the United States government (Bendefaa, 2021). It is one of the ways that children can become integrated in their new home and culture, bringing opportunities to connect with new peers. In fact, SDG 4.7 notes that

all learners [should] acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development (sdgs.un.org/goals/goal4).

On top of learning math, science, and other subjects with their peers, refugee children often struggle through school because they are in process of learning a new language at the same time.

During a refugee student orientation event, a teacher remarked that refugees have a more challenging time understanding school-related concepts. Some have a harder time than American children understanding math, science, and English due to inconsistent preparation from their schooling or lack of schooling in their home country. According to Kiteki (2021), a researcher who focuses on youth refugees, the risks of language deprivation include not being able to integrate into their new culture and exploring new interests:

Youth with serious problems in language proficiency risk exclusion and isolation from peers, leading to identity confusion, disconnectedness, and in some instances, mental health problems. [...] As a result, their educational process is further disrupted. (p. 93)

Earlier in this paper it was mentioned that children are at risk for not finishing their education due to schools not being directly accessible at the camp, requiring them to travel to school. This can lead to possible kidnapping or create problems relating to those mentioned above.

SDG 16.2 and SDG 4 aim to help children stay in school in order to have that distraction from their struggles, and focus on learning new concepts. In order to implement that goal, The Global Alliance advises that “Promoting inclusive and equitable quality education, including early childhood development, has the potential to instill values and behaviours that reduce violence and promote peace” (Global Alliance, 2019, p. 103). When those values are instilled in refugee children, they may have a desire for their own success, however that may look like for them.

One of those successes may include higher education, according to Safak-Ayvazoglu and Kunugroglu as referenced in an Australian study about African refugees who have navigated through their challenges to attain their educational goals. “It is a means of building self-esteem and self-confidence through recognition of their skills in the host country” (Safak-Ayvazoglu and Kunugroglu, 2021, p. 97). As refugees pursue their education, they are able to discover their strengths and passions to reach their full potential.

One of the ways that families are able to support each other through their challenges is having parents be involved in their child’s education; which includes helping children with their homework, attending school events, and communicating with teachers. According to Cranston et al. (2021), “Refugee parents like all parents play a significant role in assisting their children as they begin to trust teachers and principals as guiding adults in their lives” (p. 375). Refugee students are at higher risk of not succeeding in school if their parents are not involved as their child’s voice or not supporting them at home. Cranston et al. observe, “It seems reasonable to conclude that when parents are involved in and with the education system and a particular school’s personnel, their children tend [to] perform better in school and stay in school longer than their peers who do not have such support” (2021, pp. 376–77).

On the other hand, some parents do not respect the teacher’s assessments of their child’s behavior because they see it as disrespectful within their culture. Some subjects may seem to be a controversial topic among the refugee community, as they may disagree with some programs in schools. In Ontario, Canada, they “created a downloadable document titled ‘A Grade-by-Grade Guide for Muslim Parents’ with questions and answers, which is intended to provide Muslim parents with a comprehensive understanding [of specific topics]” (Cranston et al., 2021, p. 395). These sessions are the perfect opportunity to communicate with parents in order to include them in their child’s education (Cranston et al., 2021). With the combination of classes and brochures, teachers would be able to help Muslim parents understand the importance of learning about subjects that may seem sinful or irrelevant in their eyes.

Refugee youth are often “forced to live in dangerous, difficult neighborhoods as the only option their parents can afford. Consequently, their safety and security are at risk as they live in constant stress and fear, often at risk for danger through gang-related [activities]” (Kiteki, 2021, p. 92). They also may be in danger within their own home as their parents struggle with their own mental

health and other issues that may arise. The children may be expected to pick up the slack to help support their family financially. Kiteki mentions that part of the risk in that situation would be children potentially dropping out of school (2021). Clearly, education is one of the main keys to sustainable development, and so SDG 4 offers a framework that applies to global educational concerns, including access to education for all.

Mental Health

Along with the challenges of cultural adaptation come the conflicts of mental health, which are commonly seen as taboo or a weakness. However, once a refugee is in a country where they will resettle, they “are provided with services that aim for refugees to establish self-sufficiency as quickly as possible” (Yalim et al., 2021, p. 199). This is done because when refugees are in limbo, impacts occur to their mental health as they think about what they have lost—their identity, family, culture, social supports, and so on (Yalim et al., 2021). In addition,

Conflicts worldwide have resulted in several people being forced to be displaced from their homes and separated from their families. Refugees, similar to other forcibly displaced people, often experience traumatic events, such as torture, mass killings, [abuse, oppression,] and political victimization. Exposure to these traumatic experiences negatively affects the mental health of refugees. (Ali Shah et al., 2019, p. 2)

These experiences have a large influence on the mental health of a refugee. They may come to believe there is not any good in the world, and worst of all, lose trust in themselves and others. If they do not have a way to cope with their inner struggles, some refugees may experience suicidal ideation.

Part of the reason refugees are at risk for having mental health problems is that when they are fleeing from their home country, they lose their home, family connections, gender roles, and more. According to Goodkind et al. (2014), “Researchers have also found that the loss of valued social roles impacts the health and well-being of refugees. Refugee adults typically experience the loss of multiple social roles” such as “parent”, “spouse”, “child”, and “occupational roles and skills” (p. 334). For example, some nurses and doctors come to the United States as refugees but are not able to practice their profession due to licensing laws. It seems disappointing for refugees to accept underemployment opportunities in order to support their families; whereas in their home country, they worked as qualified medical personnel or other types of professionals.

As mentioned, most refugees come from war-affected countries and, along the way, experience trauma, persecution, and tragedy (Bendjo, 2018). The World Health Organization says mental health is “a state of well-being in which every individual realizes [their] own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to [their] community” (Löbel, 2020, p. 1). The more trauma refugees experience, the more critical it is to help them be aware of their mental health.

Refugees are often encouraged to gain support from those they consider family—a group of two or more people related by birth or who present themselves as a family (Löbel, 2020). According to Löbel (2020), “[a] basic family unit is the nuclear family, consisting of spouses or partners and any minor children. Yet, this concept of the nuclear family is derived from specifically Western perspectives in the research on cohabitation, which have overlooked family structures in other parts of the world” (p. 2). Löbel analyzes “refugee family networks from both perspectives, looking at the nuclear family comprised of spouses or partners, minor and adult children, and at the extended family comprised of parents, siblings, and other relatives” (p. 2). The more support refugees have from those who are undergoing, or have undergone, similar circumstances will supplement healing and well-being in their experience. The experiences refugees have faced or currently having are challenging, but the coping strategies people choose seem to make the difference in psychological growth and understanding the meaning of life (Frounfelker et al., 2020). Researching those coping strategies helps the stories of refugees grow with meaning.

Researchers noted a difference when refugees were able to utilize their family network in their new countries. “Family members usually supply the most important resources for mental well-being. They offer care, emotional encouragement, comfort and aid.” (Löbel, 2020, p. 21). “Additionally, studies on social interventions such as support groups, mentoring programs, and initiatives designed to strengthen families have sought to demonstrate a causal relationship between social networks and mental health” (Löbel, 2020, p. 20). Linking back to the family dynamic, Löbel noticed a difference when families were able to support each other throughout resettlement. She noted that “family members usually supply the most important resources for general mental well-being” (2020, p. 21). In addition, families were able to offer safety and comfort through providing encouragement, then finding a solution to the problem. Löbel also noticed that the stronger the social networks of refugees were, the better off their mental health would be: “A more recent strand of literature has suggested that network size is less relevant in providing social support in the specific context of migration. This implies that network size might not tell the whole story” (2020, p. 21). The strength of the family network provides a steadfast consistency of support from those who the refugees care about the most.

Adult refugees seem to find a higher resilience as they use their strengths to persevere through their challenges. According to Walther et al. (2021), “Strength-based views both in clinical practice and in academic research, essentially revolve around the key concept of resilience and have the ultimate aim of promoting resilience” (p. 1). Their study about how refugees have been able to adapt successfully discusses 54 adult refugees who arrived in Germany between 2013 and 2018 (Walther et al., 2021). Later in the study, they mention that refugees demonstrated adaptability by “acceptance, focus on present or future, belief in an internal locus of control, favorable comparisons between life in [their host country] and life in the country of origin, comparisons to peers, and growth through adversity mindset” (p. 4). Their article highlighted different circumstances where refugees were able to adapt by not having to worry about the dangers they faced prior to resettlement. Refugees learned how to write appointments down on a calendar, or mastered specialized training for employment (Walther et al., 2021). They had assistance and support from mentors who have the knowledge to train refugees the essential skills that other people take for granted.

Even though younger refugees have demonstrated ways to persevere through challenges, some still deal with mental illness. According to Im et al. (2021), “Refugee mental health needs are also cumulative and complex. Refugees face dual sources of distress: the strain of past traumas and current factors of acculturative stressors” (p. 2). Research has demonstrated that the sooner refugees can address their trauma, the better they will adjust to their new life. Some sources posit that it is vital to offer mental health services within the first few months of resettlement, as it can make an impact on the rest of their lives and their experiences through resettlement. Yalim et al. (2020) explain, “Scholars have stressed the need for improved methods of collecting and reporting data on this population. Suggestions include increasing cultural sensitivity, [trauma informed practices], and greater research into best practices for screening for trauma and mental health concerns” (p. 201). It also helps when professionals who understand the complexities of being a refugee, which requires patience, time, and relatability.

These suggestions are due to the “increased [data of] anxiety levels and PTSD symptoms among refugees, which can have a lifelong negative physical and psychiatric impact [if not treated]” (Yalim et al., 2020, p. 203). Improvements in assessments and mental health screenings might help future impact, as previously discussed. Jonathan Morgan (2020), a researcher in Sweden, states that in regard to refugees dealing with PTSD, “Although the incidence of PTSD or depression is high and long-term among children who have experienced war, those refugee children who have a strong sense of belonging tend to fare better in and out of school and are thought to be somewhat less inclined toward destructive behavior patterns that can distract them from their studies” (p. 41). As children are taught by caring teachers that recognize behaviors of PTSD, they will be able to help discover their potential.

Women and the Refugee Experience

Utah holds the highest amount of refugee women and children in the United States (Colvin, 2018). Even with this data, the voices of these women are not well known, yet their stories and influence are powerful, and it was an honor to review their experiences during this research. According to Umu Ozkaleli, refugee women “illustrate how after displacement women re-frame their identities differently depending on their past and present experiences” (Ozkaleli, 2018, p. 17). This research has demonstrated that some women came from affluent homes in their previous country, with security that made it unnecessary to worry when their next meal would be. Then all of their securities are taken away when they are forced to leave their homes, country, and life behind. What they used to know is gone, and their identity has to be rebuilt.

Colvin interviewed women from the Middle East who shared common experiences as mentioned above: “I had a job like normal life before the war. [...] Both me and my husband worked and my kids went in school. After the war, everything changed and it’s so hard to live there then we moved in Turkey” (2018, p. 8). Ozkaleli defines identity as a way of “becoming, rather than being” (2018, p. 18). These quotes were a beautiful way to describe the journey of refugee women adapting to a culture and growing into a new and better life. In Ozkaleli’s article (2018), one of the interviewees mentioned all she wanted was to keep her son safe, and continue his education. She had no desire to leave Syria, but she left just for him. “In Sha’llah [God Willing], we are going to go back

stronger than before and rebuild Syria. [...] We lost every demand that we had for life with dignity, even memories. Even the family gatherings [we have lost]" (p. 22). Even though the narratives and stories are different in each situation, Colvin noticed a similar circumstance among the women from the Middle East. Those women from Africa were grateful to be out of danger, despite the conditions they had dealt with at the refugee camp, and they were grateful to have shelter and a better life within the United States.

Another factor in refugee women's experiences is their need for family solidarity. Colvin interviewed newly arrived refugee women and notes that "newly arrived refugee women felt most comfortable having their children or other family members [present to] facilitate the interview experience" (Colvin and Munz, 2020, p. 5). This was in contrast to women who had been through some independent growth after living in the United States for a few years, and were comfortable enough to be interviewed alone without any others present. Colvin and Munz (2020) state that these women opted to be interviewed alone, which led them to have sitters or lead their children out of the room for privacy. "For many of the women, the interview process was also deeply moving and emotional as they told stories of personal and family tragedies, experiences of violence and civil war in their home countries, and the seemingly never-ending search for stability and resources in the U.S." (p. 5).

As observed in Colvin and Munz's article, time was the factor in helping refugees feel more comfortable sharing their stories. They had that time to adapt, focus on raising and supporting their families, and mentally reach a place where they felt comfortable sharing their experiences.

Women refugees are also able to use religious opportunities for support and continue the effort to see the bigger picture within their situations. Shaw et al. (2019) did a study with the following places: Brigham Young University, Dhi Consulting & Training (in Penang, Malaysia), and Howard University. This study included some of the issues that Muslim women refugees experienced—mostly referred to as "forced migrant" (2019) women. Their research mentions that religion was understudied but seemed to be a crucial influence in cultural adaptation. One of the challenges in a host country such as Australia or the United States was that it could be hard for women and other forced migrant people to adapt to their host country due to assumptions, prejudice, and discrimination regarding their religion. One of the aspects they researched was identity shifts through feminist theory, noting that, "After migration, women identified as refugees or asylum seekers experience this new identity alongside conceptualizations of what it means to be from a particular ethnic, religious, and linguistic community within the broader host country" (Shaw et al., 2020, p. 520). Along with that identity shift, they found an influence in their Islamic beliefs. Shaw et al. (2020) found that all of the participants found comfort within their religious beliefs and recognized the challenges in being able to participate in religious practices after resettlement. They all acknowledged trusting in God, being able to practice their religion to enable their coping mechanisms, and their fear of being persecuted and discriminated against, which limited those very practices they valued for healing trauma and encouraging personal growth (Shaw et al., 2020).

Religious Persecution

In other instances, religion is a way for refugees to find support and gain connections to get to know people within their own religion. They can reach out to those communities in the process of adapting. Shaw et al. (2019) discusses how forced migrant people use their religion or a new religion to find cultural acceptance and support within religious sectors as part of their cultural adaptation: “Religion and spirituality are situated within social and cultural contexts that include environmental changes for forced migrants[...] Religious involvement may serve to promote bonding or bridging (across groups), forms of social capital within the host country” (p. 520). Frounfelker et al. also state that those who did not have a coping strategy had a more challenging time through their experience and had the challenge to find the meaning of life.

On the other side of finding meaning and growth, is the misunderstandings of religion(s) and persecution. Jonathan Morgan did a study in Sweden interviewing some unaccompanied refugee minors (URM) who arrived in Sweden fleeing from religious persecution from their families and countries. Many of the participants in his study had a Muslim upbringing and converted to Christianity as active members in their congregations. According to Morgan (2020), “Religion, in this paradigm becomes an important psychological coping strategy that URM use to bring a sense of balance and continuity to their otherwise traumatic and unstable lives. On the other hand, religion has been understood to operate as an “engine of adaptation” to a new social context” (p. 41). Since refugees had a religious aspect, they noticed something far bigger and more beautiful than what lay in front of them. They were able to see an influence of a higher power that led them to who they are today.

According to Morgan, his participants had experiences in their conversions to Christianity. Some had positive experiences, where their families still accepted them for who they were and kept them part of the family. Others had a different experience; as Morgan (2020) states, “the participants faced an added layer of complexity in their relationships [...] making a decision that many in their homelands view as apostasy” (p. 44) In addition, Morgan explains that “this subverts the trope that all Muslim families are intolerant and willing to break ties (or worse) with their family members if they leave the faith” (2020, p. 45). In some cases, refugees end up in prison due to their change in religious views. In that situation there would be need for a voice to dispute the charges.

One of the Targets in SDG 16, discusses the rule of law (16.3) that was not referenced in detail in the Global Alliance report; however, one article discusses why Target 16.3 was not slated for implementation by 2030. Steven Malby (2018) is a legal advisor and head of the Commonwealth Office who discusses Target 16.3 as a starting point for different countries to implement and monitor the rule of law. Malby writes: “Governments may also set their own national targets ‘guided by the global level of ambition but taking into account national circumstances” (p. 2). Malby also mentioned that the methodologies were dependent on how the data was collected in each country and their priorities for implementing SDG 16.

Yet according to Malby, there was a crucial factor that explains. A country could have legal frameworks in place that align with the sustainable goals, yet “Even a well-functioning judiciary and government administrative system may not have the legal tools needed to promote the investment and socio-economic environment necessary for sustainable development” (p.11). With this factor in place, it would make sense that representation would be needed for those serving time in the name of persecution. They would be able to help refugees get through the loop holes and have access to freedom.

In addition to religious persecution, many refugees face discrimination based on assumptions about religion, anti-Black, anti-Arab racism. As Kiteki, notes, “Identity with the Muslim religion has contributed to acts of discrimination toward African refugee youth, most particularly toward the young women who are often sent for disciplinary action for wearing their headscarf and long skirts” (Kiteki, 2021, p. 92). This example is in relation to what SDG 16.9 discusses. The Global Alliance report states “Discrimination and inequalities, including those related to gender, [and religious persecution] have a large and wide-ranging impact on society, particularly with respect to the justice and inclusion aspects of SDG 16 +” (Global Alliance, 2019, p. 106). Discrimination, persecution, and inequalities lead into another challenge mentioned a few times in this work is a loss of identity.

Kiteki (2021) also writes about a common struggle among youth refugees. Part of the struggle talked about in the article was concerning loss of identity: “Loss of status begin in refugee camps and continues in resettlement countries” (p. 92). Along with that loss of identity, the youth deal with discrimination because of their religion. Particularly after the 9/11 attacks, refugees were often persecuted for how they dressed; people believed they were terrorists, and had joined Al Qaeda or the Taliban, and they would attack America again.

Conclusion

While refugees are displaced from their homes and country, their loss of identity will give them an opportunity to grow years after they get settled in their new life. As Utah was the location for this research, where most of the refugee population are women and children. Those women were able to learn independence by getting a job, becoming resilient to raise their families on their own, and supporting their children in school activities. Women who lived in the U.S. for more than five years showed a type of confidence in themselves and were comfortable to interview alone. Even among new refugee women, their husbands supported them to choose to be interviewed in a study.

Refugee experiences look different for everyone, based on the circumstances making them refugees, issues regarding women and family, the pervasive problem of mental health stigmas, and experiences with religious persecution. SDG targets 4.7, 16.2, 16.3, and 16.9 were referenced in connection to subtopics and refugees referenced in the articles.

The processes that helped refugees cope and adapt to their culture looked different for each person involved in the studies. The phenomenology method demonstrated perspectives relating

to each subtopic mentioned in this work. It is important to note that their perspectives are not universal, as each refugee has their own experiences, point of view, and growth within their story. These factors would leave opportunities for further research.

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Why does the Indian Perspective Matter? A Search for the Indian Views on the Concept of Ecological Harmony and Sustainable Development

Buddhodev Ghosh and Akanksha Prajapati
(Indian Institute of Technology, India)

Abstract

The concepts such as sustainable development and conservation that contemporary environmentalists propose and are forced to adhere to may have been inspired by what has already been said in the ancient scriptures. We need to understand the deep and comprehensible meanings of cultural and scriptural practices; to re-evaluate sustainable attitudes towards the environment. Eco-Dharma is a new term for explaining ethical ways which contribute to the consciousness of the environment. This paper will be divided into three sections; first, this paper will try to describe how eco-friendly nature is present in Indian tradition and what people are practicing. The second section will look into some environmental spirit present in dharma, and the third section will be about how these ideas can be imposed for sustainable and harmonic development.

Keywords: Environment, Sustainable development, *Dharma*, Indian tradition, Indic ideas,

Introduction

Indian tradition presents a transparent concept about the earth's ecosystems and reverently shows the need to maintain balance and stability. *Vedas* have joined or explained nature-culture with the philosophy of integrity. These narratives show the integral relationship between nature and humans. Indian tradition is well known for popularizing three major approaches as a fundamental practice in their life. These are- Non-violence, Universal acceptance of every hymn as true and the belief in God's (*Íśvar*) universal presence. It has the notion of *Vasudhaiva Kutumbakam* in the mantra of *Mahopanishad* belongs to *Samaveda* tradition, with a thought-provoking message that the whole earth is one family and every tiny being and entity on this earth is a part of this family. Thus, we ought to preserve and respect nature together with reverence and maintain interdependency with a symbiotic relationship. The era of scientific human civilization is using-misusing and over-exploiting nature with a technical, industrial, and wholly materialistic approach. The concepts such as sustainable development and conservation that contemporary environmentalists propose and are forced to adhere to may have been inspired by what has already been said in the ancient scriptures. We need to understand the deep and comprehensible meanings of cultural and scriptural practices; to re-evaluate sustainable attitudes towards the environment.

Further, eco-dharma is a new term for explaining religious ethics which contribute to the consciousness about the environment. This is one view on the matter, others may have different views. This perspective of looking back into our heritage which developed some background of ecological conservation has become very popular now. Eco is the short form of the word Ecology, and Dharma means a holistic vision of religion, ethics, duty, virtue, righteousness and cosmic law. Unfortunately, we have no particular definition to describe the term Dharma as it has a dynamic nature. However, we have to understand the concept as per convenience. It is the concept for living life prosperously. We must also admit that every civilization before the industrial revolution was far more Eco-friendly. Indian views add something new because of their philosophical approach to the world and surrounding nature. Indian traditions flourish many ecological philosophical traditions like Buddhism, Jainism, Vedantic and many others, but we will limit this paper with some of the Vedic approaches with ecological ideas. There is both a pragmatic and transcendental approach to Vedic knowledge. The Pragmatic act expresses the importance of the environment and why we should take care and not harm nature; at the same time transcendence aspects force us to think deeply about nature as sacred. This paper will be divided into three sections; first, this paper will try to describe how eco-friendly nature is present in Indian tradition and people are practicing. The Second section will look into some environmental spirit present in dharma, and the third section is about how these ideas can be imposed for sustainable and harmonic development.

Eco-friendly Approach of Indians

We must admit that the enriched civilization of *Bhārata* actually was very nature-centric. From the *Yajña* tradition to the philosophy of *Upāsana* we had the attitude where the great concern for nature actually reflects. Where *yajña* is associated with the welfare of the outer world the *upasānā* part actually takes care of the inner values by making them pure from the heart. This is important for ensuring a good environment, one must admit. Everywhere from the hymn from the *Rgveda* or the great philosophical observation it does not stop in the human-only but includes or tells about each and every creature. Dharma, is actually the environmentalist attitude we are taking care of while discussing eco-dharma. Although the constitution expressed the need for environmental laws some decades ago, the same approach has surprisingly existed since several thousand years ago. In India when we looked into the ethics for living or anything related to the rights of living beings we were using the word *bhūtāni*. Which actually indicates the concern about all living beings and non-living entities in a greater way. So, dharma is an environmentally oriented ethical idea.

Most central texts in the Indic knowledge and tradition describe the mutual relationship between nature and humans not as that of domination, but of friendship and harmony. In this context one concept comes about the cosmic creation and law. The three *śloka* from *Gītā*'s third chapter (11-13) narrate this in a very beautiful way. We can quote the translation of those *śloka* by Dr. Nagraj Paturi Sir here. The Creator, in the beginning, created human beings along with the *Yajñas*. These *yajñas* can be described as fire-mediated sacred procedures that are obviously eco-friendly and nature nourishing sacrificial procedures. And the Creator or the *Prajāpati* said: 'Through these procedures get what you want; they fulfill whatever you want. Through these procedures, nourish

and nurture the *devās* [who can be described as divinities or natural forces] and they nourish and nurture you back. Thus 'treating' each other, may you humans and natural forces both achieve the best for your welfare. Luxuries and pleasures that you want are provided by the *devās* who get treated by your *Yajñas*; thus, you enjoy all the luxuries provided by them'. So, these views from the mainstream Indic texts can be highlighted in this regard.

Not only in the *Veda* but also in *Tantra* texts or *Āgamas* has the earth been described as Mother earth with very feminine characteristics actually acknowledged and honored by the Indians, one must admit. This predates the philosophical approach of modern day eco-feminist approach. As a result, from the morning prayer for forgiveness to *touch* the mother earth with feet feeding to the animals, even to the snakes; everywhere in the vedic to folk tradition, we can notice a great affection for nature and its creatures. *Bhūmisukta* of *Atharvaveda* says that the muni prayed to mahabhumi to forgive because the earth mother has been terribly disturbed by human beings with agricultural work.

Vedas speak extensively about the sanctity of the rivers, the mountains, the forest, and so. The text on *dharma* earnestly exhorts people to practice non-violence towards all beings and enjoys a harmonious relationship with nature. This worship of fertility as the *śakti* or Devi is so well accepted that we can see at least one goddess temple in any village in India while there are no male counterparts with temples.

Significant words like *Jagat*, *Prapancha*, *Prakriti*, and *Vishwa* have different significance in explaining nature. *Jagat* refers to the perishable nature of the ecology; *Vishwa* defines environment as all-pervasiveness and the capacity to exist in every smallest part of the universe. The term '*Prakriti*' could be taken as '*Pra*' and '*Kriti*', indicating that the environment is a purposeful or teleological creation. *Prapancha* can be defined as the combination of *panch mahabhut* of *agni*, *ap*, *vayu*, *prithvi*, *akash*. Much before Jagdish Chand Basu scientifically proven, it was said in the *Rigved* (10/97/23) that plants and trees have life and destroying plants should be the most unethical. Indian thinkers had this unique spiritualist ethics in which rights were given to both humans and non-humans. Many eco-spiritualists claim that the destruction of the world is near not actually due to a cosmic anomaly but, because humans are losing their morals and destroying their nature and environment. Contemporary eco-philosophers raise the questions and criticize whether Vedic eco-spirituality is still playing any role to conserve nature?

So, we can say that it is playing a role to conserve nature, even not to a large extent but with the help of awareness and reinterpretations in people language we can regenerate the ideas of harmonical and sustainable relationship with nature. As nature is a whole and humans are also a part of that like other entities, we should not try to overtake nature, but maintain harmony. We can take examples of some communities, they try to conserve and sustain nature with the ideas, which are there in ancient Indian traditions.

Case Studies from the Different Parts of India (Republic of India)

- The *Bishnoi* Traditions are reflected in modern-day's love and dedication to the environment by Indians. The Bishnois are a community of nature worshippers mainly from Rajasthan. They follow 29 sets of rules and one important and sustainable rule is no felling of trees and no killing of animals. Trees and animals are sacred to them and they are following this rule continuously, saving the environment is their religion. They walk a long distance to get wood from fallen trees. They do not cut trees at all and use only fallen wood, they are leading a life that is eco-friendly and sustainable.
- The black softshell turtle in 2002 was declared extinct in the wild, but now a centuries-old temple in Assam and caretakers are helping them make a comeback. Assam was once rich in freshwater turtles, but its habitat was lost, and over-exploitation massively depleted its population. Now, the pond of Hayagriva Madhav temple in Hajo has become a safe home for the black softshell turtle. People believe that turtles protect everyone from harm. This project has been so successful that eighteen other temple ponds have been identified for similar initiatives and leading towards ecological conservation with the message of the importance of every entity in the universe.
- As per the increasing ecological crisis, the Venkateswara temple at Tirumala-Tirupati started the scheme of *vrkṣa-prasādam*. *Prasadam* can be taken as favor of deities. The temple is situated at a height of 3,000 feet and was once surrounded by heavy forests and biodiversity, but gradually they were endangered. In an effort to sustain the natural beauty and biodiversity of its original setting, the temple has started a large nursery and encourages devotees to take trees as *prasādam*.

This is not only how some communities are working like this, but they are spreading our thousand of years back ideas also. We should try to reinterpret those ideas of conservation and harmonic relationship as a whole, and encourage people to take initiative to maintain harmony and not pollute or destroy them. This is not about religious activity but it is our culture and duty to have the idea of sustainability and conservation in our mind so deeply, so that we can act like that as well. If the Yamuna River or any other river is holy in itself, then we should take it for its own sake in deciding what should we do? we can pollute more, but as contrasting at least in principle we will talk about removing toxic industrial wastes and other wastes from cities largely from rivers. *Atharvaveda* advocates that humans should treat the earth as a mother with oneself as the child of the earth but should act in a spirit of trusteeship. If humans do faulty things or do anything against nature, they will suffer from their own actions. If we are doing harm to ecology, it is our duty to protect them and maintain sustainability, the thought which is already mentioned in ancient Indian traditions. Ecological sustainability is possible if and only if the richness and diversity of life forms are sustained.

Ecological Spirit in *Dharma*

Dharma can be expressed or explained in many ways. We must understand the concept of *Svadharmā* too. *Svadharmā* is such a thing that can be decided as per the real nature of a person or creature as when a peacock eats a snake, a snake eats a mouse and that mouse eats seeds. In this chain, everyone is doing or eating anything only according to their particular *Svadharmā*. So, *svadharmā* is a kind of duty to be performed to make the environment sustainable. It is expected that nobody should force anyone to leave his/her *svadharmā* in any circumstances. Likewise in ancient Indian society, there were strong boundaries within the *Varnas*. A *Brahmin* had to maintain the *svadharmā* of *Ahimsā* or Non-violence. *Kṣatriya* must act in the opposite way to protect society. That's why *Kṛṣṇa* approached *Arjuna* so many times to take part in the war not to leave and maintain their *svadharmā* for balancing nature. [not clear what the author wants to say here]. When anyone does not follow this cosmic law or wants to go against it, there is harm to the whole world.

Ancient India was very much interested in understanding the natural beauty and importance of forestry too. As a result, we have the *Vrikśāyurveda* in the tradition. We can also find the depiction of the holiness of the forest in many of our ancient literatures. There was also a classification for each type of forest in terms of importance and sacredness. *Vivitarṇ* was grassland for cattle rearing. *Brahmanaraṇyārṇ* was meant for study. *Somaraṇyārṇ* was the forest from where the people used to get the wood for the *yajña*. *Mrgavanaṇ* was used as deer sanctuary. *Dravyavanaṇ* was for growing raw material for industry. *Pakshivanaṇ* was bird sanctuary. *Vyalavataḥ* was meant for wild animal sanctuary. It is also important to note that in our tradition we had a clear concept about the life in the tree and the emotion different types of emotions were also acknowledged in the *śāstras*. The sense of touch, smell and the ability to hear in the tree was acknowledged at that time- '*Tena śṛṇvanti pādapāḥ*', '*sparśastenātra vidyate*', '*tasmajjighrati pādapāḥ*' (*Mahābhārataṁ*, *śāntiparva* 184.12, 14, 16).

Water was also very sacred in our culture. Pure water is considered as the Super medicine in the *Atharvaveda*. Some texts deal with the purification of water in natural ways such as when '*añjana*', '*āmalaka*', '*uṣira*' etc. is added to well. By that formula, even the muddy, salty or water with bad taste can get good quality. There are also discussions about the production of perfumes in a natural way without using any chemical but water. Some of the texts like *Kṛṣiparāśara* suggest some refined methods for the use of water and seed properly in agriculture. As we have discussed the *yajña*, we might be surprised by the fact that it also describes how it can cause rain. The ancients also observed the behavioral changes in insects like ants and birds to forecast rain, which can be also used as proof of their engagement with and observation of the environment. In the same context, a few verses in *gītā*, the book even talks of following the 'cycle' of each effort, a concept that is so frequently found in contemporary ecological literature. One who does not follow life according to the principles of the cycle (as described in the verse 3.15) is a sinful creature and lives a vain life. This is the teaching of Bhagavān which can be also an inspiration to be aware and do our *svadharmā* and live on this earth prosperously with others. Vedic texts largely articulate the theory behind such narratives holding that whenever *Dharma*, the nature-sustaining principle is harmed or damaged, the force of sustenance manifests itself and restores

dharma, the nature-sustaining principle. This sounds very similar to the understanding from the famous quote from *gitā*- ‘*Yadā yadā hi dharmasya... tadātmānaṁ śrjāmyaham*’ (4.7); or the quote from *śrī śrī candī- Itthaṁ yadā yadā bādhā dānavotthā bhaviṣyati tadā tadāvatīryāhaṁ kariṣyāmyarisamkṣam*|| (11.55).

Sustainable Development and Indic Ideas

What is to be done to achieve the goal of sustainable development. It is not only the discussion about our heritage that will work. As such, we shall look at the practical usages that can be made from our traditional practices in the modern world. But before that, to answer the first question the most acceptable and proper answer is to create greater awareness. We also have to be dedicated to executing the ideas. Let me also be clear about one thing. The ideas we are dealing with now or discussed so much are ideas that existed before the ecological crisis. The proper solution to real problems about ecology we are facing now might therefore not come from that source. They can only make us motivated to understand the importance of the protection of the environment, which our ancestors took as their duty. If we look at the *vedāntic* literature, then we can see the world in a completely different aspect, *Upaniṣads*, the end part of *Vedic* text discussing the concepts of *Ātman* or the self, and *Brahman* or the imperishable essence manifest as cosmos, also known as *param-ātman*. These texts almost always talk of the all-pervading nature of the divine essence of the cosmos. As we have discussed above, one of the terms for nature is all-pervading. The key concept of *Vedānta* is to highlight the oneness in everything in this world, which actually indicates the very interconnection in everything in this universe. They also argue that *Jīvas* or *jīva* (individual self) is the limited version of *brahman* or the imperishable essence manifest as cosmos known as *paramātman* also. When a body part is hurt, the whole body actually suffers. Likewise every action positive or negative has an impact on the whole universe, however small or major impact.

If we take nature as sacred or divine and human beings ought to consider the environment as intrinsically valuable, why are we suffering from degradation and depletion of the environment? It indicates in a way that the eco-friendly Vedic tradition is limited in historical scriptures and fails to make a realization that nature is sacred and intrinsically valuable. The arena of eco-spiritualism gets criticism on the basis of efficacy and practicality in today's scenario. Many find this field isolated and limited which fails to work with multiple aspects of any society. To go into environmental problems requires people of vibrant backgrounds to work together. We can see the pollution level increases due to religious rituals. It is not enough to only acknowledge the environmental crisis in the world, but more important to get into and understand how individuals and communities are affected by the crisis and to find out how they are trying to address it. There are many simple solutions to environmental problems, but they demand some radical shifting in our thought, values, perceptions, and understanding. In Rabindranath Tagore's view the true quality of life emerges from a respectful and cooperative attitude towards nature. He believed that if it is introduced through education at an early age, the experience of the richness of vast nature would be enough to limit the desire for unnecessary possession of material things.

The knowledge of Vedic sciences is meant to be aware of or save human beings from falling into the utter darkness of ignorance and should have been an insight of oneness with nature. The unity in diversity (not only cultural but with the environment also) is the message of Vedic knowledge. Physical and metaphysical sciences, the essence of the environmental ethics and sustainability in the *Vedas* can be drawn here by citing a partial mantra of the *Īsopaniṣad*-1.

'One should enjoy renouncing or giving up others' part'. One should therefore accept only those things necessary for themselves, which are set aside, and one should not accept other things, knowing well to whom they belong and should not harm or poison them. They should live as part of nature and sustain without any pride to be a higher authority in nature. Therefore, human beings were not at the apex of the environment, even if they personified nature to elaborate and explain to others.

The 17th sustainable development goals announced by United Nations are similar in some respects to Indian ethics. Zero poverty the first goal was also there from ancient times in every civilization. It also means everyone should have sufficient and justifiably life conditions like pure air, water and food for leading life with sustainable nature. For achieving that, India had the practice of *Dānaṁ* or charity, as we can see in the various text from the *upaniṣad* to the *Smṛtiśāstras*, even in the *Arthaśāstra*. From the four *varnas* in the society, the *kṣatriya* has the utmost duty to that but it can be done by anyone for the welfare of the society but to the right person. For achieving the second goal we must take a pledge individually that we must not waste food. In India eating food is a very sacred thing. One of our Maharaj in college days used to say that we, Indians, eat privately but can defecate very publicly. We have to do both privately. For taking food we had the practice to first give it to the *Īśvar* that means nature and after offering, eat the food with the attitude that we should respect every particle of that food, called as *prasādaṁ*. The *Veda* clearly says that it is the duty to not waste the food. We can think about this respect and awareness to stop food-wasting all over the world and help to achieve the second goal.

Good health and wellbeing are also a thing to be concerned about and Indian Texts also suggest living even up to a hundred years but with a very active mind and body. The *śāstras* in *Ayurveda* texts are dedicated to human well-being, a process that should be natural. If quality education is a concern then the Indians are the best in that area as we actually always prioritized the truth over information collection. Holistic education was the aim for all. One-fourth of one's life (about twenty-five years) one had to be dedicated to the Education process, called the *Brhmacarya* Period. Affection about the woman and the respect for the power of a woman is old in the Indic civilization. We must bring the same respect and honor to achieve the gender equality goal. We also had the idea for pure water as we have mentioned in the water purification method in the *brhatsamhitā*. The seventh, eighth, and the ninth goal can be achieved by the proper awareness and building skills. As *krṣṇa* also told about *Yoga* and explained *yoga* as the art of doing the work easily. Other three goals after that actually an important thing and can be achieved at least to some extent, only by the helping each other or building consciousness for cooperation everywhere This can be also useful for the last goal. Affection about the woman and the respect for the power of a woman is old in the Indic civilization. We must bring the same respect and honor to achieve the gender equality goal.

For Climate Action to protect life on the land goal, we must take care of our ethics as our great ancestors did, we have discussed. We must make others aware about the 16th goal. India is once again an example where evidence can be found of the text like *vedānta* proclaimed and teaches about peace only both in the inner and outer world.

Conclusion

We are not saying that everything has been done and nothing to do now but many more to do. One thing we must understand is that the West cannot escape or deny the most responsibility for this climate or environmental crisis. As per the above discussions, this paper comes to a position to conclude that the ontological shift for an ecologically sustainable future has much to gain from the world-views of ancient civilizations and diverse cultures that have survived sustainably over centuries, so this Indian perspective matters as gives us a rich wholesome idea of nature and culture. As with the teaching, there is no dichotomy between two (nature and culture) and we should maintain harmony. Also, Indians should not only be proud of their rich heritage but act as per the instruction from those teachings. It is the duty of all people to stay under the sky. So, this is not the finish line to stop. This degradation of the environment is going on under the name of development, but it is clearly seen that the notion of development has something wrong with it that is a threat to existence; we are doing violence to nature which is inherent to the dominant progress models. We must update ourselves and create awareness for others. In the extreme situation of the pandemic, we have seen what are the priorities in our lives and what can be omitted very easily. So, the old idea of *Tyāga* (in the broader sense) is coming in a new way as the practice of minimalism all over the world. And we should not forget the *svadharma* as the children of Mother Earth and the Creator of the next generation.

Our peace peace peace

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Contested Spaces in Mali: Justice, Security, and the State

Zoë Gorman (Princeton University, New Jersey, United States)

Abstract

While recent studies find positive effects of violent conflict on judicial systems and trust in the state, this paper provides subnational evidence for the opposite trend in the context of Mali's current conflict. I argue the loss of territorial control to rebel groups leads to a sense of abandonment among populations by the state and a turn towards parallel mechanisms for judicial service provision, which become further entrenched within local society and neo-patrimonial power hierarchies. Meanwhile, efforts to improve the judiciary at the national level through initiatives, platforms and laws do not percolate to conflict-affected periphery regions in a way that meaningfully repairs their trust. The analysis leverages a Hidden Markov Model (HMM) developed by Anders (2020) to map territorial control across Mali from 2011-2019. Quantitative analysis based on the HMM mapping and Afrobarometer survey data finds a clear and robust correlation between levels of territorial occupation by rebel groups and deteriorating trust in the state judiciary, the rule of law, judicial fairness and anti-corruption

Acronyms

ACLED..... Armed Conflict Location and Event Data

AQIM..... Al Qaeda and the Islamic Mahgreb (Al Qaeda's local branch merged with other groups to become JNIM)

CLMM..... Cumulative linked mixed model (A model with hierarchy and ordinal outputs)

CMA..... Coordination des mouvements de l'Azawad (Armed grouped faction in North aiming to establish an independent state of Azawad; signatory to 2015 Algiers Accords)

COFO..... Commissions foncières (Land commissions)

CVJR..... Commission Vérité, Justice et Réconciliation Forces (Truth, justice, and reconciliation commission)

FAMa..... Armées Maliennes Forces de defense et de sécurité (The Malian armed forces)

FDS..... Forces de defense et de sécurité (Security and defense forces: army, police, gendarmes, national guard)

G5 Sahel or FC-G5S..... Group of Five Sahel Force conjointe de la G5 Sahel (Joint force consistency of battalions from Burkina Faso, Chad, Mali, Mauritania, and Niger)

GATIA..... Groupe autodéfense toureg Imghad et allies (Imghad Tuareg Self-Defense Group and Allies)

HMM..... Hidden Markov Models

IBK..... Ibrahim Boubacar Keita (Present of Mali 2013-2020)

ISGS..... Islamic State in the Greater Sahara (Local faction allied with the Islamic State)

JNIM..... Jama'at Nasr al-Islam wal Muslimin (Support group for Islam and Muslims- also GSIM for French; umbrella al Qaeda-affiliated Sahel and North Africa group active from 2017 under Iyad Ag Ghaly)

MSA..... Mouvement pour la Salvation d'Azawad (Movement for the Salvation of Azawad)

MINUSMA..... United Nations Multidimensional Integrated Stabilization Mission in Mali (Active since 2013; 18,000 personnel: 15,000 troops, as of Nov. 2021)

MUJAO..... Mouvement pour l'unicité et le jihad en Afrique de l'Ouest (Movement for Oneness and Jihad in West Africa- also MOJWA; affiliate of AQIM, Al-Mourabitoun and later JNIM)

SIPRI..... Stockholm International Peace Research Institute

UN..... United Nations

UNDP..... United Nations Development Programme

Introduction

While the 'security-development' nexus is all the rage in peacekeeping discourses, states emerging from conflict are unlikely to achieve sustained peace or development without justice in the eyes of the people. Peacebuilding access to justice, inclusivity and accountable institutions might not intuitively seem haphazardly thrown together in United Nations Sustainable Development Goal 16, yet the mechanisms linking them remain underexplored. Though the assumption that transitional justice leads to peacekeeping is an underlying logic of external intervention, scholarship on how these intertwined goals shape each other remains limited (Baker and Obradovic-Wochnik, 2016).

In light of the failure of 'good governance' oriented interventions to build sustainable institutions in conflict states (Hazelton, 2021) and prolonged intrastate wars (Fearon, 2017), these

relationships among peacebuilding, transitional justice, democracy and the rule of law¹⁰⁶ has become a pertinent topic among scholars and policymakers (O'Donnell, 2004). Druckman and Wagner (2019) demonstrate by examining 50 peace agreements between 1957 and 2008 that both procedural (process principles of fair treatment, transparency and access) and distributive justice (equitable outcomes) are instrumental to stable peace agreements over the short and long term (also García-Villegas and Espinosa, 2015). Okoye (2004) argues the international human rights framework, which serves as a foundation for the promotion of the rule of law², borrows from longstanding African conceptions of communal interest, mediation and group lobbying and informal dispute resolution, yet customary and weak state institutions often clash in conflict and post conflict settings across the continent.

Literature on modern conflicts identifies periods of insecurity as critical junctures for institutional reform and the re-evaluation of state-society relations. Epperly and Sievert (2019) argue conflict increases the possibility of institutional change; conflict onset triples the likelihood of *de jure* change related to the autonomy of judges and doubles the likelihood that the emerging political order will uphold court decisions. Newer democracies are especially likely to experience positive shifts in both *de jure* and *de facto* judicial independence (Linzer and Stanton, 2015). In turn, credible dispute institutions also decrease opportunities for criminal groups to become new *de facto* rulers in formerly occupied areas (Arjona, 2016). Several analyses cite conflict and post-conflict periods as 'golden moments' for institutional reform (Blair, 2020), windows of opportunity 'to overhaul the state apparatus and revitalize its relationship with citizens' (Call, 2008b) and critical periods of improving inclusivity by questioning enduring societal status quos that privilege certain social groups (Tripp, 2015). However, findings on the effects of conflict on judicial institutions remain mixed¹⁰⁷, and improvements to institutional capacity at the macro level do not trickle down uniformly to all societal cachets (Autesserre, 2014a). Haggard and Tiede (2014) indicate a reversion to pre-conflict levels of the rule of law in the post conflict setting. They record the mean values of rule of law indicators pre and post conflict finding countries revert to the pre-conflict rule-of-law status quo with regard to civil liberties, judicial independence and restraints on executive authority.

The modern history of Mali, and recurrent conflict in Africa more broadly, appears at odds with strains of research proposing more positive views of the revitalizing effects of conflict on statebuilding, democratization and the expansion of judicial institutions. Since gaining independence from France in 1960, Mali has undergone four cycles of rebellion, reconciliation

¹⁰⁶ Definitions of the rule of law vary across different subsectors of scholarly and legal literature (Blair, 2021). This analysis will adopt Sririam et al. 2011 definition of the rule of law as 'juridical conceptions and mechanisms that preside over the functioning of the state' while protecting the fundamental human rights of its citizens. Appendix B details rule of law indicator calculations.

¹⁰⁷ Bellows and Miguel (2009) attribute a psychological legacy of exposure to political violence to political mobilization and participation in local collective action among marginalized groups. Boateng (2016) reports increasing fear of crime and victimization as undermining institutional trust and confidence.

and reconstruction. Yet despite these periods of upheaval and subsequent statebuilding initiatives, perceptions of the state judicial services have remained historically low. In a 2015 survey conducted by the Stockholm International Peace Research Institute (SIPRI), civil society representatives from across the country ranked trust in the courts at the bottom of a list of governmental and nongovernmental authorities. The present conflict in Mali provides insights into the interactions between security and justice across a highly variegated spatial and temporal conflict landscape.

The central research puzzle aims to address the attenuation of trust in the state judiciary in contested spaces despite significant reform efforts and international aid as part of a ‘golden moment’ for innovation of these systems. I will argue territorial contestation leads to a sense of abandonment by the state and a turn towards parallel mechanisms for judicial service provision, which become further entrenched within local society and neo- patrimonial power hierarchies. This fosters an inhospitable environment for the return of credible, state judicial actors, despite reform programmes at the national and international levels. My study advances the theory put forth by Arjona (2016) in detailing how rebel governance structures entangled with pre-existing traditional systems reflect back on perceptions of the central state. The Mali case gives insights into the evolution of the judiciary amidst an expanding number of intrastate conflicts receiving international attention in post-colonial African democracies.

Background of Conflict in Mali

In 2012 a mixture of northern rebels, jihadists and fighters returning from Libya after the fall of Muammar Gaddafi capitalized on local grievances, including failed decentralization attempts, lack of commitments to northern development programmes and limited political representation for northern Tuareg, as well as a historic weak state presence in the north to take over two thirds of Mali’s territory. At the same time, a military coup in the south of the country ousted President Amadou Toumani Touré, causing political chaos. An unprecedented national and international mobilization resulted in a democratic transition to the presidency of Ibrahim Boubacar Keita (IBK) in 2013 as well as joint military and security-sector reform operations, ceasefires and negotiations between the Malian Government and armed groups, and a peace agreement in 2015 (Chauzal and Van Damme, 2015). However, the agreement has not been successfully implemented—in part because it maintains a political status quo, corrupt judicial precedent and the inability to adapt to evolving grievances and a proliferation of armed actors (Desgrais, Guichaoua and Lebovich, 2018). Regular violence persists in the country’s north and has spread to the central regions, intermixing with intercommunal tensions, compounded by persisting political instability and subsequent coups overthrowing IBK in 2020 and the transition government in 2021 (Thurston, 2020; Wing, 2021). The country is currently under military rule until new elections can be organised.

Efforts to stabilize the region often rely on weak, corrupt or absent state institutions, whose derelictions incite a marketplace of alternative actors attempting to provide the missing links for populations, further delegitimizing central governments (Gorman, 2019). Foreign intervention and the Group of Five (G5) Sahel joint security force — comprised of battalions from Burkina Faso,

Chad, Mali, Mauritania and Niger — aim to fill the gaps of the state in re-establishing endogenous control to offset a regional arc of instability but are poorly adapted to local realities (Gorman and Chauzal, 2018). Frustrations over the security situation and political disputes have resulted in France announcing the withdrawal of its operation Barkhane, and Mali removing itself from the G5 and calling for the withdrawal of the United Nations peacekeeping force MINUSMA.

Although unprecedented in scale, the present conflict fits into a historic cycle of disillusionment with the central state and rebellion despite reform efforts, international support and reconciliation processes. During the previous northern rebellions, the 1992 National Pact and new democratic constitution only deepened the crisis over the next four years. Political changes in Bamako made implementation of the pact sluggish, and leaders of armed groups lacked sufficient control over their organizations to ensure compliance and prevent the forming of new splinter groups not included in the agreement (Straus, 2015). The 1994 devaluation of the CFA prompted an increase in rebel demands and the formation of counter-rebel militia from the ranks of the FAMa, the Ganda Koy ('Masters of the Land' in Sonrai), who massacred hundreds of civilian Tuareg that year. The national pact decentralization programme fell short of northern demands for autonomy and did not foster substantial power devolution; truth commissions to investigate human rights violations never became functional with Malian official complicit in criminal trade operations in the north (Lankhorst, 2013)¹⁰⁸. 'Deep state complicity in crime and laxity towards terrorism arguably go a long way to explain why the issue of a weak rule of law and institutional capacity, which in fact allowed the trade to flourish, were never seriously addressed' (Hiil, 2017). Dialogue processes initiated during the conflict escalation period under President Konaré, including the locally driven dialogue forums among herders and farmers and 1996 Flame of Peace Ceremony in Gao, failed to institutionalize within state structures, politically oriented alongside Southern interests. state complicity in crime and laxity towards terrorism arguably go a long way to explain why the issue of a weak rule of law and institutional capacity, which in fact allowed the trade to flourish, were never seriously addressed' (Hiil, 2017).

Similarly in the current conflict episode, the situation has deteriorated following the 2015 peace agreement and intervention efforts. The *de jure* Algiers Accords only insinuated further contestation; political changes at the capital rendered enforcement sluggish; armed splinter groups (including the pro-government GATIA militia) proliferated, and the country suffered from endemic issues of state complicity and judicial corruption. Following the Accords, Mali experienced a proliferation of armed actors and deteriorating state beyond the north and hotspots in Mopti and the Liptako-Gourma tri-border region, which are no longer conducive to traditional re-negotiations of localized power (Sangaré and Tobie, 2019). The historical patterns of rebellion in Mali, along with unique facets of this cycle of conflict, provide some indications of the challenges of national-level reform efforts to target relevant communities.

The factors underlying Mali's instability—disunity along ethnic lines, economic discontentment, limited territorial control, and corruption and weak institutions—are common to many democracies

¹⁰⁸ Activities included smuggling illicit goods, cocaine from South America to Europe and Moroccan cannabis to the Levant. Complicit Malian officials would form alliances with local leaders and elites to keep the Tuareg rebellions in check while reaping resource profits.

emerging since the Third Wave (Rose and Shin, 2001). This research seeks to explain how conflict can perpetuate low confidence in judicial systems (essential for dispute resolution) despite significant reform efforts and international investment.

Hypothesis Development

Understanding the judicial-security environment in African conflicts hinges on foundational, contextual analysis of diverse societies and institutions. Building on theories of the detriments of colonial legacies, Jackson and Rosberg (1982) demonstrate weak state institutions rife with corruption are often unable to cope with insecurity or mediate disputes in a credible and satisfactory manner. Patron-client and neo-patrimonial modes of political support create disparities in statebuilding efforts across different regions and power structures (Rothchild and Olorunsola, 1983). This furthers noticeable divides between the centre and periphery with regard to state institutionalization, resource management and the diffusion of policies (Bonacker, 2018). The political electoral runoff system inherited from France further galvanizes this centre-periphery divide in Francophone West African countries. The single party national lists are tightly controlled by central party elites, which discourages politicians from establishing strong constituency linkages and rather seeking favour from elites at the centre, who regulate access to media and financial resources (Mozaffar and Scarritt 2005, Thurston and Lebovich 2013). Amidst a legitimacy crisis, institutions such as the courts not viewed as 'strategically independent and nonpartisan institutions with the moral, authoritative and legal mandate to adjudicate, render verdicts and make (un)popular decisions in both civil and criminal proceedings' (Boateng and Adjorlolo, 2019).

The 2012 coup d'état amplified the fragility of the national political and security edifice and the proliferation of crime prompted a crisis of the judicial system (Ba, 2018). A 2014 survey conducted by Friedrich Ebert Stiftung cited the judiciary as the most effected service by both bad governance (72%) and corruption (78%), followed by the police and schools. In 2018, the magistrates went on strike, demanding a greater investment in state justice in the form of salary raises, indemnities and a risk infrastructure to protect justice workers in difficult security contexts. The 10-month strike slowed prosecutions and extending the length of pretrial detentions (USDOS, 2018). Meanwhile, numerous cases of human rights abuses including extrajudicial killings, illegal detentions and disappearances of civilians by the Malian Army (FAMA), battalions of the G5 Sahel and the new-kid-on-the block, the Russian Wagner group, often are not prosecuted.

Challenges in the diffusion and institutionalization of national judicial reform initiatives pre-date conflict and are exacerbated by it (Cloward, 2015). The Malian state judicial system has undergone a series of reforms to improve the impartiality of the courts since the last cycle of conflict. The justices of the peace combining the functions of investigator, prosecutor and judge in one individual to serve rural regions are being phased out (since 1992) for courts with separate judge, examining magistrate and prosecutor, and the mid-level '*tribunaux de première instance*' will be replaced with panels of three judges rather than one. Higher courts include the courts of appeal in Bamako (south), Kayes (south) and Mopti (centre), and the highest courts, the Supreme Court, Constitutional Court and High Court of Justice (Idris 2020). Despite these (still incomplete)

reforms, the state judicial system remains plagued with both individual level corruption in the form of bribes from litigants and systemic corruption in collusion among the justices and other governmental branches. A constitutional referendum was scheduled in Mali for 31 October, 2021 but postponed indefinitely after the 2021 coup. Additional programmes of interest include the Land Commissions (COFO), the 2013 creation of the Commission for Dialogue and Reconciliation and the 2014 Commission for Justice and Reconciliation (CVJR), comprised of 11 commissariats with three-year mandates focusing on combatting impunity, as well as recent efforts to bridge the divide between state and customary jurisdictions. Yet qualitative case studies show these efforts have no impact on the most affected regions and most inhabitants have never heard of them (see forthcoming qualitative study).¹⁰⁹ As national reforms aim to revitalize judicial infrastructure, 'new institutions may simply be unable to manage the multiplicity of demands upon them, as they are expected to address civil and criminal matters, potentially including a backlog of cases,' social power dynamics and tensions may be imported into institutions of law (Sririam et al. 2011), as the new political order experiences incentives to institutionalize these reforms in the periphery.

The flight of state authorities from insecure periphery regions chisels away at the fragile perceptions of their legitimacy among local populations, who turn to alternative structures for dispute resolution. Recognized by the UN as essential for conflict and post-conflict dispute resolution since 2004, customary authorities of village elders (notables), religious judges in the North (cadis), southern traditional communicators (griots) and local village authorities fill an important gap in state juridical service provision and are viewed as more efficient and accessible than the state judiciary for minor, civil cases (Sririam et al. 2011).¹¹⁰ A March 2017 law granted traditional authorities' roles in mediating land disputes, and in July 2021 customary authorities were formally added under the remit of the Ministry for Religious Affairs (Maliweb, 2021). Traditional justice systems tend to emphasize restoring community harmony, rather than enacting personal punishment, procedures are malleable with similar cases not always treated the same (*ipse sui generis*), and the process is voluntary with verdicts enforced only via social pressure (Skelton and Sekhonyane, 2007). The case studies found the conflict has galvanised traditional cadis to expand their dockets to include criminal matters, sometimes in collaboration with jihadist rebels who bring the arms to enforce decisions. Because traditional, elderly and male customary

¹⁰⁹ Because of space constraints, these case studies were not included in this main analysis in full, although their primary observations have been integrated into the discussion section. They will serve as the basis for a additional forthcoming article with Boubacar Ba and Assinamar Ag Rousmane.

¹¹⁰ Customary and civil law were codified and deployed by colonial states to differentiate a political or 'civilized' minority from an uncivilized majority of native subjects, with 'divide and rule' policies encouraging indirect rule of law that further demarcated distinctions among ethnic groups and atomized loci of governance at the micro level. This bifurcated state, divided between a central apparatus of power organized through civil law in the urban spaces and a 'plethora of local groups in rural areas ruled through chieftaincy' embodies a 'complex legacy of colonialism for post-colonial states' (Obarrio, 2011). The codification processes of colonial rule did not represent a true integration of traditional law into colonial legal institutions, but rather a *saupoudrage* serving colonial interests with colonial law as the ultimate norm. The perception of state justice as exogenous to socio-cultural and religious realities persists in the post-colonial era (Rodet, 2018).

leaders reinforce a 'conservative social order often characterised by patriarchal hierarchy and social inequality' (Idriss, 2020), their judgements are unlikely to satiate all social cachets. In light of these observations, I put forth the following hypotheses:

H1: *Populations in contested territories where rebel groups have gained the upper hand will lose trust in the state judiciary.*

H2: *Turning away from the state, occupied communities will increase reliance on traditional and religious authorities for judicial service provision in cases outside of their usual remit, but satisfaction in these options will not increase.*

The hypotheses align with Huntington's (1968) claim that territorial contestation generates imbalance between stagnated institutional development and mobilised demands. Control of the de facto dispute resolution mechanisms is paramount in establishing rebel governance, but in communities where local leaders are strongly endorsed by the population, rebels may engage in bargaining and intimidation of local community authorities and develop hybrid systems (Arjona, 2009). As populations turn away from the state judiciary and towards these systems, areas with well-established customary systems will handle more complex and criminal cases outside of their historic remit — potentially leading to mixed levels of satisfaction with judicial outcomes. Furthermore, because of entrenched power hierarchies inherent in traditional authority dating from the colonial period, it is possible not all members of society (particularly women and locally minority ethnicities) will feel represented. Conflict affected areas accumulate both unresolved grievances and an aversion to reliance on state systems for their resolution, circumscribing subnational pockets of vulnerability and potential conflict resurgence.

I also proffer that efforts to improve the national judiciary through initiatives, platforms and laws will not trickle down to conflict-affected periphery regions in a way that meaningfully repairs their trust in state justice, which I test in the related qualitative research.

Alternative Hypothesis and Current Debates

Situating this study within recent literature, this analysis will contribute to discussions of the adverse and propitious ramifications of loss of state control on judicial expansion and institutionalization, while documenting potential scope conditions for other arguments in the field. The study builds on the pillars of SGD16 by exploring how issues of access to justice and accountable and inclusive institutions influence prospects for peace and vice-versa.

García-Ponce and Pasquale (2013)'s study of Afrobarometer survey data in 16 Sub-Saharan African countries from 2002 to 2009 provides insights into the immediate effects of political violence on institutional trust on the continent. Their study found individuals interviewed immediately following violent events were significantly more likely to report trust in the head of state, parliament, local government officials and police forces, with the relationship strongest the closer the violent event is to the interview date. Their justification for this positive relationship between violence and state trust stemmed from the desire of affected populations for the

restoration of political order after a shock. However, this positive correlation appeared only salient within a narrow window of violent events near the interview dates. For example, the effect of violence against civilians on trust for the president was strongest in the 7-10 day window but became insignificant after 15 days and insignificantly negative after 30. The study also does not consider effects of violent events on trust in the court system or the effects of prolonged, repeated violence or occupation by non-state groups. Rather, violence is considered as an isolated event without accounting for how well the state controlled the relevant territory at the time.

My analysis considers the significance of levels of state control, which shapes wartime political orders (Staniland, 2012), on institutional trust over the medium term, beyond the initial shock period analysed. I hypothesize that this level of control is significant and that, beyond an initial shock period, violence in contested and rebel-controlled territories has negative effects on judicial system trust over the medium term. This hypothesis is consistent with Lewis and Topal's (2021) finding that exposure to conflict in Africa lowers levels of generalized and out-group social trust, while increasing levels of in-group social trust because in periphery regions of low-capacity states, state judiciaries are often perceived as 'out-groups', while parallel informal, community structures constitute the 'in-group'. Studies outside of Africa such as Cassar et al.'s (2011) investigation of post-war Tajikistan associate conflict exposure with lower levels of trust and fairness, as well as entrenchment of within-group norms. As the quantitative analysis builds on this research by looking not only at the effects of conflict exposure, but degrees of rebel territorial control, the qualitative field component of the research design seeks to detail how conflict-affected communities perceive informal and state systems as in and out groups.

Blair (2021) posits that conflict can improve the rule of law by attracting UN peacekeeping missions and related UN activities focussed on state reform and creating liaisons between states, non-state authorities and citizens. His 2020 study finds a positive relationship between the number of deployed UN peacekeepers on improvements to the rule of law in the first two years following civil wars, although the effects diminish by the third year and were zero or negative during the conflict. According to Blair, UN missions lend legitimacy to the state by working with it to revise laws, rehabilitate state institutions, and train and redeploy state security and justice personnel, yet other research suggests third-party intervention may reduce loyalty to the state, increase dependence on the foreign power (Lake, 2010). Although my analysis takes place during the conflict, the causal processes documented in parallel case studies, along with a historical analysis of previous conflict episodes, showcase some of the longterm limitations of Blair's hypothesis and support for the Haggard and Tiede (2014) finding on rule of law reversion to the pre-conflict status quo.

Methodological Overview

The methodology emphasizes the link between territorial control, not just conflict exposure, on judicial trust and furthers a mixed methods design. Mapping control levels across the country and over time allows for comparison among areas experiencing rebel governance and areas with greater continuity of state judicial service provision. Scholarship on governance in civil conflicts indicates the degree of rebel control affects the treatment of civilians and can inspire localized

perceptions of the conflict and the state (Akcinaroglu & Tokdemir, 2018; Arjona, 2009, 2016; Bouhlel & Guichaoua, 2021).

The literature on the interrelated effects of conflict and the evolution of the judiciary has focussed on case comparisons and country-level data analysis. However, sub-national studies minimize contextual differences and eliminate some sources of potential bias in causal inference, while calling attention to perceptions of the citizens the conflict affects the most (Blair, 2021). Baker and Obradovic-Wochnik (2016) posit the need to turn locally to understand what justice and peace really look like, while Lundy and McGovern (2008) suggest unofficial, 'bottom-up' truth telling processes are instrumental to how local communities view justice in several contexts. Mixed method designs detailing causal pathways between micro-level theories and their macro-level implications are instrumental in linking individual outcomes or group behaviour with conflict trajectory (Sambanis, 2004; Balcells and Justino, 2014).

This research explores whether periods of rebel occupation influence persisting perceptions of the state judiciary at the local level within the context of the current conflict in Mali using a mixed methods design. Focusing on Mali's judicial system during the 2012- 2019 conflict period provides a useful mechanism for reliably testing the effects of lapses in state service provision more generally because state judicial services are among the most likely to be disrupted during periods of rebel occupation. Other state institutions such as schools may have been allowed to continue in some localities; this heterogeneity would make determining differences in perceptions from periods of disruption more cumbersome. Judicial services remain essential for post-conflict reconstruction — the mechanism by which credible governmental institutions resolve disputes without violence. Christensen and Laegreid (2005) also find trust in visible public authority such as the courts may have a rippling effect on other state institutions.

The research methodology first maps levels of state and rebel control monthly in 25 km hexagonal grid cells across Mali's territory using a Hidden Markov Model with data from the Global Terrorism Database (GTD) and Global Events Database (GED). The model pioneered by Anders (2020) draws on control typologies and probabilities from Kalyvas (2006), which exploits the principle rebel groups are more likely to use conventional attacks in areas over which they wield greater control. From there, it is possible to run a series of hierarchical models on geo-located Afrobarometer survey data from 2014 and 2017 to assess effects of rebel control periods on judicial confidence, the rule of law, judicial corruption and trust in traditional authorities. A robustness analysis includes evaluating reverse causality (judicial opinions generating conflict) at the conflict onset and noting regionally disaggregated trends in pre-conflict data.

Mapping Rebel Control

The first phase of the research established a map of levels of rebel vs. governmental control in Mali from 2011-2019. Control levels generated by location and month serve as a guide for measuring sub-national changes in judicial perceptions and service provision at various stages of local and national conflict.

Territorial control is an important indicator in conflict but can be challenging to measure. As Osaghae (1994) states, ‘the minimum requirement for effective [conflict] management is the acknowledgement that conflicts and the differences which produce them are legitimate because...the state must be regarded as a contested rather than settled terrain.’ Research has leveraged new spatial analytical techniques and machine learning algorithms to map control throughout different stages of intrastate conflicts based on the premise armed groups adapt tactics to their relative capacity to the state (Kalyvas, 2006; Fortna, 2015; Polo and Gleditsch, 2016). Kalyvas (2006) sets groundwork for understanding attack type as a critical indicator of levels of control through analysis of the 1946-1949 Greek civil wars. Kalyvas identifies five zones of control:

1. Full government control (permanent incumbent garrison)
2. Leaning government (sporadic/underground disputes)
3. Highly contested (active insurgency)
4. Leaning rebel (free operation of insurgents)
5. Full rebel control (permanent insurgency garrison with no incumbent activity)

I build on the model by Anders (2020), which calculates changes in control based on the use of conventional attacks (recorded in the GED) and terrorist attacks (recorded in the GTD) via a Hidden Markov Model (HMM). Anders operationalizes Kalyvas (2006)’s finding that rebel groups are more likely to resort to terror attacks when their position is weaker vis-à-vis the government. While terrorist tactics are used by actors with low levels of territorial control, extremist violence can nevertheless play an important role in sabotaging peace agreements by persuading the establishment a more moderate opposition group will not stop the attacks and cannot be trusted to implement a peace deal (Kydd and Walter, 2002); the presence of terrorist attacks still features as contestation in the model, albeit at lower control levels.

The HMM relates each latent state (control) to the current observable expression (rebel action) and the previous state (former level of control). Territorial control is measured over a hexagonal grid units of 25km, with the probabilities for grid cells modified by spatial and temporal decay functions given the likelihood of rebel control in nearby territories at similar points in time. The model integrates the emission probabilities the rebels will attack in a predictable way given their level of control and the transition probabilities that control will shift from one state to another to calculate the most likely sequence of states.¹¹¹

¹¹¹ Each HMM also has a stationary state, or the probabilistic state that would occur by playing infinitely many rounds, represented by the eigenvector p . The *stationary state* facilitates decoding sequences of states that would otherwise require lengthy, iterative applications of Bayes’ rule. The Viterbi algorithm calculates the most likely path by computing the next most probable states in sequence using the probability of the previous state, the transition probability to the next state, and the emission probability that the observed outcome at time t reflects this state (without normalization) (see Arora and Hazan, 2016).

I adapted Anders' model to the ongoing conflict in Mali for the 2011-2019 period in order to account for low-governance spaces. As rebels are more capable of dispersing across territories where the state does not have strong control, I increased Anders' pre-selected spatial and temporal decay factors, drawing on Braithwaite (2010) and Koren and Sarbahi (2018).¹¹² The northern-most desert hinterlands of northern Kidal and Taoudéni (northern Tombouctou) should be excluded from the analytical meaningful region because territorial control can easily permeate these regions in the absence of state authority (leading to over-estimates of government control). However, mapping of Afrobarometer interview locations for the relevant years showed no surveys were conducted in these areas, likely because of their remote, sparsely populated nature. The HMM is also only able to predict control levels for a single actor relative to another, yet Mali has experienced a proliferation of non-state armed and jihadist actors (as well as international peacekeeping forces)¹¹³, who regularly form and break alliances. The model therefore considers all rebel groups, excluding only military coups, as an aggregate rebel actor (and their attacks directed against the state rather than each other or international forces) to map the overall levels of government versus non-government control. This allows for a parsimonious and easily replicable mapping tool without requiring detailed micro-analysis of the conflict.

The following map depicts yearly averages for the HMM for Mali from 2011-2019 with the parameters described above with blue spaces government controlled and red rebel controlled.

¹¹² The choice of spatial and temporal decay parameters in the original Anders model were unmotivated. However, the several replications of the model showed results are highly sensitive to these parameters, so further research might derive the best relationship between the parameters and the regions of study.

¹¹³ During the time period of study, Mali has played host to two French military operations, Serval and Barkhane, the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) with 61 troop contributing countries, various military training missions, specialized counterterrorism task forces and the regional G5 Sahel force. Only attacks against Malian forces (including the relevant G5 Sahel battalions) were considered in the model to isolate control effects of rebel versus state. (Barma, 2017; Piombo, Barma and Levy, 2017 and 2019)



Figure 1: Map of territorial control levels in Mali from 2011-2019

The mapping shows a clear conflict trajectory from no conflict in 2011 to wavering state control in Kidal, Tombouctou and Gao from 2012 until the 2015 peace agreement (the central map), when a proliferation of armed actors in the central regions is mirrored with revitalized fighting in the north — the second conflict moment (Thurston, 2020). This moment further escalates until the state regains some control in 2019 with the deployment of the G5 Sahel and French counterterrorism forces targeting the Liptako. With the exception of the far northern hinterlands, and the initial, rapid capture of Gao in 2012 — for which limited fighting skews the model to overstated levels of government control — the map pairs with similar figures measuring conflict exposure based on ACLED data and with Lebovich’s 2019 analysis of the locations of armed groups¹¹⁴, although some differences are expected as the above map focuses not just on exposure, but control.¹¹⁵ A dataset of monthly control values scaled from 0 (fully rebel) to 1 (fully government) was generated from the model and used in subsequent sections of the analysis.

¹¹⁴ See Lebovich (2019) : https://ecfr.eu/special/sahel_mapping/.

¹¹⁵ Anders (2020) has already verified the model against ACLED data, so I will skip this robustness check. The GED and GTD databases provided the best differentiation among terrorist and non-terrorist attacks for the HMM.

Analysis of Judicial Perceptions

To test the developed hypotheses across Mali's territory at different levels of rebel control, geo-located Afrobarometer survey data on perceptions of the state judiciary, traditional authorities, corruption levels, fairness and the rule of law were analysed against the territorial control values calculated in the previous section. The results show a clear and robust correlation between higher levels of rebel control and lower reported trust in the state judiciary, and trust in traditional authorities is also decreased. Rebel occupation also appears to have a negative but more subdued effect on perceptions of the rule of law, judicial fairness and anti-corruption. Positive gains for the state in previously occupied territories do not correspond to improved judicial perceptions.

Methods

First, I tagged geo-located Afrobarometer data with the corresponding hexagonal grid cell and level of government control during the month of interview using a spatial join function.¹¹⁶ I also computed the average control level for each interview location during the 23 months prior to the survey, which provides the maximum informative interval for the interim periods between surveys conducted during the conflict in December 2012, December 2014 and February 2017 while avoiding overlap. The `control_diff` variable computes the change in control levels during the month of interview compared with the 23 month previous average with negative signs denoting losses in government control. The analysis focuses on the December 2014 and February 2017 surveys, which provide the greatest variation in control levels across territories, with the conflict-onset 2012 data and four rounds of pre-conflict data referenced for comparison.

Analysis and Results

The bulk of the analysis focuses on cumulative linked mixed models (CLMM) and hierarchical linear models combining data from the 2014 and 2017 conflict periods. These models allow for clustering of hierarchical data using fixed and random effects from multiple time periods while retaining the individual level sample size (Gelman and Hill, 2006), and the CLMM is able to capture ordinal outcomes. Mixed effects models are able to eliminate time-invariant confounders, regardless of their measurability or source.

To test the impact of rebel territorial control on perceptions of the state judiciary, a cumulative Link Mixed Model was fitted with the Laplace approximation and a standard logistic regression to capture the ordinal dependent variable with mixed effects in Model 1. Model 1 showed a change from fully rebel to fully government control corresponds *ceteris paribus* to a more positive average judicial system of 1.50 points on a four-point scale (from 0, no trust to 3, complete trust) with a significance level within 0.01 p value. Changes in control values, the `control_diff` variable, when

¹¹⁶ 270 observations had control levels of less than 1 (ranging from 0.25-1) during the month interviewed and 803 observations had experienced some level of rebel control during the 23 months preceding the interview date.

compared to the average control value from the 23 months preceding the survey had a statistically significant ($p < 0.05$), negative effect on trust in courts. This is a compelling result because it shows that while low levels of state control are correlated with decreased trust levels, improving state control does not correspond to repaired trust levels; in fact it appears to have the opposite effect. The statistical results in Model 1 strengthen confidence in H1 and its enduring effects by showing the negative impact of rebel occupation and territorial contestation on trust in the state judicial system. The models are based on the following equation with trust as the dependent variable, random intercepts by region, control values and differences as independent variables, fixed effects control variables, and individual level standard errors.

$$\text{Model 1: Trust in courts} = \alpha_{\text{region}} + \beta_1(\text{control_num}) + \beta_2(\text{control_diff}) + \beta_3(\text{year}) + \beta_4(\text{urbanrural}) + \beta_5(\text{gender}) + \beta_6(\text{education}) + \beta_7(\text{employment}) + e_i$$

Model 2 and 3 follow similar equations testing for trust in traditional authorities and trust in religious authorities respectively. Model 2 charts similar although dampened patterns for trust in traditional authorities who often remain active during periods of territorial contestation and rebel control. These results add explanatory power towards H2. As conflict-affect communities turn increasingly towards traditional mechanisms for dispute resolution, they become gradually dissatisfied with them (losing trust in traditional authorities about half as much as in the state). This reflects mixed perceptions of how traditional authorities have filled judicial vacuums from the qualitative findings. A loss in governmental control does not appear to have any statistically significant impact on perceptions of religious figures (Model 3).

Rural communities were moderately more trusting of the state (0.37 points) and traditional authorities (0.54). Significant trends for some facets of education and employment surfaced when both were included in the models, suggesting decreasing trust levels in traditional authorities with linearly increasing education level (-1.51) and slightly elevated perceptions in state judiciaries among the highly employed. Regional clusters had unique intercepts and significant differences, which supports the choice of random-intercept model clustered at the regional level.

| | Model 1 | Model 2 | Model 3 |
|-------------------------------|-------------------|--------------------|-------------------|
| control_num | 1.51** (0.51) | 1.52** (0.56) | 0.48 (0.58) |
| control_diff | -0.93* (0.43) | -0.86 (0.48) | -0.26 (0.49) |
| year | -0.05 (0.03) | 0.04 (0.03) | -0.02 (0.04) |
| URBRURrural | 0.36** (0.13) | 0.55*** (0.14) | 0.22 (0.14) |
| genderfemale | 0.28*** (0.08) | 0.02 (0.09) | 0.19* (0.09) |
| employment1 | 0.18 (0.12) | -0.05 (0.14) | 0.17 (0.15) |
| employment2 | 0.12 (0.14) | -0.25 (0.15) | -0.23 (0.16) |
| employment3 | 0.35* (0.15) | -0.18 (0.16) | -0.29 (0.16) |
| edu.L | -0.74 (0.48) | -1.52** (0.50) | -1.45** (0.47) |
| edu.Q | 0.06 (0.49) | -0.75 (0.51) | -0.36 (0.47) |
| edu.C | 0.31 (0.44) | -0.17 (0.46) | -0.03 (0.43) |
| edu^4 | 0.20 (0.35) | 0.06 (0.37) | -0.16 (0.35) |
| edu^5 | 0.06 (0.28) | 0.36 (0.29) | 0.29 (0.28) |
| edu^6 | 0.34 (0.24) | 0.08 (0.24) | 0.19 (0.24) |
| edu^7 | 0.33 (0.23) | 0.08 (0.23) | 0.32 (0.23) |
| edu^8 | 0.19 (0.22) | 0.19 (0.23) | 0.15 (0.23) |
| edu^9 | 0.06 (0.19) | -0.15 (0.21) | 0.26 (0.21) |
| 0 1 | 1.20* (0.55) | -0.71 (0.62) | -1.92** (0.63) |
| 1 2 | 2.31*** (0.55) | 0.67 (0.62) | -0.62 (0.62) |
| 2 3 | 3.33*** (0.56) | 1.70** (0.62) | 0.35 (0.62) |
| 3 9 | | 10.05*** (1.18) | 8.80*** (1.18) |
| Log Likelihood | -2984.22 | -2247.50 | -2192.65 |
| AIC | 6010.45 | 4539.00 | 4429.30 |
| BIC | 6130.28 | 4664.55 | 4554.84 |
| Num. obs. | 2223 | 2223 | 2223 |
| Groups (region) | 9 | 9 | 9 |
| Variance: region: (Intercept) | 0.16 | 0.26 | 0.15 |

*** p < 0.001; ** p < 0.01; * p < 0.05

Statistical models

Figure 2: CLMMs of trust in state, traditional and religious judicial authorities

Perceptions of Judicial Fairness, Corruption and the Rule of Law

A number of scaled indicators were developed to test different angles of the hypotheses including assessments of the rule of law, judicial fairness and equity and judicial corruption. Each indicator combines relevant questions of the Afrobarometer surveys and scales response from 1 (most negative) to 4 (most positive). These indicators contribute to understanding of perceptions of judicial process. In addition to allowing for data clustering and random effects at the regional level, I also introduced a fixed effects control variable 'peri' which assigned periphery regions higher numbers of an ordered factor with Bamako assigned the minimum value of zero.

The level of state control over the territory was significant across all three models. Higher levels of state control corresponded with moderately higher views of judicial fairness and equity (0.58) and the application of the rule of law (0.56), as well as more favourable views on judicial corruption (0.68). Change in conflict had statistically significant and negative values for rule of law and corruption, which might seem surprising at first, as increases in state control should correspond to better perceptions of the rule of law. However, changes in state control levels, even if positive, could be seen as counter-productive to establishing the rule of law; large values of the control_diff variable imply greater control variation and therefore poor levels over the past 23 months, which translated to lower judicial perceptions. The fairness indicator also showed a slight national level decline over time (- 0.06 points per year), and men (and to a lesser extent the more educated) seemed more prone to view judges as corrupt. The fixed effect peri variable did not yield any significant effect, which is expected because these effects are accounted for in the random intercepts by region.

| | Rule of Law | Fairness | Corruption |
|-------------------------|--------------------|--------------------|--------------------|
| (Intercept) | 2.70*** (0.24) | 2.54*** (0.24) | 1.69*** (0.33) |
| control_num | 0.56** (0.18) | 0.58** (0.20) | 0.68* (0.27) |
| control_diff | -0.83*** (0.15) | -0.19 (0.17) | -0.63** (0.22) |
| URBRURurban | -0.02 (0.05) | 0.05 (0.05) | -0.05 (0.07) |
| year | 0.00 (0.01) | -0.06*** (0.01) | -0.01 (0.02) |
| peri | 0.02 (0.07) | -0.05 (0.05) | 0.04 (0.07) |
| gendermale | 0.06* (0.03) | -0.04 (0.03) | -0.14*** (0.04) |
| edu | 0.01 (0.01) | -0.00 (0.01) | -0.02* (0.01) |
| employment | -0.03* (0.01) | 0.04* (0.02) | 0.01 (0.02) |
| AIC | 3749.26 | 4543.93 | 5815.29 |
| BIC | 3810.90 | 4606.17 | 5877.52 |
| Log Likelihood | -1863.63 | -2260.97 | -2896.64 |
| Num. obs. | 2005 | 2117 | 2117 |
| Num. groups: region | 7 | 7 | 7 |
| Var: region (Intercept) | 0.05 | 0.02 | 0.04 |
| Var: Residual | 0.36 | 0.48 | 0.88 |

*** p < 0.001; ** p < 0.01; * p < 0.05

Statistical models

Figure 3: HLMs of rule of law, fairness and (anti-)corruption perceptions

Robustness Checks and National Trends

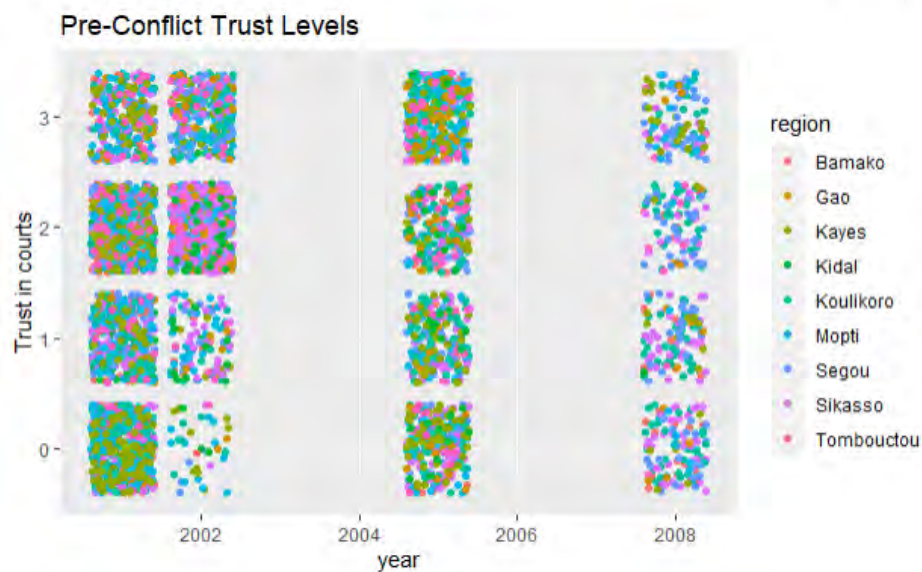
To check robustness of the findings and examine directional trends, I conducted additional ordinal logit models without random effects. A significant correlation between territorial control and perceptions of state and traditional judicial authorities, as well as perceptions of judicial fairness, the rule of law and corruption held across all models, including when clustering standard errors by region. The result was robust across models with different combinations of control variables, as well as among an ordinal logit model without random effects, an OLS model with the dependent variable as a numeric score and a hierarchical linear model with clusters for year and region.

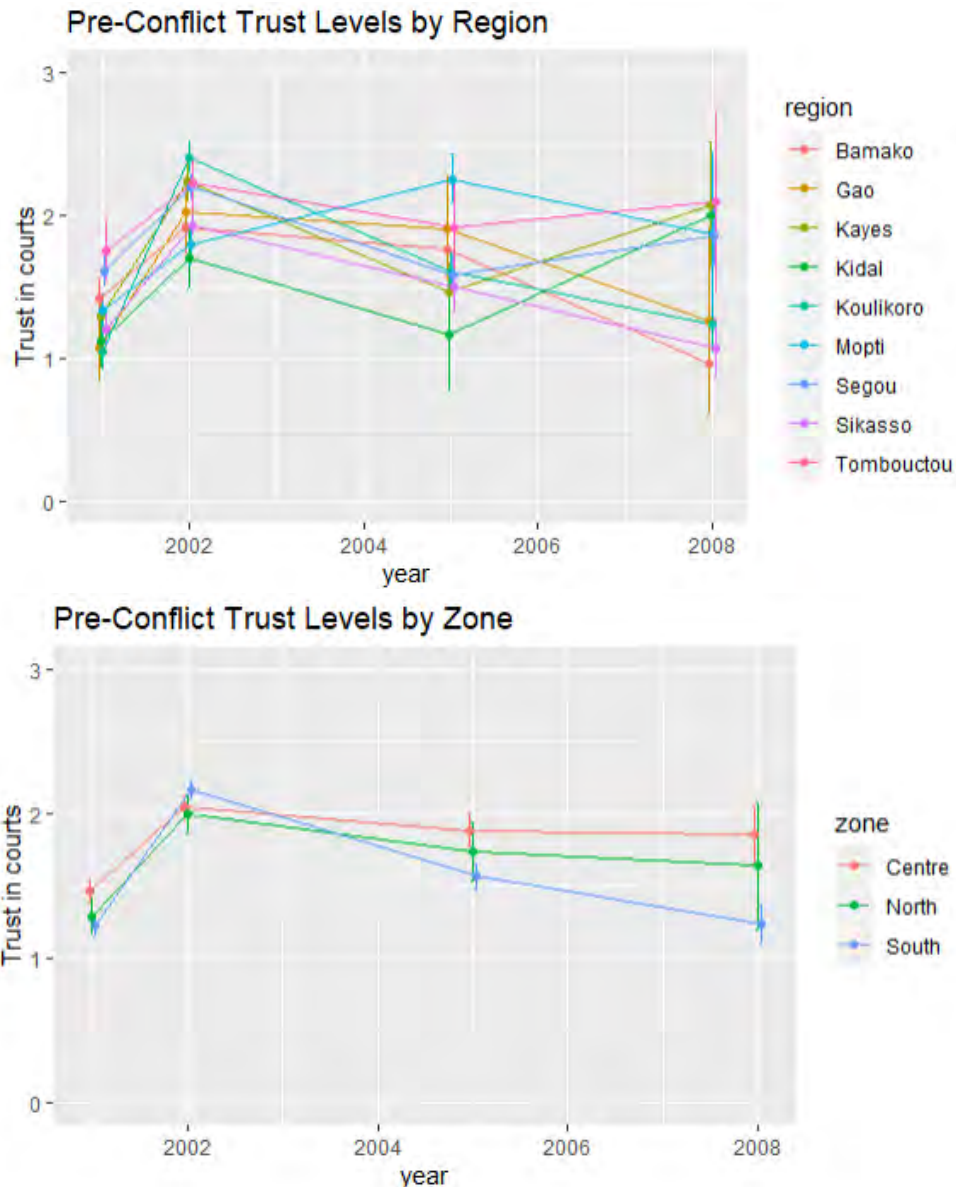
Finally, a series of ordinal logit and OLS models were run to test overall national effects of time on the outcomes of interest irrespective of levels of control. Perceptions of the national courts do not appear to have improved following the 2015 Algiers Accords and subsequent initiatives even

in zones not acutely impacted by the conflict, a finding complimented by waning impressions of rule of law, particularly in rural communities, as well as of fairness and judicial corruption. Interaction terms for year and most regions were significant in models not including control levels — reinforcing justification for clustering at the region in testing control levels, as the interaction term implicitly captures regional shifts in control. The interactive effect on trust in courts was strongest in Mopti, which experienced the most dramatic shift in conflict from 2014 to 2017.

Pre-Conflict Trend Analysis

Trust in courts increased from 2001 to 2002 but decreased again in 2005 and began to stabilise in 2008, although these trends varied by region. The global mean for trust in courts was 2.79/3 in 2005 and 2.59/3 in 2008. Fig. 4 shows populated data points for trust in courts across different years colour coded by region, as well as average values by region and by broader zone. While judicial trust decreased in Gao from 2002-2008, it increased in other conflict regions, Tomboutou and Kidal, from 2005-2008. In Mopti, trust peaked in 2005 but returned to levels close to 2002 in 2008.





Figures 4-6: Pre-Conflict trends in court trust by year, region and zone

Broad confidence intervals make it difficult to articulate trends, and data for the northern regions is not available in the conflict-onset dataset in 2012, but there does not appear a time-dependent trend particular to the regions of conflict of the magnitude of our results from Model 1. The regional perceptions of the judiciary leading up to the conflict do not correlate with indicators of state capacity based on travel time to Bamako mapped in Müller-Crepon (2021). This adds credence to H1 that deteriorating perceptions of the state judiciary result from losses of state control related to the conflict rather than pre-existing access issues.

Perceptions of the state judiciary were decreasing to the greatest degree in the south leading up to the conflict, which might indicate perceptions of judicial systems are not good predictors for

conflict. This also strengthens the results of Model 1 because it implies correlations are unlikely to arise from reverse causality – lower perceptions of state judiciary do not generate more conflict. To formalize this and test reverse causality, I regressed trust in courts in 2008 (the latest year before the conflict with available data in the north) with control values at the conflict onset.

| | Conflict Onset |
|--|--------------------|
| (Intercept) | 0.99*** (0.00) |
| trustcourts.L | -0.00 (0.00) |
| trustcourts.Q | -0.00 (0.00) |
| trustcourts.C | 0.00 (0.00) |
| trustcourts^4 | -0.00 (0.00) |
| regionKoulikoro | -0.00 (0.00) |
| regionSikasso | 0.00 (0.00) |
| regionSegou | -0.01*** (0.00) |
| regionMopti | -0.06*** (0.00) |
| regionTombouctou | -0.10*** (0.01) |
| regionGao | -0.12*** (0.01) |
| regionKidal | -0.16*** (0.01) |
| regionBamako | 0.01 (0.00) |
| URBRURrural | 0.01*** (0.00) |
| AIC | -4763.96 |
| BIC | -4687.29 |
| Log Likelihood | 2396.98 |
| Deviance | 1.44 |
| Num. obs. | 1226 |
| *** p < 0.001; ** p < 0.01; * p < 0.05 Statistical models | |

Figure 7: Reverse-causality check for conflict onset data

Pre-conflict levels of trust in courts had no significant effect on conflict onset, indicating pre-existing judicial perceptions do not incite conflict yet judicial trust varies with levels of rebel control once the conflict has begun. While socio-tropic levels of trust in the state judicial systems in specific locations do not appear an indicator for conflict onset, alternative studies show evidence that deteriorating trust as a result of insecurity may fuel violence at the individual level.

Grievances against state institutions and inter-ethnic cleavages represented the most recurrent factor leading to engagement in violence among interviewed inmates at Bamako Central Prison by the United Nations Inter-Regional Crime and Justice Research Institute and the International Centre for Counter-Terrorism between 2016 and 2019 (Vermeesch and Dal Santo, 2020).

Interviewees cited frustrations and neglect from state authorities and institutions and lack of access to justice as motivations to join armed groups. Seventy-one percent of respondents in a 2017 UNDP survey studying violent extremism in Africa pointed to 'government action' including the killing or arrest of a relative or friend as the incident that prompted them to join an extremist group (UNDP, 2017). Although regression studies cannot control for all temporally linked confounders, the quantitative data and field research support the causal direction outlined in my framework. Socio-tropic trust levels do not appear to predict conflict, but individual experiences of injustice may prompt engagement in violence within established rebel groups in the area. In this way, evidence from the Bamako prison does not undermine these results, but rather bolsters the salience of H1 and suggests potential a feedback mechanism for conflict recidivism.

Synthesis and Discussion

The above analysis provides strong support the hypotheses of decreased trust in state judicial authorities in areas that have experienced losses in state control, as well as a lack of balancing increase in trust in traditional authorities. Qualitative evidence from a parallel set of case studies suggests these processes may become entrenched in communities and difficult to reverse, despite reform programmes. This elucidates some of the complications associated with programmes aimed at improving SGD 16 in conflict and post-conflict settings.

Case studies carried out in Ansongo, Gao and Konna, Mopti documented how insecurity has led to a sense of abandonment from state judicial structures to regulate resource conflicts and prosecute crimes among diverse populations. While geographically, ethnically and politically distinct, populations in both areas shared experiences of the absence of the state judicial structures, a turn towards customary and religious mechanisms and the lack of diffusion of national reform programmes. Interviews also pointed to the transformation of social and political order under jihadist occupation which intermixes with traditional custom (see also Arjona, 2016; Rupesinghe, Naghizadeh and Connen, 2021). By invoking traditional justice as the first jurisprudential reference, followed by Islamic law, jihadist actors occupying Konna have entrenched themselves within communities in ways state authorities never managed to. Traditional and jihadist judicial authorities gave swift and useful outcomes when regulating natural resource conflicts but were not always inclusive of women and other minority groups for criminal cases. Customary and religious avenues for justice do not always provide satisfactory judicial solutions consistent with the inclusivity goals of SGDs 5 and 10 (on achieving gender quality and empowerment and reducing societal inequality) and their influence may exacerbate gender divisions in the post-conflict setting (Cooper, 2018).

The quantitative analysis in this paper implies the 2015 peace accords and programmes emerging from them did not have an overall positive impact on judicial perceptions. Participants in the case studies did not claim programmes such as the CVJR helpful to them (if they had heard of these). In fact, some NGO initiatives turned community members further towards customary authorities in the absence of the state. In this way, efforts to foster collaboration among state and traditional judicial structures increased legitimacy for alternative structures in their ability to bypass the state — emphasizing the difficulties of harmonizing traditional systems with the legal frameworks of the

reigning political authority (see Scharf and Nina, 2001; Englebert and Tull, 2008). Limited legal literacy and social stigma further impeded meaningful engagement with state judicial programmes, and opinions of United Nations initiatives were mixed at best.

A major drawback of topical research is its inability to capture longer temporal trends in relation to conflict recidivism. By focusing on a current conflict, my analysis is unable to fully test the effects of subnational rebel control on longer term perceptions of the state judiciary, in particular the hypotheses of Blair (2021) with regard to UN peacekeeping impacts on the rule of law. Still, the analysis suggests potential limitations or scope conditions on the findings of García-Ponce and Pasquale (2013) and Blair (2021). The violent events identified by García-Ponce and Pasquale may have short-lived effects on augmenting state trust, do not appear to apply to the judicial system and are moot when populations turn instead to rebel governance structures for support. The positive impact UN activities on the rule of law documented by Blair (2021) do not take effect until the state regains control and may have difficulty embedding themselves within localized structures strengthened during occupation periods — therefore the longevity of these programmes remains questionable. The historical analysis of past rebellions in Mali described in the background section, as well as findings from the qualitative studies, bolster this claim.

The results highlight that literature pointing to improvements in social engagement and the robustness of state institutions (Migdal, 2004; Spruyt, 2017) do not account for micro-level processes of disillusionment and emergence of parallel judicial structures in occupied zones, which in turn reshape the social order. ‘State-building theories which assume that empirical statehood is more fundamental than juridical statehood, and that the internal is prior to the international in state formation and survival, are at odds with contemporary African experience’ (Jackson and Rosberg, 1982). Rather, hierarchical social strata, complex governance structures, historical legacies and intricate dynamics among local and national elites complicate questions of legitimacy (Herbst, 2000). This environment facilitates micro-level, zero-sum political squabbles in which one groups’ legitimacy gains detracts from another’s situated differently within an ethnic hierarchy or across ethnic groups.

The outcomes identified in this study place significant strain on this system and its legitimacy, while international programmes do little to counteract this trend. For Osaghae (1994), citizen-based legitimacy underscores the most essential requirement of state-building in societies with a widening gulf between citizens and the state. Legal institutions remain crucial for ensuring horizontal accountability among branches of government and propagating a sense of legitimacy to populations from the centre (O’Donnell, 1996). Political transitions that pave the way for the entry of new groups and the displacement of others generate new expectations to which the emerging state must quickly respond – conflict can render the rebounding of state institutions and services challenging (Sahlin, 1977). As Lipset (1983) observes, ‘after a new social structure is established, if the new system is unable to sustain the expectations of major groups (on the grounds of ‘effectiveness’) for a long enough period to develop legitimacy upon the new basis, a new crisis may develop.’

It is therefore vital to acknowledge power structures and locally-entrenched norms when designing programming aimed to strengthen SGD 16 with regard to access to justice, the rule of law and peacekeeping. Furthermore, approaches targeted primarily at cities do not appear to reach rural communities most affected by rebel group occupation.

Conclusion

This research provides evidence that losses in state territorial control lead to decreased trust in and reliance on the state judiciary, as well as indications that this trend continues even after state authority is restored and judicial reform programmes instituted. The study of Mali emphasizes the need for subnational analysis of rebel control and community perceptions in intrastate conflicts to understand relationships implicit in SGD16. ‘The transformation of African democracies requires good governance that builds the rule of law, not the rule of force or the rule of one man,’ writes the former UN Secretary General Kofi Annan (2012). This analysis has demonstrated some of the ways in which territorial contestation (the rule of force) in conflict complicates the process of building legitimate and inclusive conceptions of the rule of law. Subnational realities of intertwined judicial and security initiatives remain critical to understanding and predicting conflict recidivism, judicial institutionalization and legitimacy in post-colonial democracies.

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Confronting Violence within and between Communities: A Case for the Creation and Strengthening of more Peace and Justice Mechanisms in India and Mali

Talatou Maiga (Utah Valley University, Utah, United States) and
Chitranjali Negi (Supreme Court of India, India)

Abstract

Violence is defined as “the use of physical force, usually with the purpose of injuring or damaging [a] target.” (Bartos & Wehr, 2002; Beer & Packard, 2012; Holbrook & Cook, 2013; Holbrook, 2015; Danziger & Lupo, 2020). Many analysts have broadened the definition of violence, not only by using it interchangeably with the word “conflict”, but also by including in its definition the threats of physical force whether made in person or online, as long as those threats are likely to cause injury or damage to the target. In countries like India and Mali, violence is seen through a wide range of forms. In this study, authors look at the two countries of India and Mali and attempt to answer the following questions:

1-Why is it that despite an increasing number of democracies, legal experts, and mediators, violence/conflict continues to rise in countries like India and Mali?

2-What is missing in the laws and processes that address conflict/violence in the countries under investigation?

3-What kinds of mechanisms might be needed in those two countries in order to empower their institutions and position them to better confront conflict/violence in all their forms?

This work is done with an eye toward the United Nations’ Sustainable Development Goal 16 (SDG 16) which is Peace, Justice and Strong Institutions which means an emphasis is put on why it matters if these two countries get new paradigms or strong institutions for conflict resolutions.

Keywords: Gender violence, mediation, law, conflict resolutions, rebellion, violence against women, public outreach forums.

Purpose of this Paper

This paper aims at examining some major forms of violence against women in India and the recurrence of a violent rebellion in the northern part of Mali. Addressing and resolving these forms of violence by creating and strengthening peace and justice mechanisms or institutions is one of the main goals of SDG 16. In its aspects discussing forms of violence against women, the paper also reveals the relevance, the importance as well as the necessity to work toward of Gender

Equality and the empowerment of all women and girls which are encapsulated under the United Nations Sustainable Development Goal 5 (SDG 5). In each of these two countries, the forms of violence identified have not only been taking place for a long time, but they have also developed into more complicated issues. The results are that entire groups of the population are negatively affected with sexual harassment, assaults, rapes, killings, displaced population, and many other forms of violence.

Design, Methodology, and Approach

First, we start by analyzing the major forms of violence in each of the two countries under examination. In that examination we look at forms of violence that almost take place regularly and their implications for communities in the two countries. We also look at ways in which the forms of violence have directly and negatively affected populations. We look at major and worldwide known cases (India) and a peace agreement (Mali) and their implications for the countries, the impacted populations and for the world. While doing all those, we examine which institutions are currently in place to address those forms of violence or even which ones are missing. Finally, we make suggestions of what needs to be done to address the violence whether it is in terms of creating new institutions or strengthening the ones already in place.

Given the major differences in the nature of the forms of violence under investigation in the two countries of India and Mali, we have found it useful to address each country separately. In that sense, though we have used the five suggested headings through the paper, we have occasionally used some smaller additional ones. The purpose of those smaller additional headings is to guide the reader through the paper and also to account for the specificity of our study. For all the reasons above, given that this is a qualitative study, instead of a “findings” subheading, we have used “Needed changes of paradigms and institutions for more Peace, Justice and Stronger Institutions” in order to keep our recommendations in line with the United Nations SDG 16.

Finally, we position this paper in the context of the United Nations SDG 16 that the organization is working to reach by 2030, which also explains why this topic matters. The main goal of SDG 16 which is Peace, Justice and Strong Institutions while identifying its targets and indicators, clearly states: “conflict [violence], insecurity, weak institutions and limited access to justice remain a great threat to sustainable development.” We agree with this statement and make the case through this paper that by creating new institutions or strengthening the ones already in place to efficiently address the forms of violence discussed in this paper, the countries of India and Mali will not only be more just and peaceful themselves, but will also contribute to the United Nations reaching its SDG 16 by 2030. In other words these two countries will also contribute by the same token to their own sustainable development. Our study makes the case that there is no sustainable development in any country without peace, justice and strong institutions.

Originality and Value of this Paper

Many earlier studies have looked at the forms of violence under investigation in this study with regard to the two countries of India and Mali. However, none of those looked at them in the context of the United Nations SDG 16. United Nations' Sustainable Development Goal 16 centers around promoting peaceful and inclusive societies, providing access to justice for all and building effective, accountable and inclusive institutions at all levels. This paper concurs with the idea that meeting the criteria and targets of peacefulness, inclusivity, access to justice for all as well as accountability, all together, create in countries the necessary conditions for sustainable development.

Finally, we anticipated this study to be an original one and our investigations revealed it to be one in the sense that not much has been done under the angle we took. In many cases, we found people who live these forms of violence to be oblivious of the conditions and the need for institutional or paradigm change to address the violence. An important part of that oblivion comes from some local beliefs and practices that communities buy in and which make addressing issues more complex than it appears.

Analyzing Forms of Violence in India

Introduction

Right from the time of her birth or even before birth a woman could become a victim or target of a crime. Millions of women around the world face abuse and inhumane treatment just because they are women. Human Rights Violence is the major Problem in India. It is rendered complex by the country's large size and population, widespread poverty, the lack of proper education, as well as its diverse culture. Despite its status as one of the world's largest and oldest sovereign, secular, democratic republics, violence against women is one of the biggest problems across the country and it affects women regardless of race, ethnicity, class, and religion.

Violence against women in India refers to physical or sexual violence committed against Indian women, typically by a man. The person may be the husband, father, lover, guardian etc. Common forms of violence against women in India include acts such as child marriage, domestic abuse since childhood till marriage (after marriage), sexual assault, sexual harassment, eve teasing, acid attack, Rape, Gang Rape and murder. Crime against women such as rape, acid throwing, dowry killings, honor killings, and the forced prostitution of young girls and women has been reported in India since very long.

Major Cases of Violence against Women in India

Our analysis of cases of violence against women in India centers around three main ones. It is true that there are many more such cases, but for the purpose of this paper we have limited our work to the ones below. First, we start with some statistics and then we move to the cases themselves. The discussion and analysis of the different cases that follow is important because it

not only helps understand the issues in-depth, but also make a context for the changes and strengthening of institutions that we recommend.

According to the National Crime Records Bureau of India, reported incidents of crime against women increased 6.4% during 2012, and a crime against a woman is committed every three minutes. In 2011, there were greater than 228,650 reported incidents of crime against women, while in 2015, there were over 300,000 reported incidents, therefore a 44% increase in four years. Of the women living in India. The 2012 NCRB report of India states a reported crime rate of 46 per 100,000, rape rate of 2 per 100,000, dowry homicide rate of 0.7 per 100,000 and the rate of domestic cruelty by husband or his relatives as 5.9 per 100,000. A 2014 study in the Lancet states, "Whereas an 8.5% prevalence of sexual violence in the country [India] is among the lowest in the world, it is estimated to affect 27.5 million women in India [given India's large population]. The 2006 survey found that 85% of women who suffered sexual violence, in or outside of marriage, never sought help, and only 1% report it to the police."

To understand the status of Indian women, it is important to understand the history of gender violence in the country. In India's history, Hinduism had a significant role in the state regarding women status and inequality which is visible in its traditions. Sati is an inhumane form of violence against women which is the practice of the immolation of the widow on her dead husband's funeral pyre performed by Hindus of superior class in society. The birth of a girl child is considered a curse for the family even now within some educated and modernized community. In the Indian community women are not conceived as complete citizens because they are considered as men's sexual property (Dobhal, 2011, p.598).

The UN High Commissioner for Human Rights (OHCHR), Navi Pillay, once described rape in India as a 'national problem' and suggested the state to "widen the definition of rape in its Penal Code to reflect the realities of sexual abuse experienced by women" (UN News Centre, 2012). The new law included certain recommendations made by a committee named Justice Verma Committee, which was formed after the 2012-Delhi gang rape case. It provides life imprisonment and even death sentence for rape convicts (Section 376 A) besides stringent punishment for other related offences (Criminal Law Amendment Act, 2013: 02). Nevertheless, India with a high rate of rape cases rejected the United Nations Human Rights Council's (UNHRC) recommendation to enact comprehensive reforms to address sexual violence and all acts of violence against women.

Gang Rape Case

Nirbhaya Case/ Jyoti Singh/ Delhi Gang Rape Case 2012

The most notorious of all rape cases has to be the Delhi gang rape of 2012. The girl named Jyoti Singh was raped by six men while she was travelling in a bus with her friend in New Delhi the National Capital Region. The girl was brutally violated by an iron rod and later died due to her horrific injuries.

Hyderabad Gang Rape/ Priyanka Reddy Case 2019

In the gang rape case of 2019, a horrific incident, a 26-year-old veterinary doctor from Hyderabad was brutally gang raped, murdered and later dumped on the side of a road. According to the Telangana Police, the victim had stopped at a toll plaza at Shamshabad, near Hyderabad with her scooter. Two lorry drivers, along with their assistants, deliberately punctured her vehicle and pretending to help her, took her to the side of a road and pushed her into the bushes. She was later brutally gang raped by the rapists and later murdered.

Kathua Gang Rape & Murder (Child Gang Rape) 2018

The Kathua rape case involved the abduction, gang rape, and murder of an 8-year-old Muslim girl, Asifa Bano, by six Hindu men and a juvenile, in January 2018 in the Rasana village near Kathua in Jammu and Kashmir, India. This case is as horrifying as it can be. Sanji Ram was found to be the main accused in the case. He is the priest of the family temple, where the incident allegedly took place. The post-mortem revealed the presence of clonazepam in the body of the dead girl. The examination by the doctors found that the girl had been drugged with a sedative before she was raped and murdered.

Forensic evidence suggested that she had been held for several days by Sanji Ram, one of the individuals accused of the crime. Strands of hair recovered from the temple matched those taken from the girl. The forensic examination stated that Bano had been raped multiple times by different men, and that she had been strangled to death, as well as hit in the head with a heavy stone. The Delhi Forensic Science Laboratory analyzed 14 packets of evidence containing vaginal swabs, hair strands, blood samples of four accused, viscera of the deceased girl, the girl's frock and salwar, simple clay, and blood stained clay. Vaginal swabs matched with the DNA of the accused as did some other samples. Hair strands found in the temple where Asifa was raped matched that of the girl and the accused.

Dowry, Dowry Death, Murders as Acts of Violence against Women

In India, it is estimated that on average five women face dowry related torture and cruelty every hour. A study conducted in 2010 shows that an Indian woman is burned to death every 90 minutes. This number does not account for the other methods used to murder women whose families fail to meet dowry demands. There were 8,391 reported incidents of dowry-motivated murders in 2010 alone. This is a substantial increase from the 7,000 cases reported in 2003. The transformation of the dowry practice into this current phenomenon has largely been shaped by the low status of women within Indian society. Traditional inheritance laws, for example, prohibit the transfer of property and material assets to women.

As a result, women are often viewed as a burden because valuable family resources, which would otherwise be inherited by the males, are used on their upbringing and dowry. Dowry deaths relate to a bride's suicide or killing committed by her husband and his family soon after the marriage because of their dissatisfaction with the dowry. It is typically the raise of a series of prior domestic

abuses by the husband's family. Most dowry deaths occur when the young woman, unable to bear the harassment and torture, commits suicide. Most of these suicides are by hanging, poisoning or by fire. Sometimes the woman is killed by being set on fire by her husband or in-laws; this is known in the country as "bride burning", and is sometimes disguised as suicide or accident. Death by burning of Indian women has been more frequently attributed to dowry conflicts. In dowry deaths, the groom's family is the perpetrator of murder or suicide.

On that note, it is important to add that a major increase in domestic violence cases was observed during the COVID 19 period as compared to the previous years. The effect of the COVID 19 pandemic on women was unprecedented and worse than before. Between April 2020 and June 2021, a total of 3,748 cases of domestic violence were received. In India, 30 percent of women have experienced domestic violence at least once around age 15, and about 4 percent of pregnant women have experienced spousal violence during a pregnancy.

Needed Changes of Paradigms and Institutions in India for more Peace, Justice, and Stronger Institutions

Peace and Justice are complementary to each other, they go hand in hand. We can't have one without the other. Peace is defined as a social connection. Where physical violence is a tool to achieve political objectives there is no peace or justice. Justice is defined as a state of affairs, a system or systems of law in which every person receives his/her due from the system, including all rights, both natural and legal. Without strong institutions, Peace and Justice are meaningless and they cannot be achieved. In this research paper we are focusing on ways in which addressing this violence as described above can contribute to the United Nations reaching its SDG 16, which is Peace, Justice and Strong Institutions.

In the specific case of India, based on the issues we are discussing in this paper, we believe the ways to address these forms of violence is to engage in reforms or improvements around the following institutions: Reforming the police system, police mentality and redefining what should be the role of Judiciary to make peace and justice. We may contribute to justice systems by improving accessibility, facilitating communication, and assisting government, administration etc. by reforming the police, the judiciary, the legislature as well as some other institutions. We should promote peaceful and conscious societies for sustainable development goals, provide access to justice for all and build effective, accountable and inclusive institutions in India. Being a lawyer, a judge, an educator, an intellectual, a meditator, a law specialist and a law-abiding citizen should mean that people have to work toward safeguarding equal access to justice for women in our society, protecting their fundamental rights, freedoms, and shielding them against torture, abuse, exploitation, discrimination, human trafficking, corruption, and organized crime. This will significantly reduce all forms of violence while promoting peace through strong and accountable institutions.

Police Reform

In India custodial rape has been a major focus of women's rights organizations so much so that it has been codified as an official category of rape defined under law since 1983. Indian law says this type of rape takes advantage of the rapist's position of authority and is therefore subject to extra penalty. Custodial rape primarily means the rape of women committed by a police officer in the premises of the police station.

Under the Constitution, police are governed by states. The primary role of police forces is to uphold and enforce laws, investigate crimes and ensure people's security. In a large and populous country like India, police forces need to be well-equipped, in terms of training, personnel, weaponry, forensic, communication and transport support, to perform their role well.

In 1996, a petition was filed before the Supreme which stated that the police abuse and misuse their powers. The petition alleged non-enforcement, unjust and discriminating application of laws in favor of accused, and it also raised instances of unauthorized detentions, torture, and harassment against ordinary citizens. For example, it might be more helpful if female police officers or social workers would be assigned to deal with women's complaints of dowry harassment, domestic violence, abandonment, rape etc. A major current need is that state governments in India should submit a time-bound plan in which they should undertake and implement the police reforms to protect women from violence and crime.

Judicial Reforms

An analysis of current practices in India's judicial system indicates that there is a need to guarantee speedy justice and a strong judicial system. The terribly low conviction rates for crimes against women is not satisfactory. Apart from implementing police reforms, we also need to ensure that there are adequate number of judges to hear the rape cases and other cases involving crimes against women. Thus, the need is to augment the number of judges to make sure that justice is delivered in a prompt manner. India also needs to establish fast-track courts to ensure speedy justice in rape and cases of sexual harassment and domestic violence. We also need a time-bound action plan by states to deal with pending cases of crimes against women.

Alternative Dispute Resolution

Cases related to other forms of violence like dowry, domestic violence, stalking and eve teasing have undeniably risen in the last couple of years. Section 498-A of the Indian Penal Code, 1860 (IPC) addresses domestic abuse. Domestic Violence is a non-compoundable offense according to section 320 of the Indian Criminal Procedure Code (CrPC). In 2013, the Supreme Court sanctioned all criminal courts for adopting Mediation with regard to specific cases under section 498-A of the IPC, but still no ground level implementation has been done. Thus, it is highly recommended that Alternative Dispute Resolution (ADR) approaches be adopted and the initiative of effective and strong mediation centers will be developed and increased in India to protect the rights of women against the human rights violations.

Lawyer's Professional Training Programs to Deal with Crime against Women

India is a country that has many lawyers. It is, however, surprising to see that their positive impact remains low in terms of protecting women against violence. Fighting gender violence requires the full commitment of lawyers and advocates. This is because violence will nearly always involve a criminal or civil claim, and a lawyer is an essential tool to achieve a successful result with that. Lawyers are very frequently the first point of contact for women who suffer gender violence and lawyers are in a perfect position to identify possible future cases of gender violence, crimes against women, which can arise through family disputes. India needs professionally trained lawyers to give legal support to a victim. Lawyers' professional training by strong mediation centers must be developed.

Need for Strong and Unbiased Media and Enforcement of Media Law and Ethics

Indian media has not been playing effective and positive roles in minimizing violence against women where everyone recognizes that the can and should play a leading role. Given the place they have in society, they could help a great deal in mitigating violence against women. Media's role should be to expose and generate awareness against society's ills and evils, therefore their role should be more effective. Media must be more aware of violence against women. For example, many women have complained that media coverage of rapes, eve teasings, acid attacks and other forms of violence has itself been like a second assault all over again. This was mentioned because of their insensitivity in using pictures, publishing names, and other violations of privacy. In order for the media to play that role, they should be independent and better trained and also ethically informed.

Analyzing Forms of Violence in Mali

Introduction and Contextual Background

Since its political independence from French colonial rule in 1960, the West African country of Mali has experienced multiple periods of political instability: Military coups, internal rebellion and violence (1963-64; 1968; 1990-96; 2006; and in between), as well as a foreign terrorist and narco-criminal invasion (2012-to date). These violent conflicts have, not only built upon one another, but also resulted in thousands of deaths, injuries, rapes, assaults, and displacement of more than 412,000 civilians (UN 2012 report on Mali). In addition to the aforementioned violence, various land conflicts fueled by a hugely corrupt judicial system have regularly occurred between farmers and cattle raisers all over the country with a bigger frequency in central Mali. Nevertheless, among all the conflicts mentioned here, the current one (from 2012 to date) has undoubtedly been the most violent with far more devastating effects than any other one in Mali's history. And the country has yet to pull itself out of it.

The 2012 conflict in Mali started as a joint rebellion of Alqaida and other islamist narco-terrorist affiliated groups combined with a group of Tuareg rebels who, after the collapse of the Libyan regime of M. Gadhafi and based on their internal intelligence about the weakness of the then

Malian regime of President Amadou Toumani Touré (A.T.T.), decided to move their fighting ground to northern Mali. Historically, this has been a geographic area that witnessed earlier Tuareg rebellions, which each one of them somehow connected to Libya. During his four decades in power, it is well known that late Colonel M. Gadhafi, regularly hired Tuareg groups from Mali and other countries into his army. Malians, as well as the international community, remember during the early 1990s Tuareg rebellion in northern Mali Gadhafi's appeal to that community (the Tuaregs) to move to Libya in a bogus claim which alleged that Libya was the motherland of all Tuaregs. For all these reasons, Gadhafi's attempts to open a Libyan consulate in Kidal (the nexus of Malian Tuareg rebellions) years ago was met in Mali with suspicion and outright rejection. Some Malians even saw in those attempts his constant desire to create trouble in that geographic area.

The 2012 invasion by the groups mentioned above resulted in the occupation of almost 2/3rd of the country of Mali. This included the entire administrative regions of Tombouctou, Gao and Kidal, as well as parts of administrative regions of Mopti and Segou. During that occupation, communities witnessed a very harsh degree of violence never reached before in the country: women were raped in wide numbers and forced into marriages with invaders; several people were killed and some others, according to newspapers accounts, got their hands or feet chopped away. Public forms of humiliations and extrajudicial executions regularly took place; children were recruited as soldiers by armed groups; cultural shrines and historical vestiges were destroyed (UN 2012 report on Mali).

During that occupation, some local residents were also used as informants to spy on their neighbors and their communities, thereby creating and maintaining more mistrust within community members on top of the violence described above. The degree to which that violence occurred during the occupation and the recruitment of other locals as informants have left many more people and communities more suspicious than ever of one another. For instance, even though Kidal was the first geographic region to fall under the control of rebel and terrorist groups combined, there has not been any records of rape, hand-chopping, extrajudicial killing, any form of public humiliation or whatsoever in that entire geographic region. Having lived through that kind of environment, people seem to have now learned and discussed (as a survival skill) not to automatically trust their neighbors or other members of their communities anymore. Communities in northern Mali and elsewhere in the country have therefore been deeply fractured and divided.

In addition to the newer forms of the violent conflict described above, Mali has also had traditional conflicts, such as land conflicts between farmers and cattle raisers, which have most of the times been submitted to either some inappropriate traditional ways of conflict resolution (sinankuya [cousinry], cadis, local chiefs, elders or religious leaders, etc.) or to corrupt judges who, unfortunately, end up making those conflicts worse.

Historically, in order to address conflicts, people and communities in Mali have used some local mechanisms like the concept of sinankuya, the involvement of griots, cadis, chiefs, elders and religious leaders). However, these mechanisms, in spite of their many strengths, have also shown serious limitations. As a result of those limitations, most tensions and conflicts they attempted to solve have, instead, continued to linger around and, even often times, as discussed above, risen

up to become bigger and more violent conflicts resulting in numerous injuries, assaults, rapes, deaths and displacement of civilians and thereby adding to the mistrust between communities (Rapport Frederich Ebert Malimètre 2015; UN reports on Mali 2012, 2013).

We recognize, however, that the limitations of traditional mechanisms of mediation and conflict resolution in Mali are not always inherent to those mechanisms themselves, but rather could be related to the interferences of a corrupt judicial system and public administration. Due to the corrupt judicial system in Mali and public administration, many parties who may or may not be connected to judges or officials at a higher administrative level may not have any vested interest in solving the issue through those traditional mechanisms (or forms) of mediation. As a result, those parties may look down on the traditional mechanisms as they may believe that their acquaintances at the higher level will make them win their cases anyway. In such cases, the whole process, therefore, lacks good faith from some parties, which makes it impossible to come to long-lasting mediated agreements. As discussed above, the distrust now unfortunately exists, not only between different communities/ethnic groups, but also within communities, which is made even more complicated by the fact that some of those communities do not even trust the Malian government.

Another limitation of traditional ways of conflict resolution in Mali is related to the fact that, under certain circumstances, traditional forms of conflict resolution/mediation in Mali do not allow enough uninterrupted time for parties to share their concerns before the issue is resolved. This may be due to the amount of respect owed to elders, religious leaders, griots, cadis and other community leaders. The entrenched gerontocracy and religious implications attached to the traditional process allow most of the talk to be done by the mediator usually a griot, a community elder, chief, cadis, or a religious leader, of whom it would be inappropriate for parties to question the insights, suggestions or decisions. So, through those traditional mechanisms of mediation and conflict resolution, in the name of community interest, the terms of agreement may end up being imposed instead allowing parties to fully express their grievances and come to a mediated agreement as a good mediation requires.

Lastly, traditional ways of conflict resolution in Mali are also problematic in the sense that they seem to reproduce the status quo by not supporting women and youth when disputes occur. This is due to the high existence of gerontocracy and patriarchal inclinations within Malian society. This study offers us an opportunity to deeply analyze those aspects.

For all the reasons discussed above, we believe that the nature, scope, duration and recurrence of the conflicts all over Mali, especially in its central and northern parts call for multiple major changes in some institutions as well as ways of supplementing and strengthening some of the ones already in place. This will imply the use of deep and serious (at least medium term) conflict resolution processes which, in addition to tapping into both traditional Malian and western techniques, will also combine all together “transformative”, “performative”, “integrative” and “distributive” strategies in order to address the lingering issues discussed above for a better peace building and reinforcement in the country, mostly in the country’s central and northern parts (Holbrook & Cook, 2013, p55-107; Beer & Packard, 2013). It appears needless to say that

institutions in place in Mali since its political independence in 1960, have failed to prevent and resolve these rebellions and other forms of conflicts which have caused multiple deaths and displaced communities on all sides. The regular recurrence of these rebellions and other forms of conflicts from political independence times to now points to the necessity to address the issues using newer perspectives different from those previously used. United Nations SDG 16 speaks to the need to address such issues in order to promote peaceful and inclusive societies by providing access to justice for all and building effective, accountable and inclusive institutions at all levels.

Needed Changes of Paradigms and Institutions in Mali for more Peace, Justice, and Stronger Institutions

Mediation is a process in which a third person, the mediator, helps parties work together to resolve a conflict or a dispute. Mediation works because it offers a context that takes seriously the issues that are key to parties. Those are mostly issues of "relationships, fairness, emotions, justice, recognition, respect, inclusion, fixing a problem" (Beer & Packard, 2012, p.5). Mediation also works because it provides parties with a structure in which to have very difficult conversations, which may not be available otherwise.

Mali is a very community-oriented country. It is a country in which communities view conflicts as a failure within their structure, their identity, and everyone will work toward the common goal of resolving it. The way mediation works in Mali is well summarized by Holbrook (2015) in his description of traditional techniques of mediation. In traditional Malian mediation, two villagers who have a dispute they cannot resolve may be required to submit to village mediation. This makes total sense in the context given the community-oriented way of life in traditional Malian villages. The community-oriented way of life justifies and strengthens the vested interest of the entire village to end the conflict. In this view, the incapacity of villagers to resolve the conflict or dispute via village mediators is perceived as a lack in or weakness of leadership by not only the villagers, but also the neighboring communities. Neighboring communities also may have some vested interest in the solution of the conflict or dispute, as they know that, traditionally, unresolved conflicts/disputes always possess the ability to spill over to other geographic areas. And indeed, recent developments in the country's current conflict inform us of ways in which unresolved disputes and conflicts, whether related to land, water, youth unemployment, cattle or rebellions can easily spill over to other geographic areas.

During the proceedings of a traditional mediation in Mali, the entire village may attend the mediation, which therefore is not confidential. The mediation is conducted by a traditional mediator – often a village or tribal chief, religious leader, cadis or a griot – who knows the disputants and all the other villagers. This village mediator may not be impartial or neutral by western mediation standards, but he remains, nevertheless committed to finding a mediated agreement: because the dispute is a threat to the stability and harmony of the entire village or community, it is not just between the disputants. The village mediator is motivated to achieve an outcome in mediation that restores and maintains the village's stability and harmony. Therefore, the mediation may not privilege the self-determination of the disputants. They may be required to

accept an outcome imposed on them by the village mediator, or else they will face social sanctions by all other villagers for their refusal to comply with the imposed outcome (Holbrook, 2015).

As one can see this type of mediation, while it may offer many advantages, can also be a source of many other lingering problems. Parties are not necessarily given enough time to speak and discuss their problems. As a consequence, community elders might oftentimes think they have resolved the issue while parties are still feeling hurt. We identified this as the reason why many conflicts which were thought to have been resolved reappear again and again, and in most cases with more frustration and anger. The accumulation of the frustration and anger, sometimes during generations, have resulted in periodic recurrences. This is the case of the rebellion in the country's northern part.

Similarly, the mediation of disputes between former rebels and the Malian government, beyond the political performance, requires concepts and skills that must be adapted from both libertarian and communitarian mediation. This, in other words, calls for a type of mediation coupled with public education and outreach programs or activities (Beierle, 1999). Such a mediation coupled with public outreach programs will offer spaces for communities to speak up, share their pains about disputes and conflicts and find common grounds moving forward. It will also offer them opportunities to have their own local mediators trained with appropriate tools and techniques, which will, in the end, give the communities a stronger sense of ownership and appropriation of the peace building and reinforcement process on the one hand, and the efficient resolution of other forms of conflict within the community.

Given the proportion, the duration and the layers of the violence described above, it is crucial to expand peacebuilding and reinforcement activities to the entire geographic areas affected, i. e. beyond the capital city of Bamako. These will require a crucial involvement of all community members like women and youth who were traditionally excluded from the process in addition to those who have always been at the center of it.

The strategy of involving all these parties and tapping into the local resources in the peace-building/conflict resolution process will have an important advantage in the sense that, while acknowledging the complexities of the challenges to be addressed, it leaves no stakeholder behind in the new process of moving forward. To summarize, the major things that need to happen in Mali to bring more peace and justice in the country and strengthen its institutions are:

- 1-The institutionalization of public outreach forums and activities. Public outreach programs will be places where free speech will be encouraged. The forums will be in public places and participants from villages and cities will freely discuss things that, in their eyes, might result in conflicts if not properly addressed. These will have a preventative value in the sense that they will address the problems within the communities before they escalate. These forums will be led by elders, leaders, women, youth, or respected people in the community who will have been trained in mediation and conflict resolution skills. Many of those leaders and respected people might already have those skills as lay mediators whose families might have conducted mediations in the community for generations.

2- The Institutionalization of mediation and training of community mediators: The community-oriented nature of life in Mali calls for an institutionalization of mediation followed by a robust training of mediators. In every village, county, and city there should be trained mediators who will be ready to mediate issues before they get out of control. In order to have these mediators as part of the conflict resolution institutions, Mali must tap into its cultural resources in order to identify mediators to be trained. Currently in the country, mediation is not a well-developed area and by training more mediators, the judicial system which is mostly seen as corrupt could be strengthened.

Mediators and public outreach forums are meant to supplement and strengthen current institutions and peace-building processes in Mali. By creating and strengthening them, Mali will have better and more powerful institutions to address not only the recurrent rebellions in its northern part, but also all the other forms of conflicts all over the country. These new mechanisms and institutions will not only tap into the local traditions but also be informed by modern conflict resolution techniques with the goal of creating and reinforcing peace, justice and strong institutions in the country. Finally, by doing so Mali will become a more peaceful and just nation which will, in turn, contribute to the United Nations reaching its SDG 16 by 2030.

Research Limitations and Implications

There are many other forms of violence in India beyond the ones discussed here. Issues like custodial rape, dowry, dowry death and murder could have been largely discussed here. For the purpose and the length of this paper we have limited our study to the ones listed here. The other forms of violence faced by women in India could be discussed in subsequent papers coming after this one. We also discussed dispute resolution mechanisms and institutions that will help the country address the forms of violence identified.

Additionally, the forms of conflicts related to Mali discussed in this paper have also been analyzed under many different angles by previous researchers. As we discussed earlier in this paper, the recurrence of rebellions in its northern part and the lingering of other forms of conflicts all over the country point to the relevance and significance of our study. They also constitute an invitation to other researchers to investigate the issues and possibly uncover the multiple layers that might be involved in understanding them. Our study specifically analyzed the issues and made suggestions of new institutions and new paradigms as well as ways to strengthen the institutions and mechanisms that are currently in place. By addressing the identified forms of violence, India and Mali will contribute to the United Nations reaching its SDG 16 which is Peace, Justice and Strong Institutions.

Conclusion

The cases of violence discussed in this paper do not exhaustively describe all the forms of violence in the countries under our investigation. They, however, offered us the opportunity to discuss them and suggest ways in which current institutions in the two countries can either be

strengthened to improve their work of delivering peace and justice or, where necessary, supplemented with additional ones that would work toward the same goals.

Finally, there is a crucial need for both India and Mali to deliver justice and peace in all the areas discussed through this paper. The solutions and recommendations provided are things that either create new institutions and paradigms or strengthen the ones already in place. Those additional institutions might review, support, improve, and even reduce the hurdles for a better delivery of peace and justice. By strengthening their institutions of peace and justice, the countries of India and Mali will substantially contribute to the United Nations reaching its SDG 16 by 2030.

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Remobiliser les Traditions Ancestrales Dans la Construction D'une Paix Durable en Afrique: Un Enjeu de Développement Durable

Jacques Moli (Cameroon)

Résumé

S'il y a une évidence sur laquelle les chercheurs peuvent facilement s'accorder, c'est qu'il n'y a pas de développement véritable d'une société sans la paix. Aussi, en constatant que « le développement est le nouveau nom de la paix », il convient de réfléchir sur les conditions qui garantissent cette paix. Notre présentation examine le rôle que les alliances à plaisanterie peuvent jouer dans la prévention et la résolution des conflits en Afrique. La tradition des alliances à plaisanterie entre membres de différentes communautés ethniques bien connue sur le continent, apparaît comme un levier mobilisable pour la quête de la paix. Les alliances à plaisanterie promeuvent en effet les relations de bon voisinage, d'entraide et de soutien réciproque entre les communautés. Nous soutenons que cette tradition séculaire, toujours vivante dans l'esprit de nombreux Africains, surtout ceux du monde rural, pourrait faire l'objet d'une remobilisation par les décideurs politiques contemporains pour faciliter la paix entre les communautés locales. Comment pourrait-on y parvenir ? Tel est l'objet de notre présentation.

Introduction

Dans sa quête de paix, pour assurer un avenir meilleur aux populations du continent, l'Union Africaine pourrait s'inspirer des traditions ancestrales dans la construction du vivre ensemble harmonieux. Parmi ces traditions, nous portons notre attention sur l'héritage des alliances à plaisanteries, qui sont une tradition séculaire, vécue sur toute l'étendue de l'Afrique Subsaharienne.

D'entrée de jeu, il convient de préciser qu'une alliance à plaisanterie est à distinguer d'une parenté à plaisanterie, même s'il est vrai que les deux traditions participent du même principe. En effet, une parenté à plaisanteries est restreinte au sein d'une famille, faite des liens de consanguinité ou de mariage, tandis qu'une alliance à plaisanteries repose sur un lien entre deux ou plusieurs groupes ethniques, à travers un pacte d'amitié scellé par leurs ancêtres respectifs. Ce pacte d'amitié, très généralement un pacte de sang, est régi par un code de plaisanteries qui rendent joyeuses, les retrouvailles entre membres desdits groupes ethniques. Chose importante, ce pacte d'amitié impose une obligation de non agression des uns envers les autres, d'assistance mutuelle en cas de menace, et de partage consensuel des ressources économiques de leur environnement commun (Sissao2002 : 6).

Au vu de ce qui précède, nous sommes en droit de nous poser la question suivante : que peut-on faire, pour que les savoirs endogènes, à l'instar des alliances à plaisanterie, servent de fondation pour la construction d'une paix, et d'un développement durable du continent africain ?

Notre hypothèse postule que les alliances à plaisanteries peuvent être mobilisées comme ferment pour la construction d'une architecture africaine de paix, de sécurité et d'intégration en Afrique. Pour en donner une illustration, nous allons indiquer pourquoi il est important de recourir aux traditions ancestrales pour construire la paix en Afrique (I), nous allons par la suite schématiser une esquisse de complexe de sécurité africain, fondé sur les alliances à plaisanteries (II) et enfin nous allons relever la contribution de cette tradition dans l'atteinte des objectifs du développement durable (III).

Pourquoi Recourir aux Traditions Ancestrales pour Bâtir un Complexe de Sécurité en Afrique ?

L'oubli de soi, de ses origines, de ses traditions, est mortel pour un peuple. En paraphrasant ainsi les propos du griot manding Wa kamissoko (Youssouf Tata Cissé et Wa Kamissoko : 1988), nous voulons insister sur une évidence : chaque peuple, chaque civilisation bâtit son avenir en s'appuyant sur l'héritage ancestral. Ce chemin a malheureusement été longtemps ignoré par l'Union Africaine.

Samuel Huntington le formule assez clairement, lorsqu'il souligne qu'à chaque époque de l'histoire humaine, les peuples s'efforcent toujours de répondre à la question « qui sommes-nous ? » très souvent, la réponse à cette question, qui préfigure les réponses qu'ils apporteront aux défis qui les interpellent, se résume en la définition de leurs identités, qui prennent sources dans leurs traditions (Huntington 2000 :135). Et le même auteur d'affirmer que la réponse à la question ci-dessus posée est cruciale, dans la mesure où nous ne pouvons calculer et agir dans le sens bien compris de nos intérêts, que si nous nous sommes définis clairement. Il apparaît donc important pour les décideurs communautaires africains, d'avoir une bonne connaissance de ce qui caractérise l'identité culturelle africaine, dans ses grandes lignes directrices tracées par Cheikh Anta Diop et ses continuateurs.

Cet examen approfondi et méticuleux de l'identité culturelle africaine fait apparaître un ensemble de traits caractéristiques, parmi lesquels l'on peut classer la tradition des alliances à plaisanteries. On note en effet que cette tradition est présente dans toutes les régions d'Afrique subsaharienne. C'est ainsi qu'elle se nomme *saanankuya* en Malinke, *Njongu* et *kallegoraaxu* en Soninke, *kal* et *gamu* en Wolof, *dendiragu njongu* et *hoolaré* en Peulh, *Masiir* en Serer, *Agilor* en Dioula, *Rakire* en Moore, *Ubuse* en kinyarwanda, *Utani* en Kiswahili, *Bamungwe* en Bemba du Congo Kinshasa, *Wusensi* en Lunda (Cannut et Smith 2006 : 690), avus so chez les Beti, *Bulu Fang* du Cameroun, du Gabon , de la Guinée Equatoriale et du Congo Brazzaville, *Mandjara* chez les peuples du Cameroun central (Bamoun, Bafia, Baboute, Banso, Mbum et Tikar). Cette énumération est juste indicative. Voyons à présent comment construire une architecture de paix sur cette tradition commune.

Essai de Schématisation d'un Complexe de Sécurité

Pour une meilleure compréhension de la tradition dont nous parlons, il convient de l'illustrer par un cas pratique. Dans un passé plus ou moins lointain, deux tribus A et B vivaient côte à côte. Voila qu'un jour, un jeune homme intrépide de la tribu B enlève l'épouse d'un dignitaire de la tribu A. Offensé, ce dernier appelle les siens en conseil, et décide de châtier le jeune homme auteur du rapt. Il s'ensuit une confrontation généralisée entre les membres des tribus des belligérants. Un homme de valeur de la tribu C, qui entretient de bonnes relations avec les deux tribus s'interpose, et invite les protagonistes à une palabre de conciliation. Cette palabre se conclut par la décision de restituer l'épouse enlevée au légitime époux, assorti de l'obligation pour la tribu du jeune homme auteur du rapt à fournir une chèvre, pour procéder au sacrifice scellant la réconciliation. Les chefs des tribus belligérantes procèdent au sacrifice de réconciliation, aspergent les protagonistes du sang de la chèvre sacrifiée, après avoir prononcé des formules consacrées, en jurant que quelque soit le membre de l'un des deux clans qui oserait encore poser un acte susceptible de rompre l'harmonie retrouvée, ce dernier encourt la malédiction des ancêtres. Cette paix scellée de génération en génération, est assortie d'un ensemble de codes de plaisanteries, que se doivent d'échanger les membres des ethnies jadis belligérantes, pour pacifier leurs relations.

Or, il se trouve que ces deux tribus ont chacune de son côté, un faisceau d'alliés, qui part effet d'entraînement, intègrent ce pacte d'alliance. C'est ainsi que partant du cercle des tribus participants au cercle des alliances de l'avus so, qui est l'appellation de l'alliance à plaisanteries de chez nombre de tribus du Sud Cameroun, nous avons pu identifier une chaîne d'alliés qui couvre quatre pays de l'Afrique Centrale (Cameroun, Gabon, Guinée Equatoriale, Congo).

L'avus so du Sud Cameroun trouve sa prolongation dans le Cameroun Central à travers la jonction qu'il fait avec la tradition similaire du Mandjara et du Labi, vivace dans cette partie du pays. De fait, cette tradition propre aux ethnies Baboute, Tikar, Bamoun, Bansa, Bafia, Mboum, Gbaya, Laka et Sara, fait jonction avec les tribus participants à l'avus so à travers la tribu Sanaga, qui a la particularité d'appartenir aux deux cercles. Ainsi, en sus des pays d'Afrique Centrale précités, l'on peut ajouter le Tchad, la République Centrafricaine situés à l'Est du Cameroun, et une partie du Nigeria à l'Ouest.

Or, les Mboum qui sont un peuple pivot au niveau du Cameroun Central, sont liés par une parenté à plaisanteries aux Peulh, qui eux même participent du vaste réseau de parenté à plaisanteries du Hoolaré, qui essaime depuis le Sénégal, jusqu'au Soudan, en passant par la Guinée, le Mali, le Burkina Faso, le Niger, le Nigeria, le Cameroun, le Tchad, et la République Centrafricaine (pour de plus amples explications et illustrations schématiques, voir mon article cité en première page, téléchargeable gratuitement sur le site du CODESRIA).

C'est pourquoi, rappelant l'argument de Samuel Huntington, qui indique que l'identité et l'appartenance se construisent par strates successives, nous pensons que l'architecture africaine de paix, de sécurité et d'intégration peut se construire par l'identification à plusieurs strates successives d'alliances à plaisanteries. Ainsi, de même qu'un soldat appartenant à une armée

s'identifie tout d'abord par sa section, puis son régiment, puis son bataillon, puis sa division, puis son corps d'arme et enfin à son armée, de même, un citoyen africain originaire du Cameroun pourra s'identifié par les cercles concentriques des alliances à plaisanteries auxquelles son ethnie appartient.

Ainsi, le Beti du Sud Cameroun s'identifiera à l'*avus so* de prime à bord, puis au Mandjara et Labi, puis en définitive, au *hollaré*. De même, le Peulh d'Afrique de l'Ouest s'identifiera par référence successive aux cercles d'alliances à plaisanterie du *hollaré*, puis du *mandjara* et *labi*, puis de l'*avus so*. Ainsi, partant d'un travail méticuleux sur les traditions d'origines des peuples africains et les alliances à plaisanterie qu'ils ont noué entre eux, l'Union Africaine peut réussir à bâtir une conscience communautaire, propice à la promotion de la paix, de la sécurité et de l'intégration au sein du continent africain sur la base des traditions des alliances à plaisanteries.

Pour une Tradition des Alliances à Plaisanterie au Service de la Justice et de la Paix

Conscient du danger qui consisterait à évoquer la tradition des alliances à plaisanterie comme une panacée susceptible de résoudre tous les conflits ayant émergé ou susceptible de l'être sur le continent, nous voulons relever avec Fabien Eboussi Boulaga que la tradition n'est utile que si elle peut permettre aux générations actuelles de réinventer le monde de leur époque, en s'inspirant de façon lucide de l'héritage ancestral. Cet héritage n'est pas un fétiche qu'il faille brandir pour résoudre les problèmes contemporains, mais une source d'inspiration permettant de créer un monde nouveau sur les vestiges de l'ancien monde. Ainsi, Eboussi Boulaga note que « *...la tradition est le moment où l'Afrique (la tribu, l'ethnie et leur projection agrandie et prophétique) est elle-même source de création culturelle, religieuse et technique, quand, directement elle dialogue avec la nature, celle des hommes et des choses, et élabore des institutions, des savoir-faire et des symboles. En ce sens, la tradition symbolise le moment de l'authenticité africaine...la tradition renvoie à ce que chaque groupe humain a fait des données matérielles pour en faire un monde* » (Eboussi Boulaga 1977 : 156).

En clair, le philosophe Eboussi Boulaga invite les africains à se saisir des réalités ancestrales pour bâtir la modernité africaine. L'une des problématiques majeures du continent en ce début de 21^{ème} siècle reste l'instauration au sein des nations et entre les nations africaines d'un climat de justice et de paix, gage d'un développement humain durable.

Nous avons en ce sens, relevé plus haut de l'une des fonctions essentielles de la tradition des alliances à plaisanterie est la pacification des relations intercommunautaires de façon durable, voir définitive. Ainsi, l'Union Africaine à travers son Conseil de Paix et Sécurité pourrait réinvestir cet héritage ancestral, pour en faire le socle de sa nouvelle architecture de paix et de sécurité. Il pourrait être concrètement question de mettre en place un mécanisme institutionnel dédié à la revitalisation et à la vulgarisation des réseaux et cercles d'alliances à plaisanteries à travers le continent. De la sorte, à travers cette tradition du vivre ensemble harmonieux entre les groupes ethniques, l'on pourrait construire la paix à la base, au niveau communautaire, et remonter de palier en palier, pour atteindre la paix à une échelle nationale, sous régionale, et même continentale.

Une telle approche contribuerait à faire un bon usage de la tradition, pour reprendre une formule de Fabien Ebousssi Boulaga. Ce penseur affirme en effet que « *l'imaginaire est sauvé s'il est projeté en avant, si au lieu d'embellir la mémoire, l'imaginaire se lance à la prospection de l'avenir. La tradition devient prospective si, après avoir critiqué le présent, elle présente le projet d'un monde autre, où règnent des relations humaines autres, où la propriété, le travail, le pouvoir, la culture se vivraient autrement, d'une façon non désintégrée et désintégrant. En présence d'une société aliénée, la tradition donnerait les normes et les modèles d'organisation d'une société plus humaine et d'une rationalité supérieure. Pour sortir du rêve, il faut décrire précisément comment on transposera ce qui était possible dans un contexte agraire (par exemple) et opérant pour de petits groupes humains dans le monde plus vaste et au genre de vie si différents. La tradition devient projet contestataire par la médiation du calcul et de la science, par celle de la politique qui ne néglige aucun détour, aucune résistance, qui prend soin de lever les obstacles et s'assure les moyens de combattre les ennemis. La tradition devient ainsi la condition d'un autre regard sur le réel, d'une distanciation qui permet la création, qui inspire l'audace de refaire toutes les règles du jeu social sur une base radicalement neuve. Elle remplit une fonction expérimentale.* » (Ebousssi Boulaga 1977 : 158-159).

En d'autres termes, l'imagination politique pour bâtir un monde de justice et de paix ne doit pas avoir de limite, et ne doit reculer devant aucun défi à relever pour devenir réalité. La revisitation de l'héritage ancestral en matière de promotion des valeurs de la paix doit interpeller tous les dirigeants, car ce retour aux sources est porteur de germe d'invention d'une nouvelle modernité.

Conclusion

En définitive, nous soutenons que pour construire une architecture de paix et de sécurité authentiquement africaine, l'Union Africaine peut valablement s'appuyer sur ces traditions de coexistence pacifique et de vivre ensemble. De la sorte, à travers des rencontres et festivals organisés par palliés d'alliances, l'on peut culminer vers une rencontre continentale des alliances et parentés à plaisanteries qui fasse sens au désir de paix, d'unité et de prospérité du continent./-

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NB : Nous avons opté pour l'usage de la méthodologie de Harvard pour les citations parce qu'elle nous a souvent été recommandée dans nos communications antérieures.



Entrepreneurship and Peace in Nigeria's Oil Region: Why Sustainable Development Matter

Obasesam Okoi (University of St. Thomas, United States)

Abstract

Entrepreneurship is a central pillar of Nigeria's peacebuilding program, which has contributed to the reduction of insurgent activities in the oil region while helping former insurgents to reintegrate into civilian society. However, entrepreneurship programs that are designed to facilitate peacebuilding are implemented in communities that continue to suffer the effects of decades of an oil industry that has polluted their lands, air, and waters, thereby reinforcing the importance of sustainable development as a critical component of peacebuilding. This article asks, can entrepreneurship contribute to sustainable peace in Nigeria's oil region without progress towards sustainable development? How can sustainable development receive greater priority and attention in the Niger Delta peace process? The study utilized a sequential mixed method design to collect and analyze qualitative and quantitative data in two phases. In the quantitative phase, I administered a standardized questionnaire to ex-insurgents in three states: Akwa Ibom, Rivers, and Bayelsa. The result provided a statistical description of the respondents' opinions concerning the role that entrepreneurship plays in the peace process to generate themes for qualitative interviews with purposefully selected participants. The empirical evidence shows that the peacebuilding program has increased the number of small-scale entrepreneurs throughout the oil region. While this peacebuilding strategy is instrumental to the unwillingness of many ex-insurgents to return to criminal behavior, environmental degradation continues to exacerbate already present pathologies in the oil region. This raises critical concerns about the sustainability of the peacebuilding program and the importance of sustainable development as the pathway to lasting peace.

Keywords: Entrepreneurship; peacebuilding; sustainable development; peace; insurgency; Niger Delta

Introduction

Oil extraction in Nigeria's Niger Delta region has increased the fortunes of energy corporations who operate with impunity while the local communities where these corporations operate are poor, mostly lacking access to social infrastructure, job opportunities, a healthy environment, and clean drinking water (Okoi, 2020; Okonta & Douglas, 2003; Okonta, 2005; Watts, 2008). The immediate direct suffering resulting from the cumulative deterioration of life chances and livelihoods that undermines prospects for sustainable development in the oil region has made violence an inevitable outcome of oil extraction (Chukwuemeka & Aghara, 2010; Idemudia, 2009; Ikelegbe, 2006; Okoi, 2021; Omeje, 2005). A study by Davis (2009) shows that at the peak of the insurgency between 2003 and 2008, Nigeria recorded significant losses in oil revenue as energy

corporations were forced to shut down production due to the activities of local insurgents who perpetrated unspeakable acts of violence targeting oil and gas infrastructure, including the kidnapping of migrant workers. The effect of surging oil prices in the international market and cuts in oil production due to insurgency forced the Nigerian government to implement a robust peacebuilding program to stabilize the oil region by disarming the insurgents, rehabilitating them through a range of psycho-social and educational processes, and building their capacity to reintegrate into civilian society through entrepreneurship training and economic empowerment. This article contributes to the peacebuilding debate by drawing empirical lessons from Nigeria's peacebuilding program to examine the relationship between entrepreneurship and peace.

Research on Nigeria's oil insurgency is rich and plentiful. So far, analytical attention has focused on the structural causes of insurgency (Idemudia, 2009; Idemudia & Ite, 2006; Ikelegbe, 2006; Obi, 2010) and the weaknesses of the peacebuilding program which involves the government's mobilization of material resources to buy peace from insurgents in order to continue oil production (Ajayi & Adesote, 2013; Davidheiser & Nyiayaana, 2011; Obi, 2014; Ikelegbe & Umukoro, 2016; Ushie, 2013). Although the relationship between business peace has been well established, the discussion has mostly emphasized the role that business corporations play in peacemaking (Idemudia, 2017; Forrer & Katsos, 2015; Joseph, Katsos & Daher, 2021). Although entrepreneurship is traditionally associated with self-employment (Brück, Naudé & Verwimp, 2013), the connection to peace has not been fully established in the peacebuilding literature. Scholarly efforts to investigate the role that entrepreneurship could play for local peace and development only lead to research that connects business and peace to ways of improving the lives of vulnerable populations in post-conflict societies (Miklain & Bickel, 2020). Miklain and Bickel (2020, p.677) have examined the relationship between business and peacebuilding and its implication for local economic development, pointing out how peacebuilding initiatives driven by business approaches "can also do more harm than good." This finding is consistent with the work of O'Connor and Labowitz (2017). In the context of Nigeria's peacebuilding program, there is limited empirical research examining the role of entrepreneurship in peacebuilding and how its success can constitute a central plank of sustainable development.

Drawing on empirical research with ex-insurgents this article argues that while entrepreneurship can raise the opportunity cost of violence by addressing the structural causes of oil insurgency, particularly in the local communities where the insurgents come from, this strategy has been less capable of translating into sustainable peace as it generally fails to address environmental injustices prevailing in the oil region that makes the goal of sustainable development difficult to achieve. The implication is that the structural tensions in the oil region and their manifestation in the suffering of local communities lacking access to economic opportunities will continue to raise the cost of peace. How entrepreneurship can meet the demand for peace and raise the living conditions of local populations deserves analytical attention.

Theorizing Entrepreneurship and Peace

Advocates of neoliberal peacebuilding have long dominated the debate on entrepreneurship and peacebuilding, emphasizing the use of private-sector assistance to facilitate ex-combatant re-

integration into post-conflict societies (Giustozzi, 2102). This debate emphasizes the importance of using economic incentives to reintegrate ex-combatants into civilian society by implementing a set of disarmament, demobilization, and reintegration activities (Guistozzi, 2012). As Richmond (2013) noted, neoliberal peacebuilding accords greater privilege to market structures, which, as Marriage (2007) pointed out, gives less attention to the dynamics of armed groups. Neoliberal peacebuilding thus underlies the relationship between development and conflict. This understanding is important because, Ginty and Williams (2009) noted, economic interventions implemented in the context of post-war reconstruction have the potential to produce unintended consequences which can sustain a conflict. But, as Rogers and Ramsbotham (2009) pointed out, economic development will be meaningless when populations affected by conflict live in poverty. The likelihood of a post-conflict society relapsing into violence due to structural challenges (Junne & Verkoren, 2005; Okoi, 2021) means sustainable peace is possible only by creating conditions that would lead to stability of conflict-affected societies (Dunfee & Fort, 2003).

The theoretical connection between entrepreneurship and peacebuilding underlines the argument that reducing poverty can be a more effective strategy for achieving sustainable peace (Rogers & Ramsbotham, 1999; Kolade, 2018; Sümer & Joseph, 2019; Williams, 2008). This argument calls attention to the relationship between economic development and peacebuilding, indicating that entrepreneurship can contribute to peacebuilding when peacebuilding processes focus on conflict-sensitive poverty reduction initiatives (Abdelnour & Branzei, 2010; Desai, Acs & Weitzel, 2013). One way of understanding the complexity of Nigeria's peacebuilding program is through a political economy lens view. Such a perspective captures the economic injustices that manifest in conflict (Wennmann, 2011). As Selby (2008) noted, political economy issues have been known to be of crucial importance to the functioning of peace processes. At the heart of the political economy of peacebuilding is a radical shift away from the fundamental concerns of peacebuilders, such as criminality, poverty, and natural resources, to challenges arising from the unequal distribution of benefits and harms, including questions about who is being marginalized in the process (Selby, 2008, pp.11). These structural challenges are fundamental to the process and outcome of Nigeria's peacebuilding program where the exclusionary process of rewarding the ex-insurgents has punctuated progress toward sustainable peace (Okoi, 2021, pp.152). The dynamics of exclusion and how they play out in the politics of peacebuilding deserve analytical attention when contextualizing the relationship between entrepreneurship and peace in Nigeria's oil region and its implication for sustainable development.

Methodology

This study is based on a sequential mixed-method design that involves the collection and analysis of quantitative data in the first phase, followed by the collection and analysis of qualitative data in the second phase (DeVellis, 1991; Creswell & Clark, 2007). The target population for this study includes the 30,000 registered ex-insurgent in Nigeria's peacebuilding database from the nine states of the Niger Delta region. I selected three states, namely Akwa Ibom, Bayelsa, and the Rivers states for case comparison. My selection criteria took into consideration several variables including the percentage of oil production in each state, the geographic location of oil activities, the level of criminality and violence, and the spread of peacebuilding activities. For example, Akwa

Ibom contributes 20 percent of Nigeria's oil production in offshore locations with ExxonMobil as the dominant energy corporation, and the level of violence is relatively low due primarily to the absence of notorious insurgent groups. Bayelsa contributes 24 percent of oil production in both offshore and onshore locations with Shell as the major energy corporation, and the level of violence is high due to the presence of notorious insurgent groups, such as MEND and Egbesu Boys. Similarly, Rivers contributes 24 percent of Nigeria's oil production in both offshore and onshore locations with Shell as the major oil corporation, and the level of violence is high due to the presence of notorious militant groups such as MEND (Idemudia, 2014). Of the 30,000 registered participants in the peacebuilding database, 1.5% are from Akwa Ibom, 38% are from Bayelsa, and 23% are from Rivers. This population comprises 62.5% of the total number of registered ex-insurgents in the peacebuilding program.

I drew the survey participants from this sampling frame. I administered 396 questionnaires to ex-insurgents in the quantitative phase, representing 2% of the total population of ex-insurgents captured in the peacebuilding database from Akwa Ibom, Rivers, and Bayelsa states. Responses were received from all 396 participants, resulting in a 100% response rate. The quantitative results provided a statistical description of the respondents' opinions concerning entrepreneurship and peace. I used this result to generate themes for context-sensitive qualitative interviews with purposefully selected participants whose firsthand knowledge of the peacebuilding program and familiarity with the entrepreneurship activities undertaken by ex-insurgents in various communities could help answer my research question. As a sequential mixed method design, greater weight was given to the qualitative data while the quantitative data was used to complement the qualitative findings (Bryman, 2006).

In the qualitative phase, I conducted 45 semi-structured interviews with purposefully selected ex-insurgents who are directly involved in the peacebuilding program. The interviews provided an opportunity to work directly with the ex-insurgents in collecting qualitative data, and to ask follow-up questions where I needed to get more in-depth on the topic. The qualitative research questions were designed to elicit responses with regards to what participants think about the impact of entrepreneurship as a peacebuilding strategy as reflected in their personal experiences. The ex-insurgents I interviewed derived their experience from participating in various phases of the peacebuilding program which made them an invaluable source of information. This study, therefore, considered the importance of local context by ensuring the data was grounded in the lived experiences of ex-insurgents. Autesserre's (2010) research in Congo DRC highlighted the importance of seeking out actors who have in-depth knowledge of the peacebuilding program. Throughout the interviews, the key informants spoke on conditions of anonymity, and I used pseudonyms to represent their names to protect their identities.

Contextualizing the Entrepreneurship-Peacebuilding Landscape

Research on the Niger Delta peacebuilding program has mostly focused on the impact of peacebuilding on human capital development (Ajibola, 2005; Ebiede, Langer & Tosun, 2020) while marginalizing the range of entrepreneurship activities coordinated by the federal government through the Office of the Special Adviser to the President on Niger Delta (OSAPND)

to facilitate the economic reintegration of ex-insurgents into civilian society. For example, thousands of ex-insurgents benefitted from the Presidential Amnesty Scholarship to pursue higher education including a variety of vocational training programs locally and overseas. Ikelegbe and Umukoro (2016, p.4) show that the Nigerian government has awarded a scholarship to 2,500 ex-insurgents to pursue tertiary education while 13,000 have received training in local and foreign training centers in 2014. The research community has hardly captured the experience of thousands of ex-insurgents who have received entrepreneurship training and start-up capital to create small enterprises as a reintegration strategy which will help us to better evaluate the role that entrepreneurship plays in peacebuilding through the lens of the ex-insurgents. As the descriptive statistics show, the most impactful reintegration strategies are education, entrepreneurship, and agriculture. I had firsthand experience with several ex-insurgents who identified the various ways the peacebuilding program has contributed to the growth of entrepreneurs in the oil region, selling retail commodities such as electronic gadgets and construction materials or operating fish farms, poultry farms, restaurants, and block molding factories.

I asked the ex-insurgents about their perception of the degree to which reintegration strategies such as entrepreneurship have been successful in reducing the risk of violence in the oil region. About 87.1% of the participants generally agree that entrepreneurship has been an effective strategy for building peace in the oil region because of its capacity to integrate the ex-insurgents into the local economy through the development of small-scale businesses (see Figure 1). To buttress this finding, 83.1% of the ex-insurgents agree that the peacebuilding program has increased the number of entrepreneurs in the Niger Delta (see Figure 2) while 26.3% perceived entrepreneurship as an impactful strategy for local economic development that can lead to violence reduction (see Figure 3). This result is important as 76.1% of the respondents indicated that entrepreneurship remains an effective strategy for addressing youth unemployment (see Figure 4). Some ex-insurgents were empowered with financial resources to establish small businesses while those who chose agriculture as an entrepreneurial vocation received training in poultry farming.

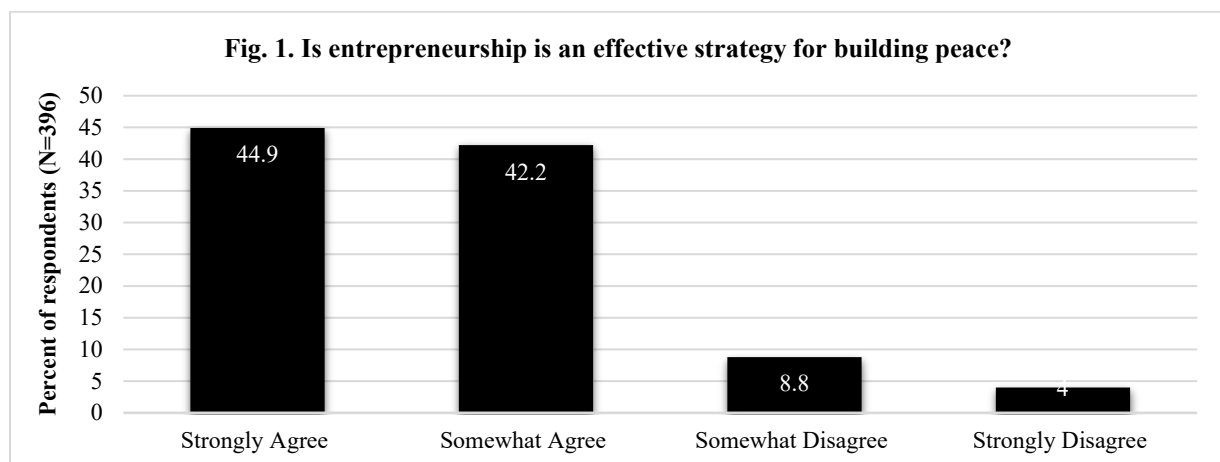
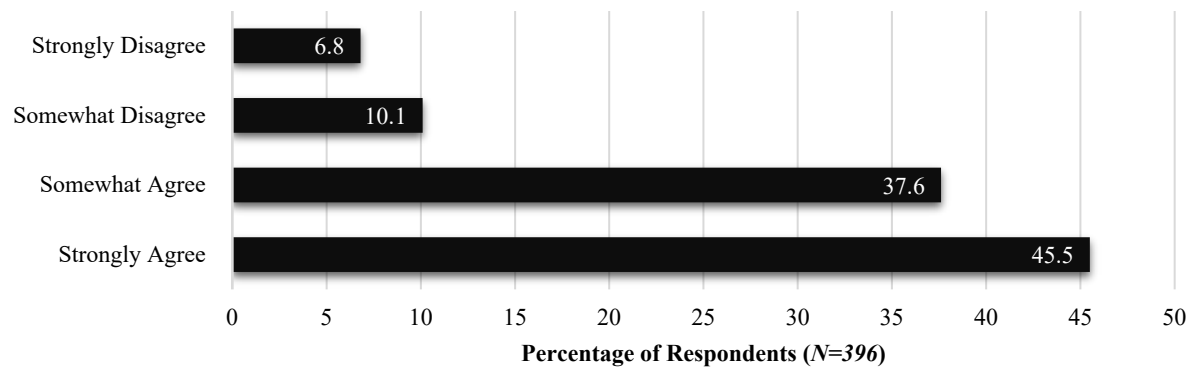
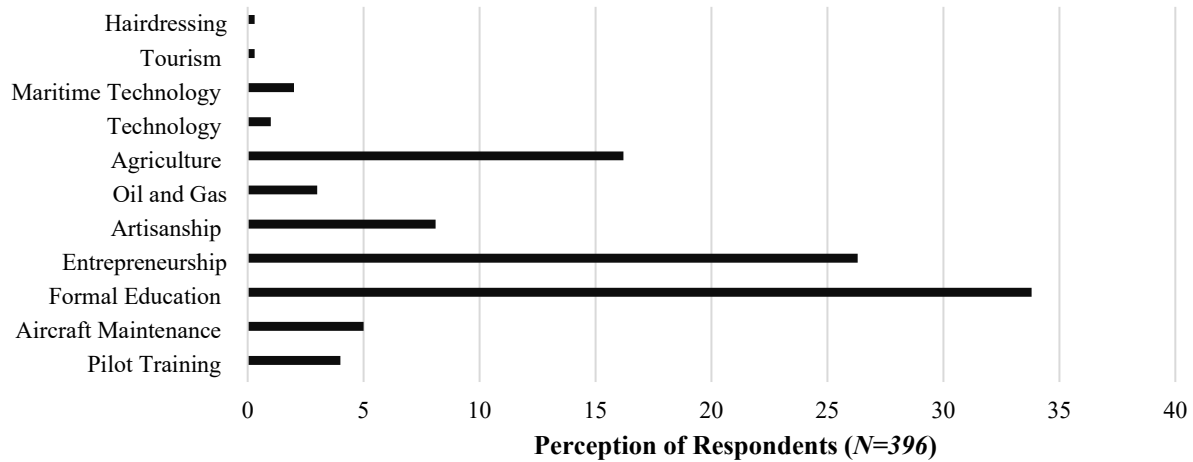
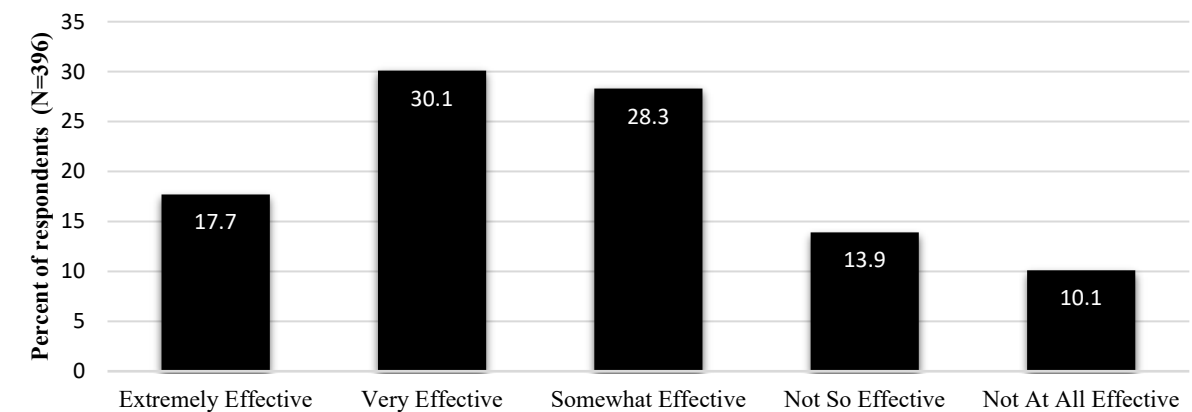


Fig. 2. Has the peace process increased the number of local entrepreneurs?**Fig. 3. Which peacebuilding strategies have greatly impacted the local economy?****Fig. 4. How effective is entrepreneurship in addressing youth unemployment?**

The statistical result shows that the perception of the ex-insurgents concerning the impact of the peacebuilding program on entrepreneurship development is positive. The result is consistent with the perspectives shared by the ex-insurgents I interviewed who told me the entrepreneurship training they received has alleviated their suffering, enabling them to integrate into their local economies while also contributing to peace in their communities. Pugel (2009) shows that in Liberia for example, ex-combatants who completed a course of reintegration training had more success reintegrating into civilian life. The conclusion drawn from the statistical analysis is that entrepreneurship development is a successful strategy for peacebuilding.

A cursory review of the literature reveals the complex challenges of establishing a theoretical connection between economic development and peace. However, a growing body of research has shown that economic development can play an important role in conflict prevention and sustainable peacebuilding (Nest, with Grignon & Kisangani, 2006; Smoljan, 2003; Vernon, 2016). As Bush (1996, pp.18) noted, “the challenge of rebuilding post-conflict societies is to nurture and create the social, economic and political space within which local actors can identify, develop, and employ the resources required to build a peaceful, just, and prosperous society.” This shows that development is a fundamental requirement for peace (Silwal, 2017). Research by Mahmoud and Makoond (2017) equally highlighted the importance of economic opportunities in preventing the outbreak of conflict as well as fostering peaceful societies. In Northern Ireland for example, economic empowerment was fundamental to sustainable conflict resolution (Byrne, 2010). While the Northern Ireland case study is such that economic empowerment was implemented in the context of external economic aid, it provides useful insights into the relationship between economic empowerment and sustainable peace in a post-conflict context.

I had firsthand experience with several ex-insurgents in Rivers and Bayelsa states narrated their experiences as former insurgents and how their participation in the entrepreneurship training enabled them to become business owners, overcome poverty, and refocus their minds away from violent behavior. The transformation of ex-insurgents into local entrepreneurs, while not an exhaustive strategy, suggests that engaging former insurgents in entrepreneurship activities that enable them to achieve economic independence can bring stability to the oil region. Since most conflicts are rooted in rural poverty (Lemus, 2014), business opportunities that focus on lifting rural populations out of poverty can contribute to peacebuilding (Miklian & Bickel, 2020). Business opportunities provide incentives to address the root causes of conflict and can contribute to peacebuilding through economic development. Humphreys and Weinstein (2009) observed that wealth creation was one of the most significant determinants of post-conflict reintegration in Sierra Leone. Therefore, the importance of entrepreneurship cannot be underestimated because, as Cusack & Malmstrom (2010) noted, investing in economic development programs can provide incentives in a highly distorted economic environment. The challenge, as Schoar (2010) pointed out, is that many of the entrepreneurial activities that contribute to economic development are undertaken by vulnerable populations working in the informal sector who create small enterprises to meet their basic income needs.

Okoi (2019) reinforces the potential of entrepreneurship as a practical strategy for engaging ex-insurgents in Nigeria’s oil region in economic activities that can lead to conflict transformation and

potentially redirect their attention away from criminal activities. For example, entrepreneurship training in Nigeria's oil region opened enormous opportunities for ex-insurgents to learn new skills and develop themselves as changemakers. The program transformed local tailors into professional fashion designers and local artisans into professional technicians who now trade their skills for income. This evidence illustrates the peacebuilding program's transformative capacity, particularly in reducing criminal kidnappings while helping former insurgents to rebrand their personalities as they reintegrate into civilian society. An ethnographic study by Ebiede (2016) shows that ex-insurgents who engaged in small-scale enterprises have been able to sustain their businesses. In other words, "sustained reintegration" occurs when ex-combatants transform into productive members of their communities (Knight, 2008, pp.29). In this context, conflict transformation is viewed as an approach to peacebuilding that enables ex-insurgents to be reflective on the consequences of violent behavior and to reimagine their role in community development through participation in productive economic activities as a means of rebuilding broken relationships with their communities (Okoi, 2019). For Lederach (1995, pp.18) conflict transformation is an approach to peacebuilding that involves changing destructive relationship patterns and seeking systemic change." At the heart of this long-term systemic change is the emphasis placed on reconciliation within society.

Implications for Sustainable Development Goals 15 and 16

On September 25, 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development, which recognizes sustainable development as the pathway to the promotion of peaceful and inclusive societies, and provides access to justice, while building effective institutions at all levels. Goal 15 of the United Nations' Sustainable Development Goals (SDGs) dubbed Life on Land, focuses on terrestrial biodiversity conservation and effort to halt and reverse land degradation and biodiversity loss. Similarly, Goal 16 focuses on promoting peaceful and inclusive societies for sustainable development, providing access to justice for all, and building effective, accountable, and inclusive institutions at all levels. Nowhere are sustainable development goals 15 and 16 more relevant than in Nigeria's oil region where the extractive activities of energy corporations generate ecological risks that hinder socioeconomic progress, rendering local populations vulnerable to poverty, food insecurity, health hazards, and conflict. SDG 16 underlines the importance of strengthening social cohesion between citizens and the state, between communities and corporations, and between individuals within a society. But in Nigeria's oil region, declining trust between communities and the state and between communities and corporations due largely to land degradation has led to social, economic, and political polarization that threatens the fabric of peace.

Land degradation in Nigeria's oil region is a significant variable in sustainable development because it affects soil resources, due mostly to intensive oil extraction activities. Degraded land in vulnerable communities affects the lives of local populations who rely on this land for food production and water resources for sustainable livelihoods. Krauss (2022) argues that SDG fails to champion justice in a way that accords priority to human lives and livelihoods while targeting indicators that exacerbate inequalities and prevent social transformation. The key challenge is the failure of SDG 15 to acknowledge the "interdependencies and connections between

conservation and livelihoods and to prioritize justice” (Krauss 2022, p. 3). In a nation like Nigeria where national prosperity is tied to the rents of natural resource extraction, the path to peace is hard, and efforts to promote accountability in the extractive sector have proven difficult. Therefore, sustainable development remains an impossible dream for the inhabitants of many local communities in the oil region whose life chances are dominated by unconscionable levels of pollution while oil extraction continues to exacerbate already present pathologies in these communities.

In 2007 the Nigerian government commissioned the United Nations Environment Program (UNEP) to conduct an independent assessment of the environmental and public health impacts of oil exploration in Ogoniland and recommend viable options for remediation of the endangered ecosystem as a way of strengthening ongoing peacebuilding efforts. The UNEP Report included technical, regulatory, and emergency recommendations that provided invaluable baseline information on the complexity of the challenge and the responsibilities of government, corporate, and community stakeholders. While the report highlighted significant environmental impact in Ogoniland from oil pollution related to historical sources, the Nigerian government was to take the lead in coordinating the various stakeholders while the Shell Petroleum Development Corporation of Nigeria Limited (SPDC) was to implement the remediation of its endangered sites including undertaking emergency measures related to water supply, in collaboration with subnational governments. SPDC has carried out oil and gas exploration and production operations in the Niger Delta since the late 1950s until its operations ceased in Ogoniland in 1993 following a rise in communal violence that threatened its activities and the security of its foreign personnel. Concerns about environmental degradation in the oil region were initially expressed by scholars and environmental rights activists who were outraged by the role that energy corporations play in the region’s under-development. As such, their writings underlined the consequences of oil extraction on the ecological systems that support the livelihoods of vulnerable populations in the oil region (Jike, 2004; Okonta, 2005).

Thus, the UNEP report was an important step in the transformation of company-community relations in the oil region, particularly in Ogoniland. While the Report generated optimism about the prospects of environmental peacebuilding, achieving sustainable peace remains a daunting task due to the limited progress in environmental remediation. Grievances arising from the failure to implement the UNEP recommendations have the potential to cause regressions over time. As these structural factors continue unaddressed, they lead to what Okoi (2021) describes as *punctuated peace*, whereby a stable post-conflict society relapses into repeated cycles of violence due to structural issues that continue unaddressed. According to Lederach, (1995, 19) “conflict can move in destructive or constructive directions.” While SDG 16 promises efforts to end violence, promote the rule of law, strengthen institutions and increase access to justice, this goal remains an aspiration for millions of people in Nigeria’s oil region living in endangered environments that threatens their security and continue to be deprived of basic rights and opportunities. Natural resource extraction, therefore, acts as a threat multiplier that aggravates social, environmental, and political stressors, conditions that lead to the experience of structural violence. Under this condition, interventions focusing on entrepreneurship as a path to peace have been counterproductive.

Although this article has shown that peace can be sustained by meeting the economic needs of the ex-insurgents, the economic conception of peace ignores the widely shared perceptions of ex-insurgents who feel disempowered by their inability to maximize the quality of their lives. According to Adams (2008), people feel empowered when they can maximize the quality of their lives. But peacebuilding must not necessarily develop from the guarantee of a basic income for ex-insurgents without necessarily alleviating environmental inequities. For peacebuilding to be perceived as sustainable, it must be capable of addressing the structural roots of violence, while also engaging in deeper social transformation at all levels of the post-conflict society. This is important because local communities in the oil region are located amidst swamps, rivers, creeks, and mangrove forests while the inhabitants of these communities derive their sustainable livelihoods from the environment. As oil extraction continues to devastate their ecosystem, high concentrations of hydrocarbons from pollution have eroded sustainable sources of livelihood. The long-term consequences of oil extraction on local communities in the oil region include the loss of fisheries and other aquatic resources, destruction of farmlands, reduced agricultural productivity, population displacement, and the spread of water-borne diseases, which eventually translate to poverty, hunger, and diseases. (Afinotan & Ojakorotu, 2009; UNDP, 2006). These concerns remain a central tenet of sustainable development that cannot be ignored in any peacebuilding process where environmental pollution plays a prominent role in driving conflict. The implication is that a peacebuilding program that focuses exclusively on entrepreneurship but gives little attention to environmental conditions prevailing in the oil region cannot be sustainable.

Importantly, sustainable peace would involve providing an environment for the achievement of healthy living conditions. Azar (1990) recognized the important connection between peace and development and argued for a wider conception of security by linking human needs to a broader understanding of “development”. Similarly, Azar (1985, pp. 69) noted that conflict resolution must be measured against the satisfactory removal of underdevelopment, while the state of peace is equated with the level of development. Therefore, sustainable peace will be difficult to achieve without addressing those human needs that can sustain development in their social, economic, and political contexts. Any attempt to suppress these needs would result in unsustainable development (Azar, 2003).

Conclusion

Nigeria's peacebuilding program provides evidence of the important role that entrepreneurship plays in post-conflict peacebuilding processes. This approach to peacebuilding has increased the number of entrepreneurs throughout the oil region selling electronics, construction materials, groceries, or working as small-scale poultry farmers. These entrepreneurship activities have been instrumental to the economic reintegration of ex-insurgents. As such, many ex-insurgents have expressed their unwillingness to return to criminal behavior. But as oil and extraction continue to exacerbate already present pathologies in many local communities across the oil region, it raises critical concerns about the need to incorporate sustainable development goals 15 and 16 in peacebuilding programming. This renewed focus has become imperative to the extent that if we are to bring sustainable peace to the oil region, we cannot undermine the importance of transforming the ways that corporations conduct themselves and their relationship with the

environments where millions of people in local communities depend for their livelihoods. communities.

While entrepreneurship has addressed part of the problem, greater attention must be accorded to environmental conditions in the oil region and the well-being of local communities. This requires efforts to transform environmental risks arising from the unethical practices of energy corporations. This is especially where oil extraction or pipeline construction is carried out without adherence to international best practices. Although energy corporations have begun to realize the importance of conducting themselves as responsible actors by adopting corporate social responsibility principles as the cornerstone of peaceful engagements with communities, their dispositions to encourage a positive impact on the environment and communities mostly favor voluntary mechanisms over regulatory measures of accountability. Responsible corporate practices must move beyond palliative measures to include the implementation of the full scope of the UNEP recommendations, focussing especially on repairing endangered sites while also adopting appropriate technologies with minimal consequences on ecosystems that support life and health systems. There must be legislation that ensures the rights of communities are upheld to the highest degree of importance, that people can live in a society where their dignity is upheld, and where their deepest aspirations can flourish without the next generation inheriting these environmental challenges. Any peace process that ignores these dynamics is not likely to lead the post-conflict society toward sustainability. In other words, peacebuilding processes must be designed in a way that gives considerable attention to the well-being of local communities affected by oil pollution, to ensure they inhabit environments where their dignity is upheld, and where their deepest aspirations can flourish.

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Gender Based Violence in Armed Conflict and Displacement and Sustainable Development Goals: A Case Study in International Law

Nandini Praveen (Government Law College, India)

Abstract

Gender-based violence (GBV) is a continuing reality that takes place during situations of armed conflict and displacements with no regard for human rights or the trauma (physical and mental) that victims have to go through. The vulnerability of victims and the strategic approach of inflicting violence on them is the exploitation of the human body. Most GBVs are gone underreported or considered insignificant by domestic laws which shower injustice on victims who have to suffer the prolonged effects of the event. GBV is an obstruction in the face of achieving gender equality and empowerment of all girls and women, which is one of the most important objectives of the Sustainable Development Goals (SDGs). This paper focuses on the SDG 16 and the SDG 5 with the chosen topic.

The paper uses a doctrinal research method in conjunction with qualitative legal research analysis in the preparation of the research paper. The paper looks at the social, cultural, and political factors that mold the contextual elements in the said narrative. The paper concentrates on the current legal regime in international law and investigates the research hypothesis for future development.

Keywords: Gender-Based Violence, Sustainable Development Goals, Armed Conflict, Displacement, International Law

"War is an inherently patriarchal activity, and rape is one of the most extreme expressions of the patriarchal drive toward masculine domination over the woman. This patriarchal ideology is further enforced by the aggressive character of the war itself, that is to dominate and control another nation or people." (Sajor, 1998)

Introduction

The most widespread and yet the least acknowledged human rights violation in the world is gender-based violence (GBV). GBV is a global public health problem that poses challenges in human health, with a higher prevalence in developing countries. GBV is an abuse of human rights that occurs internationally, in both developing and developed countries, regardless of culture, socioeconomic class, or religion (Muluneh *et al.*, 2020). In the past decade, the relationship between GBV and armed conflicts has received much international attention. The impact and implications of violence against women have led to numerous attempts to address accountability and impunity issues through processes that include access to justice mechanisms. The number

of forcibly displaced people worldwide rose to 90 million by the end of 2021 (UNHCR, 2022). Displacement causes several problems and difficulties for women, especially in the context of armed conflict. Resultantly, their lives are endangered by the dreadful atrocities of armed conflict throwing them to unbearable sufferings (Seneviratne, 2008). Local and international organizations have documented reports of sexual violence perpetrated by Russian military forces. This mounting crisis suggests, not for the first time, that conflict-related sexual violence requires urgent action (Stark *et al.*, 2022). There is an urgent need for enhanced investment by the international community to break the vicious cycle of sexual violence and impunity (UNSC, 2022).

In recent times, there have emerged extensive accounts of violence against women in times of armed conflict. Systematic rape and other forms of GBV are increasingly used as weapons of war in armed conflicts in different regions of the world. Furthermore, the use of rape to reinforce policies of ethnic cleansing and the establishment of camps explicitly intended for sexual torture and the forcible impregnation of women are tragic developments which mark a definite escalation of violence against women in situations of armed conflicts (Sajor, 1998).

All this act of violence is a hindrance to the SDG 16 - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels, specifically the targets of 16.1 and 16.2 along with the SDG 5- Achieve gender equality and empower all women and girls where the target of 5.2 is affected. This research paper will be an analysis of the proposed topic with the said SDG's.

Review of Literature

Understanding GBV

International law has not employed a specific definition for sexual violence and GBV. Sexual violence has been defined in the World Report on Violence and Health as 'any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts to traffic, or otherwise directed, against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting, including but not limited to home and work' (Wood, 2004). Whereas GBV is the violence that is directed against a person on the basis of their sex or gender, and it includes acts that inflict emotional, physical, mental or sexual harm or suffering, threats of such acts, coercion and other deprivations of liberty. This term encompasses those types of intimate partner violence (IPV) and non-partner rape, as well as a range of violent acts including other physical, psychological, economic, and sexual violence, exploitive or coercive acts, as well as harmful traditional practices (UNGA, 1993).

GBV is a broader umbrella term referring to any harmful act that is perpetrated against a person's will, and that is based on socially ascribed (gender) differences between males and females, which in most settings privilege men (Tol *et al.*, 2013). It is psychological, physical, and/or sexual violence perpetrated or condoned within the family, the general community, or by the state and its institutions (UNGA, 1993).

GBV includes a host of harmful behaviors directed at women and girls due to their sex, including wife abuse, sexual assault, dowry-related murder, marital rape, selective malnourishment of female children, forced prostitution, genital mutilation of female children, and sexual abuse of female children. Specifically, violence against women includes any act of verbal or physical force, coercion, or life-threatening deprivation, directed at an individual woman or girl that causes physical or psychological harm, humiliation, or arbitrary deprivation of liberty, and that perpetuates female subordination (Heise et al., 1999).

Understanding Armed Conflict

An armed conflict exists whenever there is a resort to armed force between states or protracted armed violence between governmental authorities and organised armed groups or between such groups within a state as stated in *Prosecutor Vs. Dusko Tadic* (IT-94-1-A) at the ICTY on 2 October 1995. There are two types of armed conflict in International Humanitarian Law (IHL), international and non-international armed conflicts. Common Article 2 to the 1949 Geneva Conventions provides that: In addition to the provisions which shall be implemented in peacetime, the present Convention shall apply to all cases of declared war or of any other armed conflict which may arise between two or more of the High Contracting Parties, even if the state of war is not recognised by one of them. The Convention shall also apply to all cases of partial or total occupation of the territory of a High Contracting Party, even if the said occupation meets with no armed resistance (see *Prosecutor v Thomas Lubanga Dyilo* (ICC-01/04-01/06)).

Armed conflict is divided into the following three subsets (Gleditsch et al., 2002)

1. Minor Armed Conflict: at least 25 battle related deaths per year and fewer than 1,000 battle-related deaths during the course of the conflict.
2. Intermediate Armed Conflict: at least 25 battle-related deaths per year and an accumulated total of at least 1,000 deaths, but fewer than 1,000 in any given year.
3. War: at least 1,000 battle-related deaths per year.

Conflicts are further distinguished on the basis of different types (Small and Singer, 1982)

1. Interstate armed conflict occurs between two or more states.
2. Extra-state armed conflict occurs between a state and a non-state group outside its own territory.
3. Internationalized internal armed conflict occurs between the government of a state and internal opposition groups with intervention from other states.
4. Internal armed conflict occurs between the government of a state and internal opposition groups without intervention from other states.

In times of armed conflict (international and non-international), the main body of applicable law is International Humanitarian Law. Human Rights Law was initially conceived to be applicable in peacetime. Its applicability to wartime was hardly considered. Since the 1960s, this position was reversed (Kolb, 1999). It is today generally accepted that Human Rights Law applies also in situations of armed conflict (Sassàli, 2007).

Understanding Displacement

Wars and armed conflicts are the main causes of displacement across the world. However, these conflicts still lead to the large-scale displacement of men, women, and children seeking refuge in neighbouring states. However, the nature of forced migration is increasingly changing, as more and more people are forced to seek refuge within the borders of their own state, as internally displaced persons (hereafter 'IDP') (Odhiambo-Abuya, 2003). Currently, internal conflict is credited as the principle cause of the displacement of an estimated 10,000 people daily (Lewis, 1992). Burundi, Rwanda, the Sudan, Sri Lanka, Columbia, Tajikistan, and former republics of the Soviet Union, such as Azerbaijan and Chechnya, are just a few of the countries with internally displaced persons (Cohen and Deng, 1998). Internal displacement occurs as the result of a number of happenings, i.e. armed conflict, internal strife, grave violation of human rights, political upheavals and persecution, for economic reasons and other natural or human-made disasters (Senevirantne, 2006). The General Assembly of the United Nations noted 'with concern':

"The number of refugees and displaced persons of concern to the High Commissioner, as well of other persons whom her office had been asked to extend assistance and protection, has continued to increase and that their protection continues to be seriously jeopardized in many situations as a result of ... threats to their physical security, dignity,, and well-being, and lack of respect for their physical security, dignity and well-being, and lack of respect for fundamental freedoms and human rights" (UNGA, 1982).

Statement of the Research Problem

On 25 September 2015, the 193 member states of the United Nations (UN) unanimously adopted the SDGs, a set of 17 goals and 169 targets aiming to transform the world over the next 15 years. These goals are aimed at eliminating poverty, discrimination, abuse, and preventable deaths, addressing environmental destruction, and ushering in an era of development for all people, everywhere (UNGA, 2016). The SDGs set the agenda for global priorities in development between now and 2030. This agenda represents a welcome change to its predecessors, the Millennium Development Goals (MDGs). It was acknowledged that the persistence of violence against women even after 15 years of MDGs has undermined the progress on other MDGs, given its crippling effect on women's ability to contribute to and benefit from broader developmental processes (UN, 2014). Universally, they call for a sustainable future, whereby all people enjoy equal rights and poverty is a thing of the past. Goal 5 is aimed more broadly at achieving gender equality and empowering all women and girls, and target 5.2 specifically aims to eliminate all forms of violence against women and girls. Achieving gender equality is impossible without ending violence against women and girls, and vice versa. Sustainable development relies on peace,

justice, and inclusive, effective, and accountable institutions. However, we cannot achieve sustainable development, including SDG 16, without ending violence against women and girls (Homan and Fulu, 2021). Reducing gender-based violence (GBV) is a public good that benefits individuals, families, and communities in many ways. Reducing GBV is a driver for progress across a host of specific SDG targets (Lang et al., 2019).

The importance of bringing an end to all forms of violence against women and girls has further been reiterated in the SDGs, which for the first time recognise this as central to the achievement of SDG 5 on gender equality and women's empowerment, as well as several other SDG targets, including those related to health (SDG 3) (Heidari and García Moreno, 2016).

The UN has noted that with the rise to prominence of violent extremist groups in recent years, the systematic use of sexual violence against women and children has become a tactic of terrorism (UN, 2016). Many of today's conflicts displace masses of people and result in women's and children's exposure to violence, family separation, splintering of community solidarity, shattered social trust, and inability to create an adequate livelihood (Ai et al., 2002). GBV takes various forms during armed conflicts like domestic violence, pornography, genital mutilation, and prostitution (Lombard, 2021).

Concurrently, the UN acknowledges that in armed conflict and post conflict situations, the vulnerability of displaced persons to human trafficking for the purposes of exploitation, including sexual violence, increases (UNODC, 2016). Displaced and refugee women, who find themselves forced to leave their place of origin and move to other locations, whether in the same country or elsewhere, deserve special attention, in view of the specific forms of violence they suffer. Although political and military violence obliges men and women alike to leave their places of residence, and affects them in a similar way because they are both victims of the same kind of aggression, the experiences of men and women, and the meaning and connotations attached to these experiences, cannot be seen as independent from a gender-based analysis, especially considering the issue of rape and the mistreatment and assaults women suffer at the hands of the men who form part of those same displaced population groups (Rico, 1997). Displaced women are vulnerable to all forms of violence at every stage of their flight (UNHCR, 1991). In armed conflicts and warfare, sexual violence against women, as well as men, is used as a tactic of war, with grave consequences on the physical, mental, and sexual and reproductive health of survivors of violence (Heidari and Moreno, 2016).

Purpose

To state the measurable purpose of the research undertaken, this study was geared to achieve the following:

- 1) To study the various conflict and displacement situations around the world in order to highlight the severity of GBV and impact on the SDG's.

- 2) To examine the social, cultural, and political factors in GBV during armed conflict and displacement.

Research Questions

1. What is the relationship between GBV and SDG in the present time of armed conflict and displacement?
2. How will solving the current legal lacuna with regard to GBV in armed conflict and displacement help achieve the SDG for the future?

Data Collection and Methodology

In accordance with the objectives of the present study, the doctrinal research design has been adopted. The doctrinal design has been used to study the jurisprudential development in the several armed conflict and displacement situations used. This has been done primarily with the help of case laws and leading judgments of various courts along with research studies conducted by experts in International Humanitarian Law and International Refugee Law. Reports from committees and commissions have been scanned for issues relating to the research problem.

The scope of the research extends to the past 50 years in process through the different kinds of conflict and displacement situations that took place around the world. Countries such as Rwanda, Bosnia, Kosovo, Sierra Leone, Sudan, Algeria, Cambodia, Sri Lanka, East Timor, Cyprus, Haiti, Liberia, Somalia and Uganda among some others are the main coverage areas in the research. The stratified sampling method is used to highlight differences between the populations based on the basis of gender in the research.

Limitations of the Study

The main limitation of the research study is the inability to enquire and collect data from the internal governments of different countries with regard to GBV crimes committed against displaced populations and in conflicted societies. The data as understood are confidential and, unfortunately, cannot be used for research purposes. Other limitations include the lack of research of SDG and the proposed research study in mainstream academic circles. There has also been a limitation of inadequate sampling for large populations with reliable data to base the research but it can be overlooked in a qualitative research like this one.

Originality/Value of the Paper

This paper provides evidence of the intermingling of GBV in armed conflict and displacement in the eyes of achieving SDG'S for the future. The research compares the current situation and shows the need for an impactful intervention to prevent and protect future girls and women from the threat of GBV. It also provides important information on the legal tools currently present in tackling the crime and the need for improvement.

Data Analysis

Causes of GBV during Armed Conflict and Displacement

The term gender-based violence was originally coined to highlight gender inequality (i.e., unequal power dynamics between women and men and unequal access to resources for women) that put women and girls at higher risk of certain forms of violence. It is, however, increasingly being used also to refer to violence on the basis of a person's sex, sexual orientation or gender identity. Notions of masculinity and femininity underpin both violence against women, and against groups with diverse sexualities and gender identities, nonetheless, the gender dynamics and the underlying drivers for each form of violence are not necessarily the same. Violence based on sexual orientation or gender identity must be studied and understood in its own right. Documenting the magnitude and nature of violence faced by individuals on the basis of their sexual orientation and gender identity will help develop more targeted approaches to addressing such violence and address the many barriers, including stigma and discrimination, which limit their access to services (Heidari and Moreno, 2016). Many writers consider GBV an aspect of patriarchy, i.e. male control, and imply that some men use violence to control their partner (Ellsberg and Heise, 2005). Some writers claim that "partner violence is primarily a problem of men using violence to control 'their women', a control to which they feel they are entitled and that is supported by a patriarchal culture" (Johnson and Ferraro, 2000). Gender inequality manifests itself at multiple levels of society. Unequal attitudes and norms that promote the acceptance of, and justify violence against, women and girls drive prevalence rates around the world. In one study from Timor-Leste, it was found that 45 per cent of men believe it is ok for a man to beat his wife if she goes out without telling him (GDS, 2016). In general, violence against women is justified by, and closely linked to, the institution of marriage.

Forced sexual contact can occur at any time in a woman's life and includes a variety of behaviours, from forcible rape to non-physical forms of pressure that force girls and women to engage in sex against their will. The touchstone of coercion is that a woman lacks choice and faces severe physical or social consequences if she resists sexual advances (Heise et al., 2002). Victims of sexual violence can face myriad obstacles to reporting an assault. In much of the world, women are viewed as keepers of the family virtue, and female modesty is enshrined in law or tradition. A woman may suffer if she reports a crime: she may lose status in her community, or her husband may leave her. She may even be killed. Where female sexuality itself is taboo, women may not be able to discuss sexual crimes with male authorities. Too often, women view violence, including sexual violence, as a fact of life. Under these circumstances women sometimes elect, or are pressured by their families or communities, not to report sexual violence to authorities (Kelly, 2005).

Contributing Factors of GBV during Armed Conflict and Displacement

Previously thought of as an inevitable by-product of war or collateral damage to be tolerated, it is now realised that SGBV is used as a weapon of war by perpetrators of these crimes. It is used to instil fear and humiliate the enemy, bring shame and destruction to a community as an instrument

of 'ethnic cleansing' and as a form of punishment (Manjoo and McRaith, 2011). GBV during armed conflicts is used as a "tactic of war". Believers of that argument claim that warring parties use GBV and rape as a tactic of war in order to defeat their enemies and achieve their military objectives. Many scholars claim that rape during conflicts is used strategically in order to achieve military objectives (Horwood, 2007). Similarly, the UN Human Rights Council confirms that sexual violence happening in the current conflict in Myanmar is used as a tactic of war (OHCHR, 2018). Hegemonic masculinity plays a fundamental factor in the commission of GBV during conflicts. In times of peace, dominant white (Dudink et al., 2004) or Arab or Macho or Muslim (Aslam, 2012) or African (Dudink et al., 2004) men represent hegemonic masculinity and lead the gender hierarchy. They exercise their dominance and power over subordinated gender identities. However, in times of conflicts, soldiers and military commanders become on top of the hierarchy (Elserafy, 2019). In expressing his opinion on the violent nature of sexual violence committed against civilian women during armed conflict, Major General Patrick Cammaert, a former peacekeeping commander of the United Nations (UN) in the Democratic Republic of the Congo (DRC), stated that '[i]t has probably become more dangerous to be a woman than a soldier in an armed conflict' (Schaack, 2009).

Shame and stigma are integral to the logic of sexual violence being employed as a tactic of war or terrorism: aggressors understand that this type of crime can turn victims into outcasts, thus unraveling the family and kinship ties that hold communities together. The effect may be diminished reproductive capacity and prospects for group survival. Just as there are many manifestations of conflict related sexual violence, there are multiple and intersecting stigmas that follow in its wake. These include the stigma of "guilt by association" with the perpetrator and their group; fear of suspected sexually transmitted infections such as HIV; the perceived dishonour of lost chastity or virginity; the stigma of maternity out of wedlock, especially where children conceived through rape are considered "children of the enemy"; homosexuality taboos, in the case of male rape; and the shame of being unable to defend oneself and loved ones (UN, 2017). The threat and use of abduction and sexual violence terrorizes civilian populations to such an extent that it drives forced displacement of civilians, particularly minorities, internally and across borders (UN, 2016).

Forms of GBV Used during Armed Conflict and Displacement

GBV in conflict and post-conflict areas can take many forms including rape, slavery, forced impregnation/miscarriages, kidnapping/trafficking, forced nudity, and disease transmission, with rape and sexual abuse being among the most common. Abduction and slavery are also frequent forms of GBV in conflict areas, where civilian girls and women are kidnapped by raiding military or rebel forces and taken back to the soldiers' camp to provide both sexual and domestic services (Rehn and Sirleaf, 2002).

Sexual GBV usually are designed to humiliate men and emasculate the victim and it takes on variety of form which includes anal or oral rape, torture cutting off the genitals, enforced nudity. There are instances where men are forced to rape fellow men or women or even watch a female

relative being asexually assaulted (Schulz, 2015). Most of these rapes have occurred in the context of internal armed conflict, and the army, police, and navy are responsible (Al, 2002). Girls and women are at risk for abuse from aid workers and other persons in power in conflict and emergency humanitarian settings (Ferris, 2007) and continue to be at risk for sexual assault from asylum professionals, such as police, lawyers, and security guards once relocated to host countries (Akhter and Kusakabe, 2014). The sexual abuse and rape of women are also frequently used as a form of political reprisal, as has been documented in the case of dictatorships in the Southern Core countries and armed conflicts in Central America and Peru. Sexual violence against female political prisoners is one form of torture used during punishment sessions or interrogations and is designed to denigrate the prisoner both sexually and psychologically. Women who are jailed or arrested for other than political reasons also often fall victim to sexual violence and, ironically, are in many cases assaulted by the very men who are responsible for their safety (Rico, 1997).

In several of the countries mentioned, displaced families frequently cite rape, or the fear of rape, as a key factor for their displacement. In Bosnia alone, the organized and systematic rape of at least 20,000 women and girls by the Serbian military and the murder of many of the victims were horrifying. Many women were raped before displacement. They left their homes because they were afraid of being repeatedly raped or sexually abused. In this way, many women and girls became internally or externally displaced due to the massive scale of sexual violence in Bosnia and Herzegovina (Niarchos, 1995).

In Kosovo too, rape and other forms of sexual violence were used as weapons of war and instruments of systematic ethnic cleansing to terrify the civilian population, extort money from families, and push people to flee their homes (Peltola, 2018). In the Rwandan genocide, women were raped until death (actually making it extermination) or purposefully given AIDS to eliminate their group (Sharlach, 2000). According to human rights workers in Sierra Leone, the rebel rape campaign was as widespread and systematic as similar incidents in the 1992- 1995 Bosnian war. However, these incidents have received far less attention (Sharlach, 2000). The world was rightly horrified by reports of Ukrainian women and girls held hostage in Bucha and gangraped in a basement for 25 days by Russian soldiers. Unfortunately, Ukraine is only one crisis marked by such atrocities. Thousands of Ethiopian, Rohingya, Colombian, and Congolese survivors of sexual violence also need protection and support, and many others remain at risk (Stark *et al.*, 2022). The list of massive scale sexual violence against displaced women is not limited to these countries, but is a wide-spread, dreadful phenomenon (Seneviratne, 2008).

Consequences of GBV on Women and Girl Children

It is evident that physical and sexual violence have an immeasurable impact on an individual and on society. There is the human cost in grief and pain to both the individual and the society. Individuals who are physically and sexually violated may not fully function in activities and may be less able to care for themselves and their families (Heise *et al.*, 1994). In addition to causing injury, violence increases the long-term risk of a number of other health problems for women, including chronic pain, physical disability, drug and alcohol abuse, and depression. Women with

a history of physical or sexual abuse are also at increased risk of unintended pregnancy, sexually transmitted infections (STIs), and adverse pregnancy outcomes (Heise et al., 2002).

Although violence can have direct health consequences, it also increases women's risk of future ill health. Physical harms such as injury to reproductive organs, traumatic fistulas, and infertility often accompany brutal or repeated rapes (Ward et al., 2005). Physical violence and sexual abuse can directly put women at risk of infection and unwanted pregnancies, if, for example, women are forced to have sex or fear using contraception or condoms due to the potentially violent reaction of their partners. A history of sexual abuse in childhood can also lead to unwanted pregnancies and STDs indirectly by increasing sexual risk taking in adolescence and adulthood. Therefore, like tobacco or alcohol use, victimization can best be conceptualized as a risk factor for a variety of diseases and conditions (Heise et al., 1999).

Some of the well-known medical problems which victims of SGBV may suffer include post-traumatic stress disorder, insomnia, HIV/AIDS, gonorrhoea, traumatic fistulas and injury to their reproductive organs or infertility as a result of being raped repeatedly (Manjoo & McRaith, 2011). Victims of SGBV are normally traumatised twice. First, from the violence suffered at the hands of their perpetrators, and then from the reactions of society and state toward them (UNSC, 2017).

In addition to these physical effects, GBV also has serious psychological consequences, including depression, anxiety, post-traumatic stress disorder, shock, memory loss, and sexual dysfunction (AI, 2007). After an assault, survivors experience The Rape Trauma Syndrome (RTS), which affects not only victims of rape, but also victims of all types of sexual violence and would perhaps be better labelled as Sexual Assault Trauma Syndrome (Chivers-Wilson, 2006). Fear of additional sexual violence may also prevent women from going about their normal activities, such as attending school, participating in the market, or participating in politics. This is true both for conflict areas and post-conflict areas, as women remain exceptionally vulnerable to sexual violence even in societies that are engaging in post-conflict transitional justice mechanisms (Scanlon and Muddell, 2010).

Understanding GBV from the Perspective of International Law

Feminist scholars and activists have critiqued the ways that international instruments primarily focus on strategic rape and fail to provide for the broader range of violence that may be experienced by women during conflict. By making visible wider forms of violence that women experience as part of, alongside, and distinct from strategic rape, this article aims to close some of the gaps in empirical knowledge about women's experiences of conflict-related violence. It purposely diverts focus from what is routinely considered to constitute women's primary experiences of violence in armed conflict, i.e., patterns of systematic rape set out as public harms under international law (Swaine, 2015).

Feminist scholars argue that IHRL is created by men and for the sake of men. Hence, the issues of human rights law are men-centered, in the words of Charlesworth and Chinkin, "in the major human rights treaties, rights are defined according to what men fear will happen to

them”(Charlesworth and Chinkin, 1993). Considerable work has been done on women and armed conflict by institutions concerned with human rights violations against women in general. Indeed, the process of identifying women's particular experiences and demonstrating the failure of the law to acknowledge them is more advanced in this context than in organizations focusing solely on armed conflict (Chinkin, 1997).

Understanding the international humanitarian community's response to sexual violence in armed conflict necessitates an analysis of how actors within this community position themselves in relation to the issue, as well as to victims/survivors of sexual violence (Anholt, 2016). Over the past decades, the international community has taken concrete steps in response to the various calls to recognize GBV as a serious crime.

Prior to the development of International Humanitarian Law, laws governing conduct in war were primarily based on custom, bi-lateral agreements, military doctrine and religious codes. One of the earliest attempts at international codification of sexual violence was the Regulations to the 1899 Hague Convention II that implicitly referenced a prohibition on sexual violence during occupation, stating 'family honour and rights ... must be respected.'

There has been progress in the body of international law relating to SGBV crimes committed in armed conflict situations: various UN reports (UN, 1998), human rights law, such as the Universal Declaration of Human Rights (UNGA, 1948), human right instruments, such as, the Vienna Declaration on Violence against Women (UNGA, 1993), the Convention on the Elimination of All Forms of Discrimination against Women (UNGA, 1979), the Declaration on the Elimination of Violence against Women (UNGA, 1993), and UN resolutions such as 1325 (UNSC, 2000), 1888 (UNSC, 2009) and 1820 (UNSC, 2008) have been instituted to address such violent attacks. The UN in 2008 unanimously adopted Resolution 1820 (2008) recognising that 'rape and other forms of sexual violence can constitute a war crime, a crime against humanity, or constitutive act with respect to genocide.'

The UDHR is the first human rights tool adopted by the UN. Whilst, it is not a binding document, however, it does reflect part of customary international law (Sohn, 1997). Article 5 of the UDHR prohibits torture or cruel, inhuman, or degrading treatment or punishment (UNGA, 1948). The Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), adopted in 1979, is the most extensive international instrument dealing with the rights of women. Nonetheless, the CEDAW committee's general comment 19 defines GBV as "Violence that is directed against women because she is a woman or that affects women disproportionality. It includes acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion and other deprivations of liberty" (CEDAW, 1992). As Sellers notes, since General Recommendation No. 19 is considered as an 'authoritative legal interpretation of CEDAW', it thereby recognizes that CEDAW grants 'women and girls the right to equal protection or non-discriminatory application of humanitarian norms in times of international or internal armed conflict and reaffirms the redress of war-related gender-based violence, such as rape, has a human rights dimension' (Sellers, 2009). It has been suggested that the Women's Convention is in some ways of lesser status than general human rights instruments. This is evidenced, for example, in the

acceptance of the widespread practice of States making reservations to its provisions that appear to strike at its very heart (Belinda, 1991).

Despite SGBCs occurring in armed conflict situations, these crimes were often passed over for prosecution by tribunals such as the International Military Tribunal (IMT) in Nuremberg, which elected to prosecute the perpetrators for generalised war crimes such as murder and torture. Instead, gender-specific crimes were subsumed under the category of 'other inhumane acts' (Ashiru, 2017).

On the basis of the Yugoslavia wars of the 1990s, feminist scholars and activists achieved recognition for rape as a crime within the international legal paradigm (Stiglmeier and Faber, 1994). The International Criminal Tribunal for the former Yugoslavia (ICTY) and the International Criminal Tribunal for Rwanda (ICTR) are commonly regarded as the events that put sexual violence in conflict on the international agenda (Marsh et al., 2006). Historically, rape and other forms of sexual violence against women were regarded as an inevitable aspect of armed conflict and were hardly ever prosecuted (Chinkin, 1994).

"Violations of the human rights of women in situations of armed conflict are violations of the fundamental principles of international human rights and humanitarian law. All violations of this kind, including in particular murder, systematic rape, sexual slavery, and forced pregnancy, require a particularly effective response." (UN, 1993). At the conference to establish the ICC, states agreed upon a number of provisions in the Rome Statute recognizing various forms of SGBV as "amongst the most serious crimes of concern to the international community." (ICC, 2014). The Statute is the first international law instrument "to include an expansive list of sexual . . . crimes as war crimes [in the context of] both international and non-international armed conflict." It also expands the heretofore accepted list of sexual crimes as crimes against humanity beyond the crime of rape (ICC, 2014).

The first case at the ICTY to concentrate entirely on charges of sexual violence was that against Anto Furundžija, in *Prosecutor v. Anto Furundzija* (IT-95-17/1-T 10). The court in discussing the position of the law on Gender-based violence stated that, "The essence of the whole corpus of international humanitarian law as well as human rights law lies in the protection of the human dignity of every person, whatever his or her gender. The general principle of respect for human dignity is the basic basis and, indeed, the very *raison d'être* of international humanitarian law and human rights law; in fact, in modern times it has become of such paramount importance as to permeate the entire body of international law. This principle is intended to shield human beings from outrages upon their personal dignity, whether such outrages are carried out by unlawfully attacking the body or by humiliating and debasing the honour, the self-respect or the mental well-being of a person. It is consonant with this principle that such an extremely serious sexual outrage as forced oral penetration should be classified as rape."

Though rape has historically been considered a criminal offence in national and international laws relating to armed conflicts and it is not condoned by IHL, gender-specific violence remains rife in armed conflict situations (Copelon, 1994). IHL contains general provisions protecting all civilians

and a number of provisions affording women "special protection" during armed conflict (Tabory, 1989). However, they all deal with women in their relationships with others, not as individuals in their own right. Nineteen are, in fact, designed to protect children (Pilloud et al., 1987). Those that deal with sexual offenses are couched in terms of offenses against women's honor. The rules dealing with women are presented as less important than others. They are drafted in different language than the provisions protecting combatants and civilians generally, using the concept of "protection" rather than prohibition (Gardam, 1997).

Recommendations/Suggestions

Access to Justice for Victims and Other Stakeholders

One of the primary reasons as to why victims of GBV never approached a proper judicial system with their request for justice is the lack of the same in their home ground or their place of settlement after displacement. Justice is an abstract concept for many as they often have to go through domestic trials inside their own families who make them stand out for being a victim and provide absolutely no support in prosecuting the criminals. All GBV victims and their families who have been affected by the influence of such a crime need a proper answer, which must be established in the form of domestic laws prosecuting GBV in armed conflict and displacement by the respective governments in all countries.

Prioritising the Need for Gender Equality

As stated in the paper, the very fact that there still exists a large population of men who thrive on patriarchal norms and behaviour gives a reason for understanding the existence of GBV in most situations. The time to reestablish and remove the discriminatory notion of treating women as the spoils of war and treating them as such is beyond human dignity. There is a severe need for high level prevention efforts from the part of civil society organizations and governments in the ground level to bridge the gap in equality for Men, Women and Other genders in the society. Women and other Genders need to understand their value of being treated at par with men everywhere. It is also important to institute women as gender advisors in places of conflict.

Need for Urgent Response for all the Victims and Survivors

Victims and Survivors need serious medical help both in physical and mental care. The rehabilitation process of all victims and survivors need to be held in a systematic and judicial manner by governments. The need for convalescence in a manner of providing the necessary medical attention that can help prevent further complications which can arise due to GBV should be part of all proactive measures which will be taken by NGO's and local governments on the ground level. The victims also needs to be given therapy by certified mental health professionals in a long term initiative to bring them back to their feet and help them go back without judgment from their own families for being a victim.

Strengthen Accountability of Governments for GBV Crimes

Criminals who committed GBV crimes during armed conflict and displacement are more or less given a free ticket of not being prosecuted due to the lack of accountability on the part of the governments. The domestic laws and governments are in fault for not advocating trials for meting out justice for the victims and survivors who remain afraid of the perpetrators for the rest of their life. In some case, the courts rarely have acknowledged the evidential proof of such a crime taking place thus putting the onus of responsibility on the victim to prove their case. The states have to impose recognition of such crimes which take place in the guise of an armed conflict and situations of displacement with due respect to the victims and survivors through domestic legislations and criminal responsibility of the heads of state.

Increase Awareness of the Impacts of Armed Conflict and Displacement on Women and Children

Armed Conflict and Displacement put women, children, and other minorities in a vulnerable position where their physical and mental well-being is threatened as a consequence of the whole situation prevailing before them. The need to reintegrate peaceful societies and sending the message that violence will not be tolerated in any way is a necessity. Law enforcement agencies, civil society organizations, private sector enablers along with the Governments have to launch wide-spread campaigns stating impunity of any kind will not be provided while taking steps to ensure the protection of vulnerable populations as a high priority care. There needs to be support shelters and safe spaces which can safeguard and provide support for women, children, and other sexual minorities.

Conclusion

In summary, this paper has outlined that GBV during armed conflict and displacement is a constant fear of vulnerable groups like women, children and other sexual minorities. The results of this research study indicate that there is a rather strong connection between GBV and the still pertaining existence of the gender inequality among other factors in the society. The findings of this study have several implications stating that despite the prevalence of GBV in situations of armed conflict and displacement, there is a severe lack of accountability in spheres of criminal justice systems of State Governments along with the need for protection of vulnerable sexual minorities. The present study provides sustainable solutions which needs to be implemented in order to combat GBV and achieve the practical formulation of SDG 5 in the setting of SDG 16.

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Genocides of Coloniality: Power, Race and Genocide as a Foundational Practice in Colonial America

Lia Baez Vidal (Westminister College, United States)

Abstract

Genocide as a phenomenon has been widely studied, defined and policed, especially in the fields of political and justice studies. The general academic and legal consensus is that genocide is the attempted or successful annihilation of a people, based on a variety of factors and motivations - including race, ethnicity, religion and national origin. However, the existing literature fails to include the issue of colonialism in the discourse and genealogy of genocide. This article examines the issue of how and why genocides of conquest and coloniality are omitted from the record on genocide by analyzing and critiquing the current discourse, which will enable not only a broadening of the term but also a deconstruction of power as it pertains to what genocide is and its effects as an act of worldbuilding. In order to do this, the author will critically analyze the role that racism played in genocides of conquest - specifically those that took place in the Americas, using a decolonial, power/knowledge and critical race theory lens. Initially, the author hypothesized that understanding this morphing of power would make it possible to find a way to break the cycle of oppression that allows for these atrocities to be committed again and again. In reality, genocide gave power through colonial suffering and no morphing of this power was necessary because genocide gave power by fear, creating docile bodies out of the colonized and establishing the foundation of a new, hegemonic world order - what we now see as normal. The author recommends a revolution in genocidal discourse as an alternative that would allow a dismantling of colonial systems and cycles of oppression.

Keywords: genocide, colonialism, decolonial, race, discourse, power

Introduction

In 1492 Columbus sailed the ocean blue. This voyage is regarded as a pivotal moment in world history. A moment which opened what historians deem an era of possibilities, of global movement, trade and agglomeration of wealth. However, for the indigenous populations¹¹⁷ of what would come to be known as the Americas, this moment would mean certain death, enslavement and/or a permanent change to the fabric of their daily life, their traditions, and sacred rituals.

From almost the exact moment Columbus stumbled upon the Islands of the Caribbean (what he would call the West Indies), there was bloodshed. The extermination of a people took place; a chain of events that, under definitions and characteristics currently set up by international law, would be considered genocide. However, the literature on genocide in the fields of international

¹¹⁷ Acknowledging the impact of this moment and what would become the "Columbian Exchange" on people of all continents.

law and political science show a considerable gap when it comes to not only defining and naming genocides of conquest for what they truly are, but also as it pertains to including these colonial genocides in the mainstream narrative and allowing them to shape the definitions and impact of genocide in modernity. This gap can either be conceptualized as misunderstanding, negligence or purposeful erasure as it pertains to including genocides of conquest within the category of genocide. The purpose of this study is to understand why early genocides of conquest (specifically for the purposes of this study, the Arawak Taino genocide in the Caribbean) are effectively erased from history, especially genocidal discourse in academia and the international community in charge of classifying, policing, prosecuting and punishing the crime of genocide.

Literature Review

Definitions

The term *genocide* was coined by Raphael Lemkin, a Polish lawyer of Jewish descent, during the Holocaust. The word is derived from the Greek work *genos* and the Latin suffix *caedo*, meaning “race” or “people” and “to kill.” Daniel Feierstein defines modern genocide as “any genocidal social practice related to the destruction of a human group since the late fifteenth century, especially those involving Europeans or European settlers” (Feierstein, 2009). It is interesting to note here that most academic definitions of genocide include genocides of conquest in a general timeframe, but judicial-legal definitions focus only on prosecutable instances that fall within a statute of limitations that is limited from the 20th century to the present. There are many different types of genocide. For instance, foundational genocide, which is aimed at destroying ideologically ‘impure’ populations and/or political opponents in an effort to create a new nation state (Feierstein, 2009). Reorganizing genocide refers to destruction aimed at transforming social relations within an existing nation state (Feierstein, 2009).

However, both of these examples refer to modern instances of genocide which occurred after the formation of the modern nation state. In this article, the author focuses on what has been called genocides of conquest, colonial genocides, and postcolonial genocides (Feierstein, 2009). More specifically, the author will focus on these genocides as they relate to colonization, race, and constructions of power/knowledge (Foucault, 1975). The author argues that race and racism are among the primary root causes that catalyzed these genocides, as this rhetoric allowed for dehumanization and deathly violence to be perpetrated against the colonized and justified in the eyes of the colonizer. The author hypothesizes that, by focusing on genocides of conquest, the perceived motivations and desired outcomes of genocide will shift. The gap this author hopes to fill in the literature would aim to recognize genocides of conquest as integral to not only how we understand genocides in modernity, but also how we understand the impact of colonial genocides - not as something that just “happened” a long time ago, but as criminal acts that are the foundation of hegemonic power structures.

The author will describe the existing literature on this topic as they fall in the following categories: first, on how the construction of race catalyzed and justified genocides in the Americas; then, the continuation of genocides of conquest in modernity; next, how discourse analysis reveals that this

continuation has been allowed by a failure to root genocidal practices in systems of colonial oppression; finally, an analysis of power and genocide. The author will critically analyze the literature from a decolonial and critical race theory framework. Decolonial theory not only reveals critiques of the ongoing legacy of colonialism and imperialism and details the human consequences of exploitation of colonized peoples, but also offers alternatives to hegemonic structures of power in society. Critical race theory (CRT) is a legal framework that looks at society in the context of race, the law, and power relations in the US. The CRT framework can also be extended to global contexts. The reason for the author's use of this dual lens is an observation of a significant gap in the literature that either completely overlooks or lacks an in-depth analysis of the colonial era and neo (ongoing) colonial era in its study of genocides of various indigenous peoples across the Americas at the hands of colonizers originating from various European states (Ostler et. al., 2021).

Applying this perspective to an issue such as genocide, which exists within the framework of international humanitarian law (IHL), will also be beneficial in the deconstruction of human rights as a Western project which allows for perpetuation of systems of oppression behind a liberal facade of the greater good. This deconstruction then opens a path for developing a new model for human rights in the context of all of world history, not just the history of the West. Jose-Manuel Barreto details this path in his article, *Decolonial Strategies and Dialogue in the Human Rights Field: A Manifesto*. He writes that a "Third World approach to human rights encompasses a different interpretation of the philosophy of history in which the human rights theory is based on, and gives birth to, a new paradigm in which the events of the Conquest of America and the colonization of the world are also recognized as key signposts of history" (Barreto, 2012). The ideas Barreto presents in his paper include "empire/suffering, modernity as crisis, the colonial origins of human rights, postmodernity as an epoch of moral sensibilization, power/epistemology, and critical dialogue" (Barreto, 2012) which fit well with the task of this study to critically analyze discourse in order to decolonize knowledge in the field of genocide.

Race

Racism is a common rationalization or justification for genocide. In *Scourge of Racism: Genocide in Rwanda*, Kenneth R. White outlines one of the major social problems of the 21st century as the problem of the color line. He goes on to describe racism as "any activity by individuals, groups, institutions, or cultures that treats human beings unjustly because of color, physical features, and/or ethnicity and rationalizes that treatment by attributing to them undesirable biological, psychological, social, or cultural characteristics" (White, 2007).

According to White, Rwanda is no exception to the effects of racism, even though the events that occurred there appeared to the rest of the world to be unaffected by race. More than 800,000 Rwandans were killed in the government-directed ethnic cleansing of Tutsis and moderate Hutus during 1994. It is considered this century's best organized genocide. It is also considered the greatest failure on the part of the international community to act in protection of human life and human rights. Further, though the article does a fantastic job of analyzing race as a factor in the Rwandan genocide, the author misses an opportunity to add necessary nuance by overlooking

the colonial context that set up the Rwandan nation-state for failure and the Rwandan genocide for success. This author would add that recognition of how a colonial past (involving Belgian control over what is now the nation of Rwanda) and the intervention of empire, also aided in the development of racial divides that allowed for the creation of genocidal conditions in the country.

Although the author of that article does not ignore the role of racial/ethnic divides in the case of the Rwandan genocide, failing to discuss colonial legacies that exacerbated political circumstances which led to genocide encourages (by way of passivity and negligence) the continued thought processes and practices that instigate prejudice and discrimination (Ostler et. al., 2021). For this reason, it is essential to look at the racial aspects of genocide through a colonial lens, as it could be argued that genocide is the most violent manifestation of prejudice and discrimination, and that it was a practice that was applied with precision during an era that killed millions of indigenous Americans (Wolfe, 2006).

It's important to parallel *why* they were annihilated - power, economic gain, etc. with the *rationale* behind the why: dehumanization via racism and animalization. European colonizers wouldn't have killed peoples indigenous to the lands they were 'discovering' if they didn't see them as a credible threat - whether in the near or far future, it doesn't matter. Savages can't rise against an empire - *equals can*. And that's what makes the race factor so important. So long as the people you kill are dehumanized there is no guilt, and racialization is a legitimate, logical and even scientific method of otherization. As long as they are dehumanized, even if some remain, there is no threat due to internalized oppression and the fact that the dominant group begins to believe that they are truly superior to the oppressed groups in society. "The Negro enslaved by his inferiority, the white man enslaved by his superiority alike behave in accordance with a neurotic orientation" (Fanon, 1952).

What happened in Rwanda is unique because the genocide was interracial but also occurred within a nation with a heavy colonial legacy. The divide between the Hutus and Tutsis was very real and was exacerbated by colonial meddling with indigenous structures that established Tutsis as governing elites, and further deepened the bad blood between the two groups that were forced to coexist within borders created by colonial powers in the first place. The conditions that allowed for Hutus and Tutsis to start killing each other were not created by Belgium leaving the colony - they were created as soon as Belgium, a colonial power, interfered and established itself as superior in a place it had no business governing. Therein lies the great contradiction of one of the pillars of our modern world - oppression and discrimination on the basis of race. Especially when the reality is that, not only are we all equal yet made unequal by the current world regime, but also that without European intervention/suppression, had Africa, Asia and America been left to their own devices, the world would undoubtedly be better than what it is now.

Colonialism and Neocolonialism

In *Genocide and Social Death*, Claudia Card argues that "social death, central to the evil of genocide (whether the genocide is homicidal or primarily cultural), distinguishes genocide from other mass murders" (Card, 2003). Social death is constituted by a loss of social vitality and a

loss of identity, and thereby of meaning for one's own existence. The author argues that seeing social death at the center of genocide takes our focus off body counts and loss of individual talents, directing us instead to mourn losses of relationships that create community and give meaning to the development of talents. Card not only looked at instances of genocide where the physical body count was high but also where little to nothing of a culture was left behind and argued that this cultural annihilation is what “distinguishes the peculiar evil of genocide from the evils of other mass murders” (Card, 2003). She found that only mass murders and other measures that have as part of their reasonably foreseeable consequence, or as part of their aim, the annihilation of a group that contributes significantly to the social identity of its members are genocidal (Card, 2003). Unfortunately, Card recounts no specific instance of colonial genocide in her account, demonstrating just how much these instances are lacking from dominant discourse shaping the concept of genocide.

Adding to what Card says, Isaac Kamola points out in *The International Coffee Economy and the Production of Genocide in Rwanda* that most academic work on the genocide in Rwanda uses either a methodologically social scientific or historical approach to explain the genocide's root causes. Quoting Louis Althusser, Kamola comes close to alluding to colonization as one of these root causes: “History ‘asserts itself’ through the multiform world of the superstructure, from local tradition to international circumstance...Like the map of Africa before the great explorations, this theory remains a realm sketched in outline, with its great mountain chains and rivers, but often unknown in detail beyond a few well-known regions” (Kamola, 2006).

However, he fails to follow through with a deeper analysis beyond modern economic and cultural driving factors. These causal stories most often focus on ethnicity and, in doing so, understate how structured economic-material relations made the conditions for genocide possible. This article forms an alternative method for narrating the genocide which treats the genocide as the result of highly complex and over-determined social relations. The author then re-examines the structural causality of the genocide, focusing on how the coffee economy intersected with the economic, cultural, state, and ideological registers at which the genocide was produced. Representing the genocide in terms of structural causality addresses how over-determined exploitative relationships between Hutu, Tutsi, colonizer, colonized, rich, poor, farmer, evolver, northerner, southerner, coffee producer, coffee consumer etc. produced the genocide (Kamola, 2006). At this point, this author would recognize the economic motivations behind genocides of conquest: land, gold and other natural minerals and resources motivated European colonizers to do the horrible things they did.

While some scholars, such as Patrick Wolfe, author of *Settler colonialism and the elimination of the native*, would claim that this phenomenon of genocides of conquest is simply a violent manifestation of the larger structure that is settler colonialism and should be distinguished from the modern, legal definition of genocide (Wolfe, 2006), this author refutes such claims. Colonization is an inherently violent endeavor and requires tools by which to exert power over the colonized. Genocide is one of those tools, a means by which the “complex social formation” (Wolfe, 2006) of settler colonialism has been able to establish dominance and maintain it through time. That said, this author does concur with Wolfe’s analysis that “racial regimes encode and

reproduce the unequal relationships into which Europeans coerced the populations concerned” (Wolfe, 2006).

Power and Accountability

This Age of Genocide: Conceptual and Institutional Implications by Peter J. Stoett seems to argue that it is the responsibility of the colonizers (in the case of colonial genocide) to give reparations. The author asks two very important questions: Should the prevalent definition of genocide be changing to reflect the expanded scope of human rights concerns? And, can justice be achieved while sovereignty remains the primary ordering principle of the nation-state system? This article also examines the concept of genocide, in part by contrasting the broader definition with the more limited legal one, and discusses some institutional implications for modern international organization (Stoett, 1995). However, Stoett fails to ground his contemporary analysis of genocide in past instances of genocide, going as far as to say that indigenous people can be “added” into this discourse - as if indigenous people should not be the very basis of genocidal discourse (Ostler et. al., 2021).

Nevertheless, the questions posed by Stoett are important in the context of this article for two reasons. First, this article is also concerned with deconstructing discourse surrounding genocide. Second, this article is also concerned with deconstructing how colonial genocide specifically was a tool used to lay the foundations for modern organizations of power. This author will take Stoett’s questions one step further by asking not only if definitions of genocide should be expanded, but by showing how and why they need to be expanded.

Synthesis

The dialogue and literature on genocide tend to focus on the study of more “modern genocides” or “ancient genocides” in the old world. For instance, most of the literature on genocide focuses on the Holocaust, Armenia, Srebrenica, and Rwanda. Further, most of the literature in political science and international law does not analyze the genocide of indigenous peoples upon the colonization of the Americas at all (the new world). Certainly, the literature that does engage with this topic is lacking one essential piece: grappling with the issue of race in the context of coloniality. Feierstein quotes Lemkin when he writes that, “Those seeking to destroy both the group and its culture [constitute the third type of genocide]. *Lemkin considered the Nazi genocide as a prototypical instance of this third type*” (Feierstein, 2009).

This author must emphatically refute that point. If anything, the “prototypical instance” of this type of genocide is the massacre of indigenous people on the American continent, notwithstanding the significance of the Holocaust. While it is estimated that approximately 11-17 million were killed during the Holocaust, an estimated 55-65 million (Koch et. al., 2019) were murdered during colonial genocides in the Americas alone, from the 1492 to the 16th century AD. A number so great that ecological researchers show the planet’s temperature cooled due to the drastic and sudden lack of carbon dioxide being released into the atmosphere. This shift, which “lowered surface air temperatures by 0.15°C,” was “a result of the large-scale depopulation of the Americas

after European arrival, subsequent land use change and secondary succession” (Koch et. al., 2019). The sudden lack of carbon dioxide that caused a global decrease in temperature was caused by the massacre of Indigenous Americans at the hands of European colonizers. In short, the planet cooled down because, all at once, a significant number of warm bodies turned cold, villagers stopped farming, people stopped living and breathing.

The ultimate purpose of this project will be to critically analyze the role that racism played in genocides of conquest - specifically those that took place in the Americas, although this argument could be extended to other places like Africa, Asia, and Australia. This in order to develop a new mode of looking at genocide not merely as a social practice (i.e., destruction and reorganization of social relations) but as an exercise of illegitimate power that somehow morphs into legitimate, real power and governments that people fear and respect (out of fear). While the purpose of colonial genocide was to gain control over the land and natural resources (including labor) of indigenous peoples, the root cause behind it was racism as a means to dehumanize native populations and therefore rationalize the use of violence and legitimize ‘ownership’ through legal means (if no one is alive to claim the land, or if the native population believes that the land should not and cannot be claimed, but you go ahead and do it anyway and file the necessary paperwork, it’s yours, because, technically it’s unclaimed).

The gap in the literature the author aims to fill by carrying out this study is what could be perceived as a deliberate omission of colonial genocides from the academic and international legal framework. If proven, this omission would be significant because colonial genocides were the first act that established Western dominance and laid the foundation for a new, hegemonic world order. This would mean that practices, such as dehumanization, that allow for justification of modern genocides find their origin in the genocides of conquest. Further, the erasure of colonial genocides could also be framed as an ethical allowance for continued oppression of indigenous subalterns, as current power/knowledge establishments are predicated upon this continued oppression.

Theoretical Framework

In order to examine the omission of genocides of conquest from the historical record on genocide and carry out a deconstruction of power as it pertains to both the term and consequences of this omission and exclusion, it is necessary to apply a theoretical framework that addresses colonialism, race and power. Therefore, the author will critically analyze the role that racism played in genocides of conquest - specifically those that took place in the Americas - applying a decolonial theory lens and using critical race theory to critique and fill gaps in how decolonial theory frames race in modernity. Finally, the author will apply a Foucaultian perspective to review the power structures that allowed these genocides to take place and subsequently be erased from history, replaced with a narrative of the progress and ingenuity of empire instead of the truth of its barbaric brutality and bloodshed.

Philip Spencer’s definition of modern genocide is the most relevant to the aims of this study, given the emphasis it places on the importance of recognizing genocide as a colonial project. Spencer

describes modern genocide as, “a particular, historically located phenomenon. It goes back to the origins of the world order in which we still live (a world order dominated by western, imperialist states)...in many cases, conquest involved not only the subjugation of indigenous peoples, the theft of their land and... resources - but also the destruction of groups, in whole or in part” (Spencer, 2013).

Genocide is the basis of the current world order; Western, hegemonic civilization is founded upon colonial violence. Furthermore, racism and otherization also play a role in how genocides of conquest are erased and framed as less than what they were (i.e., not even defined, categorized, or remembered as genocides, simply a lot of people that just “died right as expansion of the world took place” not “were murdered at the hands of colonizers for the purposes of founding a new world order”). For this reason, in order to address this colonial violence and suffering inflicted upon the colonized, the author is applying decolonial theory as part of the theoretical lens.

Decolonial Theory formed in direct opposition to the dominant hegemonic system. The theory of decolonizing encompasses the intellectual work which articulates a broad rejection of Western European supremacy by colonial/racial subjects. The roots of decolonization can be traced to the first reactions made by colonial/racial subjects as early as 1492 to the violence wrought by Columbus in the Caribbean (Mignolo, 2018). It is also found consistently in revolts to colonial rule throughout the Americas for the next 450 years. An important turning point in the history of decolonization was the first revolution carried out by colonial/racial subjects: The Haitian revolution carried out by enslaved people -- of both indigenous and African descent -- which led to Haiti’s independence from the French in 1804. In the following century, decolonial theory and action took definitive form as colonial/racial subjects from around the world fought for their liberation. A rich intellectual tradition was born that made explicit connections between the experiences of different colonized groups. This tradition was developed by drawing on local Indigenous knowledge bases, while simultaneously and explicitly engaging Marxist, existentialist, phenomenological and other modes of analysis. Decolonial theory is successful at expressing the experience of so many because it points out each discourses' respective limitations while furthering their applicability to the conditions at hand, and the common goal of colonial/racial subjects to achieve liberation, autonomy, and sovereignty (Mignolo, 2018).

Its aims are to dismantle the oppressive world order established by the West and imagine a future in which indigenous peoples will have their sovereign lands back and complete autonomy over their bodies. The crisis of Western hegemony and of its coloniality of power (Quijano, 2000) has been framed in terms of the refusal of the West to acknowledge the degenerative effect its unsustainable way of life has had on the world’s ecology, economy, health, peace, and human civilizations. Jones writes, “The routine reproduction of Eurocentric forms of social inquiry is parasitic on widespread ignorance of world history, including the histories of colonialism and imperialism and, even more so, the histories of non-European peoples. These structures of ideology and ignorance are deeply embedded in historical process, in actual international relations” (Jones, 2006).

Decolonial theory is important for this study as it allows us to determine both the extent to which colonial violence and genocides of conquest are the basis of modern power structures, why genocides of conquest are omitted from modern definitions of genocide, and the consequences/impact of this omission. Decolonial theory also allows for an envisioning of a new start instead of the reimagining or restructuring that post-colonial theory would advocate for. Not to mention the fact that decolonial theory allows for a de-centering of Western, hegemonic experience and a centering of the histories of indigenous peoples.

Moreover, although Critical Race Theory exists in a space that aims to reform and improve the existing system whereas decolonial theory exists to change the system by means of radical thought and literal revolution, CRT is still in a position to bring value to this project by virtue of the fact that it allows us to explore the social construction of race, the subsequent emergence of whiteness as social capital and Blackness and/or indigeneity as a burden. “The racialization of identity and the racial subordination of blacks and Native Americans provided the ideological basis for slavery and conquest.” (Crenshaw et. al., 1996) Whilst it might seem counterintuitive, Kimberle Crenshaw’s CRT is truly important for this project as it simultaneously creates space for a critique of one facet of decolonial theory’s ousting of all non-indigenous peoples - even those who are mixed descendants of colonized and colonizer - from indigenous lands *and* fills that gap with proposal of intersectional ideology and presentation of duality, bifurcation and fluid borders that exist in the creation, definition and in living within racial identities. “The construction of white identity and the ideology of racial hierarchy were intimately tied to the evolution and expansion of the system of chattel slavery... It was their racial Otherness that came to justify the subordinated status of blacks.” (Crenshaw et. al., 1996) The same argument of otherization can be made for the indigenous peoples of the Caribbean, Mexico, Peru and other parts of Latin America, who were enslaved by Europeans and forced to mine gold (de las Casas, 1552).

The value of bringing in the narratives of African slaves brought to the Americas by colonizers to this project is three-fold: First, the “racial axis has a colonial origin and character, but it has proven to be more durable and stable than the colonialism in whose matrix it was established” (Quijano, 2000), which will prove useful in an analysis of the morphing of colonial power. Second, the African slave population (especially in the Caribbean) served to replace the cheap labor source that indigenous populations had provided even as colonizers steadily killed them off. This dichotomy is complex and worth exploring. Third, the African slave population was ripped away from a land that was also colonized and this population became a part of a diaspora - by taking these slaves from their mother land, from their native tongue, from their families, cultures, and traditions, colonizers were committing social genocide.

Both of these forms of genocide (physical and social/cultural) are means of exercising power over a population. These actions form a part of what Michel Foucault describes as a political anatomy of power that is the primary mechanism that assists in the creation and disciplining of docile bodies. These docile bodies are the source of cheap labor that colonialism and, later, capitalism would rely on to make empires rich and continue to accumulate power. “A ‘political anatomy’, which was also a ‘mechanics of power...’ defined how one may have a hold over others bodies, not only so that they may do what one wishes, but so that they may operate as one wishes, with

the techniques, the speed and the efficiency that one determines... Small acts of cunning endowed with a great power of diffusion, subtle arrangements, apparently innocent, but profoundly suspicious, mechanisms that obeyed economies too shameful to be acknowledged, or pursued petty forms of coercion... Discipline is a political anatomy of detail" (Foucault, 1975).

What's more, is that, as Spencer points out, colonial violence became the basis for the greatest power in world history: Western hegemony. These mechanisms have become entrenched not only in social structures and political institutions, but in the bodies of the colonized themselves. So, as time has gone on, colonial/racial subjects see less of a way to bring down the system of colonialism and even begin to oppress one another using these same tactics. Frantz Fanon wrote that, "The unpreparedness of the educated classes, the lack of practical links between them and the mass of the people, their laziness, and, let it be said, their cowardice at the decisive moment of the struggle will give rise to tragic mishaps" (Fanon, 1961). Educated classes or "colonial elites" have taken the tactics of the colonizer and turned them against their own people.

Colonial violence somehow became legitimate power, the concept twisting in such a way that colonial/racial subjects feel trapped. Thus, they act on notions of internalized oppression and take decisive action to end their wretched state by acting upon what they perceive as their only way out. This only option out? Repeat what worked for their oppressors in a quest for 'progress' or 'success,' and figure out a way to otherize/terrorize 'inferior' populations. Only, as the story of colonial power has persisted, and morphed into neocolonial, neoliberal, and therefore capitalistic forms of suppression, this otherization has become based in class (1) instead of race or (2) on top of race. Either way, violence towards a dehumanized other begets power. "Perhaps we haven't sufficiently demonstrated that colonialism is not satisfied merely with holding a people in its grip and emptying the native's brain of all form and content. By a kind of perverted logic, it turns to the past of the oppressed people, and distorts, disfigures, and destroys it" (Fanon, 1961). In short, destruction. For colonized peoples, this is all 'progress' leaves in its wake.

Lemkin defines genocide as "a coordinated plan of different actions aiming at the destruction of essential foundations of the life of national groups, with the aim of annihilating the groups themselves" (Genocide Convention, 1945). This definition of genocide has informed the Western creation and codification of the term and action of genocide. However, this definition is lacking on several fronts, not the least of which include a listing of values/objects significant only in Western ontology (such as national feelings, destruction of personal property, and destruction of economic existence of nation-states). For the purposes of addressing these shortcomings as they relate to genocides of conquest, the author will now critique the inclusion of intent and a "plan" in the Western definition of genocide utilizing a decolonial framework in conjunction with a radical race theory - an idea derived from critical race theories but retrofitted to be able to intertwine with decolonial thought without a conflict of interest.

Colonial genocide is a composite act. It is composed of the cumulative effect of discrete actions, such as dispossession from land, neglect of and starvation of indigenous populations, and kidnapping of children. In the beginning (i.e., when the Tainos encounter Columbus on the island of Quisqueya), colonizers committed atrocious acts with no coordination or plan other than to

inflict pain: "...accounts of Spanish colonists (hidalgos) hanging Tainos en masse, roasting them on spits or burning them at the stake (often a dozen or more at a time), hacking their children into pieces to be used as dog feed and so forth, all of it to instill in the natives a 'proper attitude of respect' toward their Spanish 'superiors...' [The Spaniards] made bets as to who would slit a man in two, or cut off his head at one blow; or they opened up his bowels. They tore the babes from their mother's breast by their feet and dashed their heads against the rocks...They spitted the bodies of other babes, together with their mothers and all who were before them, on their swords" (Ward Churchill, 1994).

Unplanned and uncoordinated as they may have been, the effects of these reckless and violent actions would result in the near-complete annihilation of a people. This is genocide, but it is not recognized as such, especially not on any political platform or even on an international scale.

The United Nations claims to be the premier organization for fostering peace and defending so-called universal human rights in the world - yet it fails to include genocides of conquest in any legal precedent establishing regulations for the prevention and punishment of genocide. Thus, recognizing genocide first and foremost as a colonial project that preceded its use in modernity will play an important role in the development of this project.

The question now is: will the system ever accept this definition and use of the term genocide? What would a failure to do so mean for colonized peoples? What would a concession to do so mean for empire? The following sections are meant to take the reader through how the author attempted to find answers to these questions, utilizing the theoretical framework that has just been presented.

Methodology

Given the ideological, political and at times philosophical denseness of both the research question and the subject matter at hand, a qualitative study is the path this researcher will take. Secondary data collection will suffice for the purposes of this project. Most importantly, the author will carry out a critical discourse analysis of several United Nations documents. 'Most importantly' because critical discourse analysis will allow the author to establish the aforementioned link connecting past to present. As Foucault, this author sees that it is "fate to be redefined by knowledge," and that a genealogy of the present academic-legal complex from which the power to define, police, prosecute and punish genocide derives its foundations, also masks how these systems have managed to duplicate genocide as a foundational practice for colonizers and as a way to create docile bodies of the colonized (Foucault, 1975).

Discourse Analysis

Discourse analysis will allow this author to carry out this genealogy by way of examination of various official documents that make up the framework of the international body that is the United Nations. The author chose to study genocidal discourse through document analysis for the following reasons: First, document analysis is an effective way of gathering data because

documents are manageable and practical resources. Second, documents are commonplace and come in a variety of forms, making documents a very accessible and reliable source of data. Third, obtaining and analyzing documents is often far more cost and time efficient than conducting one's own research or experiments (Bowen, 2009). Finally, documents are "non-reactive" data sources, meaning that they can be read and reviewed multiple times and remain unchanged by the researcher's bias or changes in the research process (Bowen, 2009).

Discourse analysis is the most practical method for carrying out genealogical studies for the following reasons: First, "In order to interpret the research material, an appreciation of the embedded norms of social practices gained through being 'inside' the discursive field, is... required" (Hewitt, 2009). Critically analyzing the language and discourse surrounding genocide found in official UN documents will allow the author to reflect upon practices used by this body from the "inside" of this body. Language dictates norms, thus, by studying language, the author will be able to decipher how exactly genocide is defined, policed, prosecuted and punished by the United Nations. Second, "Analysis of discourses has the potential to show the link between political rhetoric, and how discourses are created and maintained. Foucault's concept of power acknowledges the diverse influences of social and political relations on policy, beyond the immediate political arena" (Hewitt, 2009). Third, discourse analysis will allow the author to further analyze what UN practices and discourse surrounding genocide mean within the theoretical framework proposed. Finally, discourse analysis is useful for researchers carrying out "time-limited academic research," (Hewitt, 2009) which applies to the context of this study.

Why the United Nations?

The United Nations has played a central role in the construction of the term *genocide*. It can very well be said that the organization created the term, or at least put their full support behind the person who did. At the very least, the UN plays a big part in legitimizing the word *genocide*. For example, until the UN recognized the Rwandan genocide as a genocide, it simply wasn't one in the eyes of the international community. It took 800,000 people being murdered, women and children being dismembered in the streets, for the Rwandan genocide to be graduated to "crimes of genocide" in the UN framework. The UN also plays a large role in deciding when to use and when not to use the term genocide, as evidenced by the Rome Statute of the International Criminal Court, the only international body equipped to appeal, prosecute, and punish the crime of genocide.

Meaning, the United Nations, as the premier authority in modernity and hegemony of international interaction and rule, has developed most of the body of work as it pertains to defining, regulating, policing, and prosecuting instances of genocide. In short, the UN wields immense power, especially on the topic of genocide, as evidenced by the UN charter wherein the majority of the countries of this planet pledge their support and give power to the UN to be an international force for maintaining peace and working towards a vision of the greater good. By studying this specific organization's literature, this author foresees gaining insight into power structures and relations that have allowed for an erasure of colonial genocides from informing the body of knowledge on

genocide in modernity, as well as how race as a specifically (ongoing) colonial project has impacted these structures.

The research sample consisted of four United Nations articles and guiding documents, including the *Convention on the Prevention and Punishment of the Crime of Genocide*, the *UN Declaration on the Rights of Indigenous Peoples*, Article 4 of the *Geneva Convention*, and the *Rome Statute of the International Criminal Court*. Using the UN's own documents to gain a sense of understanding for how the organization defines, regulates, polices and prosecutes genocide is truly only possible through discourse analysis (as demonstrated in the above subsection titled "Discourse Analysis"). The United Nations is viewed as the premier organization consolidating international authority and creating jurisprudential knowledge at this moment in world history, again, as evidenced by the sovereign nations that have ratified the UN charter, fund the organization for this very purpose and are participants to its functions. These documents have been selected because they are guiding documents of said organization, specifically as it pertains to defining/criminalizing/prosecuting genocide/genocidal acts.

The UN Declaration on the Rights of Indigenous Peoples is the only document included in this study that does not form a part of governing documents for the UN as a whole entity or even for branches of that entity. Nevertheless, the UNDRIP has been selected as part of this study because it was created in an effort to add nuance to the way the organization (UN) deals with matters that pertain to indigenous peoples. Moreover, the UNDRIP is the only document in the body of UN declarations that grapples *directly* with indigenous issues, and specifically addresses indigenous genocides (importantly, employing the term *genocide* in its description of events). In addition to specifying that genocide did occur in a colonial setting, the Declaration states the importance of sovereignty and self-determination for indigenous communities, and introduces communal rights as a rhetoric more fitting with indigenous life ways than a "traditional" international human rights narrative.

To reiterate, critical discourse analysis is the best methodological approach to analyze these documents for the following reasons. Firstly, discursive analysis works well with the heavy/dense theoretical framework being applied to/in this research study. Secondly, qualitative discourse analysis will help to break down the data collected and aid in organizing findings and inputting those into the theoretical framework. Thirdly, critical discourse analysis is an approach that will require the UN to look to instances of genocide that occurred before its creation. This final point is important in the context of this study because these genocides of conquest have shaped the world, and discourse analysis will reveal exactly how that shaping took place. Finally, seeing as the UN was founded in response to World War II, to prevent global conflict on that scale from happening again, and maintain the peace, critical discourse analysis will allow the author to evaluate the organization in relation to this goal.

Furthermore, because of the context in which the UN was founded, most of the early international guidelines passed by this body (specifically those concerned with protection of human life and human rights, especially during wartime) were those that attempted to understand, govern and prevent genocides like the Holocaust from happening again. However, though their quest to

understand this phenomenon was noble and necessary, this body failed to base their research on instances of genocide that were more far sinister than even the Holocaust. Was this because these instances were further back in time? Was it because of the hyper-racialized nature of colonial genocides? Was it because these instances were seen as essential to the founding of a modern world-order whereas the Holocaust was seen plainly as inhumane? Was the omission of colonial genocides from the creation of an international discourse of genocide a combination of all these factors? Critical discourse analysis applied in a Foucaultian context allows the author to decipher this complex puzzle.

Colonialism has influenced the creation of language/discourse. Discourse, in turn, shapes history; it shapes who is privileged, who is exploited, who is centered, who is otherized. Power is knowledge and knowledge is power (Foucault, 1975). Studying the language in each of the documents will allow this author to dissect *why* (1) neocolonial/neoliberal facade and progress over rights narratives exist in hegemonic discourse shaping definitions and consequences of genocide, (2) perpetuation of colonial oppression and colonial violence through a refusal to acknowledge genocides of conquest as exactly what they are (i.e., genocides) appears constantly within a hegemonic framework, and (3) anything that could be of substance/used for achieving some semblance of justice is automatically followed up with a fail-safe that protects the interests of empire.

Analysis

In the *Convention on the Prevention and Punishment of the Crime of Genocide*, drafted on 9 December 1948, the word genocide appears 19 times in the document as a whole (excluding titles). Out of these 19 instances, zero refer specifically to the Holocaust (though it can be inferred by the date that the drafting of this document and others that followed were motivated and inspired specifically to prevent anything like the Holocaust from happening again) and zero refer specifically to colonial genocides in the Americas. Further, there is no mention of specific genocidal instances on any continent and obviously no mention of the Rwandan genocide as it had not yet occurred.

Article II of the Convention states that, “genocide means any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group.” These acts include, killing, causing bodily harm, causing mental harm, sterilization, and/or forceful transference of children from one group to another (UN, 1951). Moreover, and perhaps most importantly in the case of this document and in the context of this paper, Article XII states that, “Any contracting party may at any time, by notification addressed to the Secretary-General of the United Nations, extend the application of the present Convention to all or any of the territories for the conduct of whose foreign relations that Contracting Party is responsible” (UN, 1951). Put simply, this states that control over non-sovereign territories (i.e., colonies) is left to the nation-state that has imposed itself as sovereign in those areas. However, looking at this from a decolonial and critical race perspective, this inclusion of a loophole through which colonizers can escape international justice on a technicality, shows how power in a colonial context has evolved and continues to impact/shape international relations. These are serious allegations which have

powerful implications for potentially proving claims that the UN is an inherently imperial institution, set up to protect the interests of colonial powers instead of the interests of all humankind, no matter their race or creed.

The UNDRIP is a non-legally binding resolution, presented at the UN General Assembly in 2007 to assert that indigenous peoples should be privy to the same rights as the rest of humankind. Article 3 of the UN Declaration on the Rights of Indigenous Peoples states: "Indigenous peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development." Parts II and III in Article 46 of the same Declaration read as follows: In the exercise of the rights enunciated in the present Declaration, human rights and fundamental freedoms of all shall be respected. The exercise of the rights set forth in this Declaration shall be subject only to such limitations as are determined by law and in accordance with international human rights obligations. Any such limitations shall be non-discriminatory and strictly necessary solely for the purpose of securing due recognition and respect for the rights and freedoms of others and for meeting the just and most compelling requirements of a democratic society. The provisions set forth in this Declaration shall be interpreted in accordance with the principles of justice, democracy, respect for human rights, equality, non-discrimination, good governance and good faith (UNDRIP, 2007).

Even if a few powerful ideas are put forth in the Declaration as a whole, this conclusion completely counteracts the contents of the rest of the Declaration. Article 46 completely cancels out Article 3 (to name a specific clause, though the rest of the UNDRIP is also impacted) according to the repugnancy clause as detailed by Roger Merino Acuña in his article *Critical Human Rights and Liberal Legality* (Acuña, 2013). According to Acuña, self-determination is an incredibly important principle that must be put in practice if liberation of indigenous peoples from colonial structures is ever to become a reality. However, hegemonic legal structures are not equipped to conceptualize and allow implementation of autonomy for indigenous peoples, as evidenced by the inclusion of Article 46 which effectively absolves the UN and its parties of any action in addition to the fact that almost no imperial power ratified the UNDRIP.

Human rights, especially those applied in a genocidal context, are biased tools manipulated and made to appear universal but in reality, they provide "no platform to recognize a real indigenous autonomy" (Acuña, 2013). Historically, change must come from outside liberal legal systems because these frameworks are not equipped to advance the indigenous cause and cannot make a difference because these institutions are biased to begin with. This author wishes to respect the Declaration to recognize the work put in by leaders and lawyers of various indigenous communities around the world; *however*, does working within a framework as historically imperialist as the UN's truly advance the cause/struggle of indigenous peoples all over the world? To be frank - no, it does not.

Further, the UNDRIP mentions the word genocide in an indigenous context only once in Article 7, Section II, stating that, "Indigenous peoples have the collective right to live in freedom, peace and security as distinct peoples and shall not be subjected to any act of genocide or any other act of violence, including forcibly removing children of the group to another group" (UNDRIP, 2007). In

fact, when speaking of past injustices indigenous peoples have suffered vis a vis colonization, the UNDRIP again fails to mention genocide specifically: “Concerned that indigenous peoples have suffered from historic injustices as a result of, inter alia, their colonization and dispossession of their lands, territories and resources, thus preventing them from exercising, in particular, their right to development in accordance with their own needs and interests” (UNDRIP, 2007). Why would the one charter in the history of the United Nations that is focused on the life and rights of Indigenous Peoples decline to mention one of the most impactful, harmful and hurtful events in indigenous histories across the globe?

Frantz Fanon offers an interesting insight at this point. He wrote, “Sometimes people hold a core belief that is very strong. When they are presented with evidence that works against that belief, the new evidence cannot be accepted. It would create a feeling that is extremely uncomfortable, called cognitive dissonance. And because it is so important to protect the core belief, they will rationalize, ignore and even deny anything that doesn’t fit in with the core belief” (Fanon, 1952).

It’s obvious that mentioning genocide would completely undermine not only the United Nations as an institution, but the very hegemonic structures that uphold it. The reality is that this hegemonic world order is founded not only on genocide but also on the negation that they were capable of committing such atrocious acts. Without this negation their minds would rupture, so this premise is replaced with an alternative narrative. Genocide could not have been and cannot be committed against indigenous peoples in the mind of the colonizers because they have had to dehumanize them to the point that the life of an indigenous person is worth no more than the life of a pesky fruit fly. Now, after dehumanizing them, colonizers are able to frame themselves as white saviors, rescuing the “savage” from his terrible state of nature. “In the colonial context the settler only ends his work of breaking the native when the latter admits loudly and intelligibly the supremacy of the white man’s values” (Fanon, 1952). This way, the colonizer never has to see himself for what he is: a murderer.

Article IV of the Geneva Conventions (1949) sets rules that must be followed with regards to civilians in a time of war, presents a definition of who is a “protected person,” and stipulates how protected persons should be treated. Article IV of the Geneva Conventions contains zero mention of the word genocide, in any context. However, the Convention offers helpful context to how protected persons should be treated in a time of conflict. Moreover, although the law in this case cannot be applied retroactively, the fact that some or all of these protocols have been broken in colonial contexts (i.e., Syria, Yemen, Darfur, Iraq, Côte d’Ivoire, and Afghanistan to name just a few) after the Conventions were ratified has a lot to say about the pervasiveness of otherization and dehumanization in the application of international humanitarian law.

According to Article IV of the Geneva Conventions, a protected person is someone who is taking no part in the hostilities of war yet at any given moment finds themselves, in the case of a conflict or occupation, in the hands of a party to said conflict or in the hands of an occupying power of which they are not nationals. This definition as set forth in the Convention includes “members of armed forces who have laid down their arms,” and it is expected that all protected persons be treated humanely under all circumstances, “without any adverse distinction founded on race,

colour, religion, or faith, sex, birth or wealth, or any other similar criteria" (1949). In addition to requiring that all protected persons be treated humanely, the Convention also prohibits the following behaviors with respect to any and all protected persons: "violence to life and person, in particular murder of all kinds, mutilation, cruel treatment and torture; taking of hostages; outrages upon personal dignity, in particular humiliating and degrading treatment; the passing of sentences and the carrying out of executions without previous judgment pronounced by a regularly constituted court, affording all the judicial guarantees which are recognized as indispensable by civilized peoples" (1949).

Each of these prohibited acts was committed on Hispaniola, formerly known as Quisqueya, what is now the Dominican Republic and Haiti against protected persons (elders, women and children) taking no part in the hostilities of war, as shown by this account written by Bartolomé de las Casas, a Franciscan priest sent with the Spaniards to document the colonies: "A Spaniard...suddenly drew his sword. Then the whole hundred drew theirs and began to rip open the bellies, to cut and kill [a group of Tainos assembled to deliver encomiendas] men, women, children and old folk, all of whom were seated, off guard and frightened...And within two credos, not a man of them there remains alive. The Spaniards enter the large house nearby, for this was happening at its door, and in the same way, with cuts and stabs, began to kill as many as were found there, so that a stream of blood was running, as if a great number of cows had perished. Elsewhere, [de las Casas] went on to recount how in this time, the greatest outrages and slaughterings of people were perpetrated, whole villages being depopulated...The Indians saw that without any offense on their part they were despoiled of their kingdoms, their lands and liberties and of their lives, their wives, and homes. As they saw themselves each day perishing by the cruel and inhuman treatment of the Spaniards, crushed to earth by the horses, cut in pieces by swords, eaten and torn by dogs, many buried alive and suffering all kinds of exquisite tortures... [many surrendered to their fate, while the survivors] fled to the mountains [to starve]" (Ward Churchill, 1994).

The same pattern extends across time; we can see that the same is happening in Syria, Afghanistan, and Iraq. In Syria, cities are indeed being depopulated, people are being forced to flee their homes. In Afghanistan and Iraq, white phosphorus, a chemical weapon banned by the UN, has ravaged entire villages overnight (Meuse for [NPR](#), 2017), tearing flesh from the bodies of women, children, men, and animals in the vicinity, incinerating the lungs on contact. Why did this happen? Why does this continue to happen? Power continues to be taken by fear mongering. Land continues to be stolen by wiping the original inhabitants off of it as if they never existed.

Just as gold was mined by working indigenous slaves to death, and Western wealth was accumulated by enslaving millions of Africans, oil has also been claimed at the expense of the sovereignty and stability of entire regions. Cheap labor and control over resources are apparently still more valuable than a human life. Dehumanization is evidently still enough of an excuse to reduce a human life to less than nothing. The cycle of colonial oppression established and legitimized by the genocide of millions of indigenous peoples in the Americas continues today. Is the prosecutorial body the UN created in the face of these "grave human rights abuses" equipped to prosecute crimes of genocide if they are committed by the very nations that founded the UN? Is something better than nothing? Or does the UN's judiciary structure simply serve to punish

those committing genocide on the periphery, while their examples in the center (such as the U.S., France and China) continue to get away with murder?

The Rome Statute of the International Criminal Court (ICC) was passed by the United Nations General Assembly and the Security Council in 1998 in Rome, Italy. The Statute established the ICC and gave the Court jurisdiction over grievous crimes “of concern to the international community as a whole” (Rome Statute, 1998). The Court is located at The Hague, Netherlands and is complementary to the International Court of Justice, with power to prosecute individuals and states accused of the following crimes: genocide, crimes against humanity, war crimes, and aggression (Rome Statute, 1998).

The word genocide is applied in six distinct instances in the document overall. The term genocide is employed zero times in direct relation to the Holocaust. However, the beginning of the Statute does read as follows: “during this century millions of children, women and men have been victims of unimaginable atrocities that deeply shock the conscience of humanity” (Rome Statute, 1998). The use of the phrase “this century” heavily implies that the atrocities responsible for shocking humanity include the Holocaust, which occurred in the middle of the 20th century, during World War II. The term genocide is used zero times in reference to conquest in the Americas. The term killing appears 4 different times in this document, each instance with no direct reference either to the Holocaust or genocides of conquest. It’s important to mention that only one of these instances in which the term killing appears occurs within the specified “Genocide” section of the Statute (Rome Statute, 1998). The term extermination appears twice: once to introduce the term as a crime against humanity, and the other to define the term (Rome Statute, 1998). There is no reference to any specific instance of genocide within the document as a whole. Finally, there is no specific mention of the Rwandan genocide or any colonial context, although the document could also be alluding to the Rwandan genocide when it mentions “atrocities” that occurred in “this [the 20th] century” (Rome Statute, 1998) as the Rwandan genocide occurred in the year 1994. Furthermore, the International Criminal Tribunal for Rwanda, set up by the UN Security Council in Tanzania under the auspices of the International Criminal Court, was the first international court to pass a judgement on genocide, setting important international, legal precedents (Leithead for [BBC](#), 2015). That tribunal ran for 21 years, finally adjourning in 2015.

In the preamble of the Rome Statute we read, “Recognizing that such grave crimes threaten the peace, security and well-being of the world,” (Rome Statute, 1998). Why are we only mindful of the unimaginable atrocities that occurred in “this” century (i.e., the 20th century)? Why do those crimes shock the conscience of humanity so deeply? Why did the Holocaust shake western civilization to its very core? Because never before had a people with such proximity to whiteness been subjected to the atrocities mentioned in the Rome Statute. Never before had a people with such proximity to whiteness been victims of genocide after colonization and the Columbian encounter/exchange. The former threatened the well-being of structures of power beneficial to hegemony and the West, while the latter is responsible for the successful creation of these structures of power that have persisted into modernity.

This begs the question: On the other hand, why is it that a genocide that literally changed the course of the ecology of the planet (Koch et. al., 2019) and laid the foundations for Western civilization and dominance in modernity is rarely mentioned? Why is it that this genocide has not been utilized to shape discourse surrounding genocide in both domestic and international contexts? The answer is simple: If the barbaric, systemic and heartless killings of indigenous peoples of the Americas, starting with the genocide of Tainos on Hispaniola, on to the ones that followed (including massacres of Arawak, Inca, and Maya; Apache, Cherokee, and Mohawk), were to be used in the formation of genocidal discourse, Western civilization would face a crisis of cognitive dissonance, as has previously been established in this section (Fanon, 1952).

Findings

We owe our current world system to the millions of murdered Indigenous women, children and men upon whose mutilated bodies settlers founded a 'brave new world.' What these settlers did was truly revolutionary - it had never been done before - and it is the basis of the current Western-centric, capitalist, hegemonic order. But, in order to uphold the myth of white supremacy and the structure of Western societies, and in order for the system of humanitarian justice that allows for countries that have placed themselves in the political center to continue to exploit countries they have placed in the periphery, the colonizer cannot see himself for what he is - a murderer, a rapist, a cold-blooded killer - and must paint himself as a liberator. The first step to dismantling oppressive systems of power, then, is to break this myth, to shatter it into a billion pieces.

Jose-Manuel Barreto writes about the colonizer as he is, directly complicit with the suffering he has caused the colonized, and helps us understand the link between power in modernity and genocides of conquest, using Foucault's theory of power/knowledge. He writes, "There is an immediate and inexorable link between the power of empire and the suffering of the colonized. The development of the concept of empire/suffering can benefit from revisiting Foucault's dyad 'power/knowledge,' focusing on its idiosyncratic structure. There exists a causal relation between power and knowledge: 'There is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations.' The counter-intuitive notion according to which knowledge is always the product of the operation of power is 'paraphrased' here by the notion of empire/suffering, which encapsulates the all too obvious but neglected historical fact that the deployment of colonial violence was and continues to be followed by pain and anguish in the bodies and minds of the victims of imperialism. In every deployment of imperial power there has been, as an unavoidable consequence, a causation of suffering. Empire and suffering are inextricably and necessarily linked. Empire/suffering does not enshrine another modern binary opposition; rather it highlights an amalgam of two inseparable sides: suffering is a potency residing in imperial power, and the consequence of the materialization of power. In the context of modern colonialism this translates into the cruelty of empires which may extend as far as exterminating their victims en masse, and into the suffering of the colonized" (Barreto, 2012).

Empire has been built upon the graves of indigenous peoples and on the backs of slaves. Genocide in a colonial context was used as a new politic - that of worldbuilding as requiring a new

and radical act, such as murdering 55-65 million people (Koch et. al., 2019) to agglomerate wealth for the motherland. Sinisterly, and to impede the colonized from turning around and employing that same politic of worldbuilding but as a foundational revolution and resistance to the system, genocides of conquest had to (of course) be erased from the narrative. The truth can't set anyone free if they don't know it.

"Hiding crucial aspects of their genealogy, Eurocentric theories of rights afford little or no significance to the history of the relations between the Third World and modern empires...By framing human rights in conceptions of history based exclusively on European milestones, the theory of rights remains within a Eurocentric horizon of understanding" (Barreto, 2012). Colonization is the project of European settlers thinking they knew best and forcibly transferring that knowledge in a context they did not understand. They transplanted Eurocentric ideals to places the world over and violently insisted: this is the "right way" to be, to exist, to govern, etc. What do you have to do to a people to justify colonizing them, both to yourself and to those people? You dehumanize and other them, pull rhetoric out of thin air that says you are superior to them because they have darker skin and wear less clothing. You then destroy their knowledge, their ways of producing knowledge. You have to destroy their way of existence, the way that they produce and practice culture, tradition, what they value. You have to destroy all of it. As has been shown, this is exactly what happened, and the suffering that ensued in the wake of the establishment of empires was appalling. That is who the perpetrators of colonial violence should see when they look in the mirror - someone who murdered and cheated and stole their way through to hold the positions of power they do now.

To understand how epistemology can aid in decolonization, it's helpful to look back and analyze how this same process aided in colonization, but one must be careful in this endeavor not to repeat the atrocities committed by colonizers (this is what most likely happened in Rwanda).

Axiology is the way colonizers ascribed worth to everything from the people to the land, quantified in terms of what the colonizers can gain by exploiting these people and things that to them are now resources. Axiology then informed epistemology - how one conceives knowledge and how one transfers knowledge, and what knowledge one sees as valid. Epistemology then shapes ontology - what is and what one knows about what is. Postcolonialism, and settler colonialism are the institutions and governance structures which are based off of those beliefs that were brought upon first contact. This narrative has been shaped, formed, and propagated by colonizers, and shoved down the throats of the colonized. The colonizer creates and sets the norm. The argument then is that this same structure can be flipped on its head and be used in favor of the marginalized. Barreto argues that the only possible way in which this 'flipping' can be achieved is by attempting to arrive at some notion of universal knowledge through a process he calls "epistemological decolonization." He claims this process will "clear the way for new intercultural communication; for interchanging experiences and meaning as a basis of another rationality which may legitimately pretend to some universality" (Barreto, 2012).

However, what settler colonialism does to us is that it makes us exist within all of these institutions - the intercultural communication Barreto is proposing take place in the stead of revolution would

be held within these colonial institutions. In other words, Barreto is saying that intercultural dialogue is a political tool that can replace revolution as the means of liberation. It is simply not that simple. To say that intercultural conversations can dismantle the structures that uphold empire and replace the hegemonic system undermines the violence the empire resorted to and the suffering said violence caused the colonized. How is it then that the empire can be torn down and the suffering that colonial conquest brought with it be made right?

Boaventura de Sousa Santos agrees with the previous points made by Barreto and argues that “the emancipatory potential of Law can be found on the legal dimension of counter-hegemonic global struggles developed by organizations and social movements” (Acuña, 2013). According to subaltern cosmopolitanism what makes liberal legality hegemonic is the specific use that the powerful make of it, but de Sousa Santos argues that, if the Other could somehow figure out a way to adopt these methods, it becomes possible to use hegemonic tools (laws and rights recognized by the state) for non-hegemonic aims. “Law is not emancipatory or non-emancipatory; emancipatory or non-emancipatory are the movements, the organizations of the subaltern cosmopolitan groups that resort to law to advance their struggles” (Acuña, 2013).

However, Acuña clearly states that the “problem with this approach is that it tends to see liberal legality as neutral,” when in fact its basis is committed to a capitalist political economy and Western modernity. “The focus on ‘human rights,’ ‘consultation,’ and ‘participation’ in all the binding instruments of ‘recognition’ of indigenous people’s rights is made at expense of ‘self-determination,’ ‘autonomy,’ and the necessity of ‘consent,’ communal rights that have profound redistributive features since they entail a limitation to the expansive nature of capitalism” (Acuña, 2013). In short, the master’s tools cannot dismantle the master’s house (Lorde, 1984).

In the context of what the literature points to as ‘wrong’ with the human rights framework (in theory, in the law, and in praxis) what benefits are there to these various declarations and what negative consequences could come from their existence in a space that negates the consideration of the entirety of history whilst simultaneously shaping discourse? Moreover, what is the significance of the supposed neutral/gray area where neo-colonizers like the US, Canada, Australia and New Zealand reside when they do not accept declarations and resolutions of this nature as legally binding documents, and refuse to recognize and work with indigenous peoples? All that said, at this point, the author would also like to discuss alternatives to working within the hegemonic system and its liberal legal facade/restraints. What would a modern revolution look like?

Recommendations

Discourse Revolution

Frantz Fanon spent a lot of his time thinking about that last question, and, for this author, truly, revolution is the only way out of a system so pervasively oppressive and corrupts as is the current hegemonic structure. He wrote, “Why don’t they stay where they belong? Of course!! Here lies the tragedy: it is said that they should stay where they belong. Only we told them they were French... We inserted France into everywhere, into their body, into their ‘soul,’ into every place

where something might prove great" (Trojan, 2016). Colonized bodies are docile bodies, exiled to the periphery of the world system. Unfortunately, this means they are otherized, racialized, and dehumanized. They are treated as objects rather than as individuals and subjected to greater oppression than docile bodies at the center of the world system.

Yet, this also allows the colonized to be uniquely positioned as it relates to escaping the disciplinary regime, seeing as the disciplinary regime doesn't fully accept them in the first place. This proximity to the periphery, this "ejection of [the colonized] from the world in which they had been told that they belonged," becomes a blessing in disguise because it is also what puts the colonized in a position to successfully orchestrate a revolution. "To suffer the condition of the colonized is to exist fundamentally without a world, to suffer world-lessness" (Trojan, 2016). Is it any wonder that a human being put in this position, without a place in the world as it is, would want to create a new one? One must wonder, what would have happened if the inhabitants of what is now the Americas had reached Europe before Europe reached them?

Foucault, however, claims that dominant regimes always resist revolutions, dodging change in an expert manner, because they must - it is an act of self-preservation. This is the one issue the author takes with Foucault's theoretical framework: he makes no room for any normative possibility of change. For Foucault, the way regimes resist foundational, revolutionary change is by making restorative, adaptable changes that change disciplinary technique without compromising the deeper, desired effect (i.e., the creation of useful, docile bodies). Foucault describes these changes as, "[small] acts of cunning endowed with a great power of diffusion, subtle arrangements, apparently innocent, but profoundly suspicious, mechanisms that obeyed economies too shameful to be acknowledged, or pursued petty forms of coercion - it was nevertheless they that brought about the mutation of the punitive system, at the threshold of the contemporary period." This author agrees with Foucault on one point: Regimes *always* resist revolutions. If there wasn't resistance, there wouldn't be much chance for a revolution in the first place. However, from Foucault's point of view, change is apparently something that can only be employed by the disciplinary regime to redesign its facade every time it's threatened. This view of change is restorative, comparable to fixing up an old car with fresh paint, new rims, and maybe a new set of tires, but nothing fundamental changes and it's the same car in a different color.

For Fanon, on the other hand, revolutionary change must be foundational. Meaning, the old car is sent to the junkyard and melted down, and then the hard work of building a brand-new car from scratch begins. On why this dismantling and subsequent forging must occur, Fanon writes, "Dominant publics are by definition those that can take their discourse pragmatics and their life-worlds for granted, misrecognizing the indefinite scope of their expansive address as universality or normalcy. Counter-publics are spaces of circulation in which it is hoped that the poesis of scene making will be transformative, not replicative merely" (Trojan, 2016). Although resistance to revolution will always be present, it will be useful in the sense that it will fuel a conflict which can serve to strengthen a foundational revolution. Moreover, this proves that a regime making adaptable changes is not revolutionary but restorative, and restorative changes are problematic because they allow for sinister perpetuation of unjust systems of oppression by framing these systems as universal truths or correct. A foundational revolution would not allow the old system

to regenerate, because the first step of this type of revolution is to take down the system, the old disciplinary regime, in order to make room for a completely new beginning.

The foundation referred to in this case is ideology, axiology, and epistemology. As demonstrated ad nauseum, the inequities present in current world systems are not accidents of nature or the results of phenomena beyond human control. On the contrary, they result from actions and omissions of public institutions and others charged with protecting human rights and upholding human dignity. This article has demonstrated the harm that omissions of colonial genocides have caused. This author also sees a path forward to correcting this harm. It is as powerful and as simple as changing the language we use in the defining, policing, prosecution, and punishment of genocide. In short, changing the language surrounding genocidal discourse would allow for a revolutionary shift in power from the top to the bottom, from the North to the South, from the oppressor to the oppressed.

Future Research

This study cannot be taken as a means to reform the UN, but it can inform future research that may wish to work within the hegemonic system. Further research is also required to establish whether genocides of conquest have any sort of bearing upon judgments of the ICC as they pertain to tribunals established to bring war criminals to justice. This is a completely separate body of documents that this researcher did not access, but that would serve a valuable purpose to add even more nuance to this study and/or others that may follow.

Conclusion

The purpose of this study was to analyze if an omission of genocides of conquest exists in dominant discourse surrounding genocide. This purpose was achieved, and the author has found/concluded that colonial genocides have been omitted from the record, erased from history, as it were. What the omission of these genocides means reveals so much about current structures and systems of power - it reveals that Western political thought and civilization is not so much based on values/ideals of democracy and liberty, but more so founded upon genocide (i.e., systemic killing of a racial/ethnic group) as a means of creating a new world order, stealing/pillaging of indigenous lands, and exploitation of indigenous and African bodies, among other atrocities that, yes, are indeed crimes against humanity.

These genocides are the foundation of modernity and hegemonic world order. The fact that colonizers have still *not* been held accountable has enabled/perpetuated the following: (1) Colonizer nations have grown economically and privileged to have an excess/surplus created by a capitalist system built on stolen land (access via the systemic extermination – genocide – of indigenous peoples) and stolen lives/labor (enslavement/diaspora of African natives). (2) Colonized nations have been oppressed and unable to grow economically because their life ways have been destroyed, any crops grown were exported (food deserts and starvation in a fertile land) to the hearth of empire (colonizer nations). The island nation of Haiti is an example of this. Beyond being colonized, and in the ultimate act of cruelty and irony, Haiti was later forced by

France, under threat of neo-colonization, to pay reparations to its colonizers (Porter et. al., 2022). (3) Finally, lack of accountability has allowed for perpetuation of racist and inherently oppressive narratives. These unresisted discourses have contributed to current manifestations of this crisis: including police brutality against colonized bodies living within the confines of empire and perpetuation of genocide within former colonies against ethnic minorities (e.g., Rwanda) and on the part of corporations¹¹⁸.

Power, how power is held, exercised and distributed has been predicated by these genocides and the fact that they reorganized the world in favor of murderers. If the reader can see this thread, then the author has succeeded in what she initially set out to do. Beyond this realization, the author also hopes that you desire and are willing to work towards justice and change. What exactly would justice look like? Well, hegemony is power but it can't turn back time (nor would it want to, all things considered) or bring back the dead. What it can do is take its proverbial foot off the necks of the descendants of the dead and *allow* them to breathe, to live, to grow, to die in peace when it is their natural time to leave this earth. Hegemony owes a monumental debt, considering the fact that a life is surely worth more than gold, and they've taken millions. To repay this debt, the system must ensure that the descendants of those it murdered carry out a quality life. However, because the system's survival is predicated upon the oppression of those descendants, of those colonized, docile bodies, it will not do these things. Hegemony can't bring back the dead - but it can be dismantled. Only through ideological and structural revolution can the system be changed enough for justice to be achieved. We, the people, not the system, bring justice to the dead.

This is the author's contribution to knowledge in this field: a challenging of knowledge itself. Not on what genocide is, we know very well how barbaric, how sad genocide is and what constitutes a "genocide." No, this article challenges what genocide does and what it means for world systems. This article demonstrates that genocide is the foundation of a hegemonic world system. The U.S., for example, "succeeds" not because the U.S. is successful - the U.S. succeeds because the U.S. committed genocide. "Two centuries ago, a former European colony decided to catch up with Europe. It succeeded so well that the United States of America became a monster, in which the taints, the sickness and the inhumanity of Europe have grown to appalling dimensions" (Fanon, 1952). The success of this empire is a product of the blood spilt by colonizers, with no regard for life. By contrast, Haiti is a "failed state", not because Haiti is a failure - Haiti "fails" because it is a product of pain, suffering and death inflicted at the hands of empire (Barreto, 2012), for the benefit of empire and the detriment of the (newly formed category and narrative to justify atrocities) 'less-than-human' native.

¹¹⁸ "Land judged to be valuable to corporations would be bought or forcibly seized by paramilitaries and sold to rich individuals or corporations. When someone refused to buckle under the weight of threats, the paramilitaries resorted to violence... In Colombia, on Dec. 6, 1928, Chiquita—then the United Fruit Company (UFC)—got the police and army to massacre hundreds of banana workers striking for better conditions. Colombians still refer to the so-called 'masacre de las bananeras.' UFC is infamous throughout the region for its intense lobbying effort in Washington, which eventually helped lead to a CIA-instigated military coup d'état in Guatemala in 1954, overthrowing the democratically elected reformist social democratic president Jacobo Arbenz and installing military dictator Carlos Castillo Armas. This helped unleash a civil war that ended with a quarter of a million dead, and what the United Nations has termed "genocide" against the indigenous Maya population." (Kennard 2017).

For Foucault, there is no escape from the disciplinary regime. Systems of power-knowledge are deeply embedded within society. It is these disciplinary structures that create individuals, shaping them into docile bodies to be exploited for the benefit of the same system (Foucault, 1975). These bodies are continuously observed, subjected and expected to live in accordance with what Foucault calls the “normalizing power” (Foucault, 1975). Inasmuch as discipline makes individuals, the panoptic gaze of the disciplinary regime also makes it so that individuals cannot step outside of societal norms imposed by said regime.

However, what this author wishes to remind the reader of is this: Before European hegemony willed itself into existence, and before Western thought dominated a modernized world, there was no global, disciplinary regime formed by a dominant discourse. There was no universal notion of “normal.” The world was decentralized, and the discourse which informed power-knowledge in Europe, was not the same as the discourse that informed power-knowledge in pre-Columbian America, ancient Oceania, or pre-colonial Africa. Fanon shows us that the colonial project is the beginning of an imposition of European (colonizer) norms upon indigenous populations (colonized), which would result in the oppression and exploitation of the colonized.

Discourse preceded genocide, discourse justified genocide, and discourse continues to perpetuate systems of oppression built upon terror and genocide – built upon crimes against humanity that no one has paid for committing, that no one has received justice for enduring. Therefore change involves countering the false narrative of white saviorism – that fallacy that preaches “Europe did it right, so Europe has to save the poor little colonies.” No, actually, they did it wrong and upended life-ways in a previously self-sufficient and flourishing ecosystem and civilization. It is their oppression that subjugated them in the first place (Freire, 1970).

Based on these conclusions, practitioners should consider ideological and structural revolution as a viable means of abolishing the current, oppressive world order and founding a new and equitable one, with the principle of justice enacted to counter continued implementation of colonial violence. We “realize at last that change does not mean reform, that change does not mean improvement,” and that “we must make a new start, develop a new way of thinking, and endeavor to create a new man” (Fanon, 1952) for the system to ever really change. We must build a new world; one that recognizes genocides of conquest and gives power back to those it was taken from so long ago.

In 1492 Columbus sailed the ocean blue. What that would mean for the peoples indigenous to the Caribbean and what that still means for their descendants is certainly death, torture and oppression in the various forms that have been detailed in this paper. However, contrary to the narrative that is propagated about this people - the Taino people, this author’s people, the first to receive colonizers in the “new world” and offer them refuge and sustenance, for which they received repayment in the spilling of their blood - they are not extinct. To be clear, the fact that their genocide is not included in the dominant discourse and the fact that they are erased and portrayed to be extinct is another form of genocide; truly, a way to ‘finish the job’ started by Spanish conquistadors, and later the French, Dutch and British, among others. Yet, in spite of this continued oppression, they live on. *They live on.* And the fact that they do is in and of itself a

counterargument to a discourse that would rather paint this resilient people as dead. Their very life is an act of rebellion, a subversion of hegemony's narrative; their continued existence and resistance is a revolution.

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Enhancing Quality Education through Partnerships: Why It Matters in Higher Education in Cameroon

Eta Mercy Aki, Sophie Ekume Etomes, and Linda Melem
(University of Buea, Cameroon)

Abstract

Higher education is tasked with developing quality workers and increasing the quality of life of its recipients. Achieving these goals requires high-quality education. Quality education allows people to break the cycle of poverty and improves their well-being. It enables the attainment of other Sustainable Development Goals. Yet, Higher Education Institutions (HEIs) in Cameroon do not seem to provide adequate opportunities for sustainable development in light of the challenges of high enrolment, inadequate infrastructure and unemployment. One way to minimize these challenges is through partnerships. HEIs have been involved in many partnerships yet the benefits are not significant which may be a consequence of the procedure for establishing the partnerships. The study investigates the gaps in the procedures for engaging in partnerships to develop a model for partnerships in HEIs in Cameroon. A concurrent mixed method design was employed. The sample included 68 participants (25 personnel in HEIs and 43 personnel in partner institutions). The purposive and snowball sampling techniques were used. Documentary analysis, an interview guide and questionnaires were used to collect data. Quantitative data was analysed using SPSS version 25.0 for frequency counts and percentages while the qualitative data was analysed thematically. Based on the challenges of partnerships identified, a model was developed to guide partnerships in HEIs in Cameroon.

Keywords: Quality education, Partnerships, Higher education, SDGs, Cameroon

Introduction

Higher education is mandated to improve on the labour force which has a multiplier effect on the quality of life of its recipients. Achieving these goals requires high-quality education, which includes good teachers, students, courses, planning and management, facilities, resources, teaching, and evaluation systems (UNESCO, 2004). Quality education allows people to break the cycle of poverty, resulting in the eradication of hunger and the improvement of health and well-being and enabling the attainment of other Sustainable Development Goals. Yet, graduates from Higher Education Institutions (HEIs) in Cameroon do not seem to have acquired relevant skills for sustainable development (Etomes, 2021; Endeley 2014; Fonkeng and Ntembe, 2009). This is so as many graduates are unable to find decent jobs and as a result, poverty rates remain high, hunger persists and wellbeing is compromised which threatens peace, stability and sustainable development. Furthermore, Higher Education faces challenges of high student enrolment without a corresponding increase in human resource, material resource and infrastructure, thus

minimizing access to Higher Education. These, together with the insufficient pedagogic skills of teachers (UNESCO, 2003) threaten quality education.

One way to minimize these challenges is through partnerships where local, national or international organizations invest resources in the development of educational tools and facilities (United Nations, 2018) so as to enhance quality education and improve access to educational resources and employability, needed for the attainment of other SDGs. This is why ensuring quality education through partnerships matters, targets that have been well captured by SDG 4 and 7. According to United Nations (2019), quality education (SDG4) enables the attainment of the other SDGs such as health and well-being, gender equality, decent work, responsible consumption and growth and climate change mitigation. In addition, access to quality education ensures social mobility, mitigates the inequality gap and allows people to break the cycle of poverty resulting in the eradication of hunger. This is more linked with higher education, which is considered an investment in human capital. In order to enhance quality education, partnerships are critical.

HEIs in Cameroon have a long history of partnerships, although the benefits of these collaborations do not appear to have improved education quality considerably, since these institutions still have constraints in attaining quality education. This suggests that there may be issues with the procedure for establishing partnerships. Thus, the study investigates the gaps in the procedure for engaging into partnerships so as to propose a model for cooperation that can make a significant difference in the quality of higher education and attain sustainable development goals in Cameroon.

Quality education is a complex and multidimensional concept. However, UNESCO (2004) agrees on three broad principles that guide the description of quality education. These broad principles include relevance, equity and human rights. Notwithstanding this complexity, UNESCO (2016) defines quality education as one that is meaningful, relevant and responsive to the needs of individuals and the society as a whole. Jain and Prasad (2018) further described quality education as one that includes the whole system of education, that is, teaching, policies and the learning environment; the quality of what is provided to students which includes curriculum, teaching quality and learning process. Quality education is one that provides all learners with capabilities they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being. However, the learning outcomes at each level of education differ even by context, for instance, at the end of the basic education cycle outcomes must include threshold levels of literacy and numeracy. Capacity development to improve the quality of teachers and other education stakeholders is crucial throughout this process. Quality education enhances equity, contextualization and relevance, child-centred teaching, sustainability and a balanced approach.

Equity in education means that personal and social circumstances such as gender, ethnic origin or family background are not obstacles to achieving educational potential and that all individuals reach at least a basic minimum level of skills. Quality education cannot be based on a blueprint that is applicable in all situations. Solutions and adaptations of education systems must be based

on the real needs of a country and/or community. It puts the child in the centre and helps him/her to reach his or her full potential through active participation. Quality education aims at developing a balanced set of capabilities of learners that they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being.

Educational partnership, on the other hand, is a form of unification, support and assistance for formal education to ensure quality education (Vrasmas, 2002 as cited in Gurlui, 2015). Collaboration of educational agents in education partnership is the top priority of educational policies aimed at increasing the quality of education. Educational partnership requires actions carried out between school institutions and local associations, social workers, schools, companies, etc., which means that the student's education becomes everyone's problem and require the mobilization of all energies of educational stakeholders (Cristea, 2000). Educational partnership manifests itself as a social phenomenon and pedagogical approach involving curricular approach to education, focused on respecting and valuing diversity, multiculturalism and uniqueness of each human being. School represents an institution that functions in a community build up from many educational items like: family, authorities, governmental or non-governmental institutions, and church, police and health units.

Adelman and Taylor (2006) argue that the working together of schools, homes and communities can promote inclusive and quality education in schools. Schools can be efficient and effective if they form an integral part of the community. In the interests of revitalizing African higher education, many universities and HEIs from the global North have engaged in a process of partnership with universities from the global South. Within the context of higher education development cooperation, the American Association of State Colleges and Universities (AASCU, 2018), described partnerships as one operating at both local and global levels and encompassing personal, social, political and cultural dimensions; organizational structures and systems; quality assurance and quality enhancement strategies and procedures; government policies and funding programmes; and a wide range of practices and opportunities that enhances quality education. Similarly, Eddy (2010), further described higher education partnerships as joint venture initiatives between institutions, through departmental alliances across institution or within university programmes that pair with business organizations and other community agencies.

AASCU (2018) identified three major types of university partnerships which include community relationships; educational institutions and public and private partnerships. These partnerships usually ranging from low-risk and less prominent to high-risk and high-profile partnerships. School-community partnership is based on the notion of working together to solve some of the challenges that the schools and the community are facing. Partnerships could be formal, less formal or temporary, but all partnerships are equally important and valuable to the educational process and build upon each other. Higher education partnerships can solve some of the underlying challenges in HEIs and consequently enhance quality education. For instance, Aloysius et al. (2018), revealed that university's collaboration with the industry enhances the acquisition of employability skills for students on the one hand, and on the other hand, improves on the productivity of the industry to meet up with the demands of the society.

For partnerships to be successful, the process is important. Partnerships involve a process, and though the contingency theory of coordination, cooperation and collaboration have dominantly been used in business management, it can offer a guide to the activities that should guide the development of university partnerships. An analysis of the literature (Isaeva et al, 2021; Castañer and Oliveira, 2020; Ashkenas, 2015) posits a continuum of steps that result in a partnership; it often starts with coordination, progresses to cooperation and collaboration, and ultimately results in partnerships as seen in figure 1.

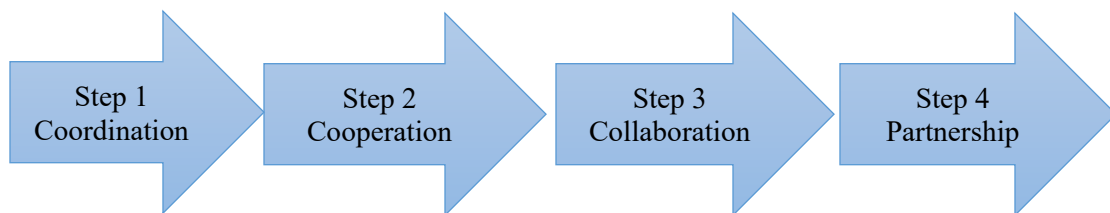


Figure 1: Partnership Processes

Every step is important and worth pursuing; for instance, at the coordination stage, institutions learn about the services and clients served by partner institution or organizations. This step includes an exchange of information and learning about each other's reasons or motivations for wanting to engage in partnership. Cooperation involves an increased understanding of partners' motivations to participate in a partnership, greater appreciation of resources and skills that the partnership can bring and emergence of joint strategies. The collaboration stage involves increased recognition of the values of each institution, trust, respect, a clear understanding of the benefits for each partner. A common problem is identified and innovative ideas are presented to solve the problem. At the point of collaboration, a letter of collaboration is established to formalise the process. Finally, partnership, with a high level of trust and communication, roles and responsibilities of each partner can be well defined and developed. This must be accompanied by the signing of a Memorandum of Understanding (MOU) involving all authorities concerned.

There are many factors that affect the partnership process. Such factors need attention; for instance, lack of collaborative planning time and insufficient collaboration between the partners in identifying relevant needs, establishing plans, and clarifying roles are the most frequently mentioned causes for ineffective partnerships in Higher Education in Africa, which also apply to Cameroon. Lack of reciprocal engagement during the planning or execution phase appears to have resulted in a lack of trust and an inability to overcome cultural gaps. Other issues include limited time and resources to hold face-to-face planning meetings during the proposal writing or early implementation stages (USAID, 2004).

According to Wanni et al. (2010), many funding sources do not cover the costs of worker time. While this may help keep proposal expenses down, it substantially limits the initiatives' effectiveness. As a result of this condition, partnerships appear to have times of high production just before and during certain phases of partnership projects. However, owing to the time restrictions faced by people involved in project implementation, they can often go inactive. Partner

institutions may find cooperation frustrating due to resource imbalances. For instance, while in the UK, access to technology (e.g. computers) is taken for granted, in Africa, however, this can be a stumbling block and a severe constraint for many institutions (AUCC, 2003). Furthermore, while there are a variety of funding initiatives explicitly geared to enhance capacity, these are frequently temporary solutions. Given that capacity-building is a long-term process, this is an issue. Another issue is the long-term viability of partnerships. In many cases, financing is provided to 'start' the collaboration and offer some finance for projects, but no long-term support is provided. Many funding schemes do not give funds to evaluate project outcomes.

According to USAID (2004), the keys to sustainable partnerships most often cited are the following:

- a. Increasing trust between individuals and institutions. This is aided by the development of strong personal bonds between faculty members on both sides of the relationship.
- b. Devoting the time and effort required to establish trust prior to creating and implementing programs. This is especially true for institutions who have had little or no prior experience working together. Cultural sensitivity and learning about each other's customs and practices are closely tied before attempting to collaborate on project activities.
- c. Agendas that are shared and mutually productive (i.e., clear benefits for all partners engaging in the partnership).
- d. A strong contributing factor is obtaining high level university support. This type of visibility and support was mentioned as important to achieving the partnership results, but most critical for future sustainability.

Educational Partnerships in Higher Education in Cameroon

Some of the HEIs in Cameroon have been engaged in multiple partnerships. With regard to North–south partnerships, academic collaboration between Cameroon and German universities is the most active and partially regulated compared to other international countries. It is governed by agreements on economic and technological cooperation that date back to 1962 and were expanded and revised in 1978. Given the enormous increase of the cultural component, this agreement is accompanied with customized application methods that should ensure the long-term viability of this collaboration. Academic and cultural collaboration between Germany and Cameroon, on the other hand, is governed by specific agreements between university institutes. Both parties signed together conventions setting the terms of their partnership. Likewise, the state of inter-university cooperation with the DAAD (German university exchange office), the Goethe-Institut, ERASMUS and many other non-states or para-public organizations (Friedrich Ebert Foundation (FES), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Thyssen Stiftung etc) is satisfactory, but remains fairly modest. A few other partnerships with public and private HEIs in Cameroon and the areas of interest are listed below (table 1):

Table 1: Some North-South Partnerships with HEIs in Cameroon

| Cameroon HEI | Partner Institution | Country | Area of Partnership |
|---|--|--------------------------|--|
| Catholic University of Cameroon Bamenda (CATUC) | University of Osnabrück | Germany | Psychology |
| Evangelical University of Cameroon Bandjoun | University of Hamburg | Germany | General pedagogy and didactics |
| University of Buea | University of Bayreuth | Germany | BA-MA-Doctorate-Post-Doc Cultural and African Studies among others |
| | University of Arizona | United States of America | Health Sciences |
| | Center for Tropical Forest Science, USA | United States of America | Plant and Environmental Science |
| | Howard University | United States of America | Technology and Engineering |
| | | | |
| University of Yaoundé I | University of Leipzig | Germany | Scientific research in general |
| | | | |
| | University of Bayreuth | Germany | |
| | Ludwig Maximilians Universität München (LMU) | Germany | |
| | University of Paderborn | Germany | |
| | University of Bremen | Germany | |
| | | | |
| University of Yaoundé II | University of Bielefeld | Germany | All disciplines |
| | University of Paderborn | Germany | |
| | University of Bayreuth | Germany | |
| | University of Leipzig | Germany | |
| University of Ngaoundéré | University of Bremen | Germany | Mathematics and Economics |
| University of Dschang | University of Cologne | Germany | Medicine and biomedical sciences |
| | Wolfenbüttel Higher School of Applied Sciences | Germany | Engineering Sciences / Agronomy |

| | | | |
|--|---------------------------------------|---------|--|
| University of Douala | Technical University of Ingolstadt | Germany | Informatics, electrical engineering and engineering sciences |
| Catholic University of Central Africa (UCAC) | Technical University of Cologne | Germany | Economics |

Source: University Research and Cooperation Units in Cameroon (CATUC, UB, UYDE1& II UCAC, Dschang, Douala, Ngaoundere, Banjoun)

At the national level Universities have partnerships with all ministries including the Ministries of Secondary and Basic Education, just to name a few as well as industry where students are sent for internship to acquire employability skills. Another partnership mostly undertaken by HEIs is to mentor younger institutions. University of Buea, for instance, is a mentor to over five institutions, some of which include: Biaka university Institute; Catholic University Institute of Buea; National Polytechnic University Institute of Bamenda; Cameroon Christian University of Bali and Chitechma higher Institute Buea. The mentorship agreement between these mentor and mentee institutions are geared towards quality assurance. In addition to these, partnerships also include joint research activities and visits, amongst others.

Therefore, HEIs in Cameroon have been engaged in many partnerships or cooperation agreements both nationally and internationally. These range from funding to capacity building, research, teaching, infrastructure and more. Yet, in each of the universities which have benefitted from this cooperation, there are still issues of quality education. In the case of Cameroon, higher education challenges threaten quality education; for instance, unsteady economic growth, an expanding youth population, and rising elementary and secondary enrolment have increased enrolment at the tertiary level. While this rapid growth succeeded in expanding access to higher education, by international standards, access remains restricted for there is no correlation between increased enrolment rate and infrastructural development, which threatens equality of access to educational resources. Therefore, with regard to quality education, much is still desired. Classrooms still remain overcrowded limiting access to school and resources (Etomes, 2021). A report submitted by the government of Cameroon to the African Commission on Human and Peoples' Rights in 2020, noted that Cameroonian universities had seats for a maximum of 295,128 students, well below the 450,000 students hoping to be admitted. This is in line with an earlier statistic from the Ministry of Higher Education in Cameroon (2015-2017), indicating that the capacity of students required for the 1079 infrastructures (classrooms, laboratories and workshops) is 29,840, but as of the 2017 academic year, student enrolment was at 209,374. The situation has worsened as it has been observed that while the students' population increases at an exponential rate, infrastructural development has remained relatively the same over the years. Overall numbers also hide stark disparities in access by location and socioeconomic status. While 28 % of college-age Cameroonians from the richest quintile attended a higher education institution in 2018, less than 3% from the three poorest quintiles did. These situations are similar as in other

places, for instance, Fallwick et al. (2021), in a world news reported that around 15% of college-age individuals living in cities pursued higher education, but just 2% of residents from rural communities did so.

The quality of graduates is yet to improve significantly with unemployment still at its peak and the greater percentage of graduates not picking up decent jobs. Many are petty traders, taxi drivers, hairdressers and engaged in other low paying jobs. Many of these graduates, having come from a low socio-economic background are expected to become the bread-winners of the family, yet they cannot find jobs. The circle of poverty and hunger remains and every other aspect of human life is affected. Evidence from research, posit that graduates from Cameroon HEIs have not acquired relevant skills for sustainable development. For instance, Etomes (2021) examined skills acquisition and labor market opportunities for 79 graduates from public universities and 29 employers in Cameroon and found a mismatch between the supply of skills by HEIs and the demand for skills by the labor market with graduates' unemployment rate of 69.6%. Part of the explanation for unemployment lies in the quality of education received at universities, as the university system has been criticized as inadequately preparing students for the job market (Endeley 2014; Fonkeng and Ntembe, 2009). A 1998 World Bank report noted that Cameroon's higher education system, "initially designed to produce personnel for the civil service, no longer conforms to the economy's needs in the era of shrinking public services, nor to international best practices" (Cameroon, 2015). This shows that the numerous partnerships Cameroon HEIs have indulged in have not yielded significant fruits. Amongst other factors that may account for this situation is the procedure of establishing partnerships in HEIs in Cameroon. This procedure may emerge as a model to be followed by Cameroon HEIs in developing fruitful partnerships.

Thus, the study aims at investigating the gaps in the procedures for engaging in partnerships in order to develop a model for partnerships in HEIs in Cameroon and beyond. This model is based on an empirical analysis guided by the following questions:

1. What is the nature of partnerships in HEIs in Cameroon?
2. What are the procedures for establishing partnerships in HEIs in Cameroon?
3. What are the benefits of these partnerships?
4. What are the challenges of these partnerships?

Methodology

Research Design

The mixed method concurrent design was employed in which quantitative and qualitative data was collected in a single phase and analysed independently. Mixed method concurrent design is a mixed method approach in which both types of data is collected at the same time (Creswell and Creswell, 2018). Consequently, findings from the qualitative and quantitative data were both used

at the interpretation phase to support and detail on key aspects of interest. This approach was employed as we sought to obtain different but complementary data that will help us to understand the nature, procedures, benefits and challenges of partnerships in HEIs and their partner institutions in Cameroon.

Sample

The sample was drawn from 5 state (public) universities in Cameroon (including; University of Buea, University of Douala, University of Yaounde I, University of Bamenda and University of Ngaoundere) that represented the HEIs and 5 partner institutions (including; SONARA, BIAKA University, Open Dreams, CDC and MTN Cameroon). The choice of these partners was that one of them (for example; Open Dreams, MTN Cameroon) are independently partnering with more than one public HEI in Cameroon. The total sample included 68 participants (25 personnel in HEIs and 43 personnel in partner institutions). A total of 11 participants were interviewed (6 in HEIs and 5 in partner institutions) and 57 participants filled out a self-administered questionnaire (19 HEIs and 38 in partner institutions). HEI participants included Deputy Vice-Chancellors in charge of Research and Cooperation as well as Deans and Directors of schools. Partner institutions included the heads or directors of the organisation, heads of services or departments. Purposive and snowball sampling techniques were used to select participants for the study as they were specific to a position or role within HEIs or partner institutions considered relevant for the study.

Instrument

The study included the use of interviews, self-constructed questionnaire and documentary analysis. The interview guide used consisted of 3 key questions that captured a description of the reasons for partnerships; procedure of establishing partnerships and the challenges faced in partnerships. On the other hand, two separate questionnaires were served to participants from HEIs and partner institutions. Both questionnaires included 3 sections that solicited for demographic information; objectives and needs of partnerships; procedures involved and partnership outcomes. The questionnaire mainly consisted of open and closed ended questions. The close ended questions were a 4-point Likert scale quantitative instrument. Documentary analysis included a list of existing partnerships from research and cooperation units in the participating HEIs as well as policy documents stating the vision, mission and goals of the institution.

Data Analysis

Qualitative data was analysed thematically as responses from interviews were transcribed into text and categorised to develop categories. These categories were grouped and re-grouped to develop sub-themes that were later grouped in to themes and described. Along with groundings, these themes were presented in a theme-grounded-quotation table. A similar approach was used to analyse open-ended responses from the questionnaire; however, close-ended responses were analysed descriptively using frequency counts and percentages.

Findings

Based on the analysis of responses from 68 participants including HEIs and their partner institutions, findings are presented in 4 broad sections including the nature of partnerships; procedure for partnerships; benefits and challenges of partnerships.

Section A: Nature of Partnerships in HEIs in Cameroon

In analysing the nature of partnerships in HEIs in Cameroon, we focused on the types of partnerships; objectives and needs of partnerships from HEIs and their partner institutions. Documentary analysis as well as an analysis of the responses from interviews and questionnaire revealed the following about the types of partnerships in HEIs in Cameroon as seen on table 2.

Table 2: Types of Partnerships in HEIs in Cameroon

| S/n | Universities | Partnership | | | |
|-------------------|-------------------------|-----------------------|---------------|-------------------------------------|---------------|
| | | Academic Institutions | | Business and Corporate Institutions | |
| | | Local | International | Local | International |
| 1 | University of Bamenda | 15 | 11 | 01 | 02 |
| 2 | University of Douala | 07 | 04 | 04 | 02 |
| 3 | University of Yaounde 1 | 08 | 03 | 13 | 12 |
| 4 | University of Ngoundere | 04 | 02 | 01 | 02 |
| 5 | University of Buea | 30 | 66 | 105 | 15 |
| Total = 05 | | 64 | 86 | 124 | 33 |

Source: Partnership documents from Research and Cooperation Department in the various state universities

Table 2 indicates that partnerships in HEIs in Cameroon are divided into two broad categories including academic institutions and business /corporate institutions. Each of these broad categories includes local or national and international partnerships. However, findings showed that there are more partnerships with the business and corporate institutions, 157 (51%) compared to the academic institutions, 150 (49%). Similarly, there are more local partnerships, 188 (61%) than international partnerships, 119 (39%).

Based on documentary analysis of the mission, goal and objectives of public HEIs in Cameroon, findings indicated that there are several objectives of HEIs stated at the level of departments; faculties and schools; and at the university level. However, irrespective of the level, most public HEIs have 4 broad objectives. Similarly, we focused on the objectives of partner institutions that relate to HEIs and they can also be characterised in to 4 broad categories as seen in figure 2;

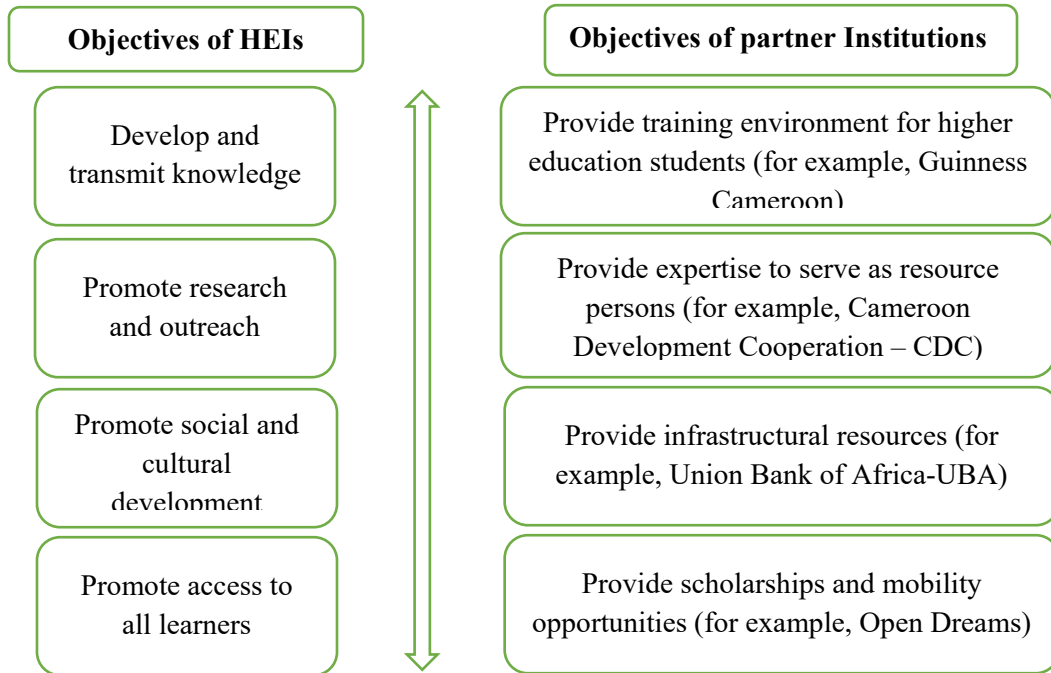


Figure 2: Objectives of HEIs and partner

There are several objectives of HEIs and partner institutions with regards to partnership and quality education as seen in figure 2. While most HEIs seek to transmit knowledge, promote research, culture and access to all learners, partner institutions complement these objectives by providing practice environments for internships and other visits as well as resources to support the objectives of HEIs.

However, in partnership, both institutions (HEIs and partner institutions) must benefit so we sought to find out the needs of these institutions. An analysis of the quantitative and qualitative data revealed the following as seen in figure 3.

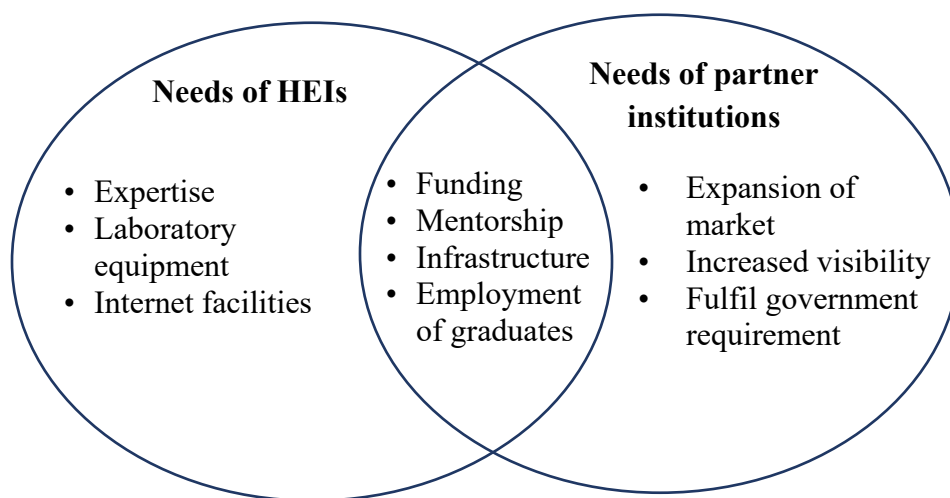


Figure 3: Dominant Needs of HEIs and Partner Institutions in Cameroon

The relationship between HEIs and partner institutions are characterised by several needs as seen in figure 3. However, while there are slight differences in the needs of HEIs and partner institutions, they both intersect on the need of funding, mentorship, infrastructure and employment of graduates. For instance, funding was one of the most cited by participants in HEIs as they indicated that this was essential in paying supervisors (internal and external) during internship exercises. Funding was also indicated as an essential need for purchasing equipment required to run several programs as indicated in the following quote by an HEI director; *“Our training programs require equipment such as quantum magnetic resonance body analyser, audiometer, etc., to fully equip students with the necessary skills and knowledge”*.

Similarly, another participant, a head of service in HEI indicated the following; *“We need expertise but adequate funding to bring them from other countries”*.

These participants ascertain that funding is a major need of HEIs. However, beyond funding, other dominant needs include mentorship, laboratory equipment, infrastructure, internet facilities and employment opportunities. On the other hand, the needs of partner institutions dominantly revolve around expanding their market niche, increasing the consumption of their products, promoting visibility and fulfilling government requirements. For instance, one of the directors in a partner institution indicated the following; *“Regulatorily, to be accredited as a private higher education institution in Cameroon, one must be mentored by a public higher education institution”*.

These findings were complemented by quantitative data, however, a slight difference was found as majority 67 (99%) of the participants from both HEIs and partner institutions indicated need for infrastructure; 66 (97%) for funding; 63 (93%) for expertise; 62 (91%) for mentorship and so on.

Procedure of Partnerships in HEIs in Cameroon

In an attempt to understand the procedure of partnerships, interview analysis revealed that procedures were operational and varied depending on the type, form and level of partnerships. Partnerships can be initiated by either an individual within a higher education institution or partner institution (bottom-top) as well as broadly by the institution or Ministry of Higher Education (Top-bottom). Partnerships initiated by individuals come as a result of the individual projects of staff as expressed in the following quote: *“Staff mostly initiate these partnerships through their grant request or research but the institution can also receive request proposed to the ministry”*.

In the case where individuals are initiating a partnership, they have the responsibility of evaluating the intended organisation and submitting the required documentations for signature by the official signatories of the university (which usually includes heads of services in the research and cooperation unit; deputy vice chancellor in charge of the unit and vice chancellor) as expressed in this quote: *“External partners fund research for staff and in this case the staff must follow all administrative procedures for documentation”*.

Another participant indicated: *“The staff submits the request file for approval and it is transmitted for signature”*.

Apart from staff-initiated partnerships, the Ministry of Higher Education equally accepts certain partnerships on behalf of the university. Similarly, the central system of the university equally accepts some general partnerships on behalf of faculties and schools. In most cases, partner institutions initiate the request for partnerships and the request is accepted by the central body directly in cases where the partnership is general to the university body or all faculties, however, if the partnership request is specific to a particular faculty, then the central body, forwards the request to that specific faculty. The faculty studies the program and transmits their decision back to hierarchy as expressed in this quote: *“When we receive a partnership request, we do a cost/benefit analysis and if it will add value, we submit our interest to hierarchy but all administrative procedure is done with hierarchy”*.

This quote indicates that there is some studying of the file; and studying usually entails only a reading of the document submitted by intended partners as expressed in the following quotes: *“We study the file by reading the request and documents attached by the intended partner institutions”*.

“Well, it depends on the type, if it’s a grant, we sign”.

Similarly, another participant indicated the following: *“As long as the partnership is beneficial whether to the individual or institution, it is approved”*.

These quotes underscore a limited priority of an investigation of partner institutions and their interest and highlight that there is no clear-cut approach for establishing partnerships beyond statutory approvals.

Benefits of Partnerships in HEIs in Cameroon

Interviews with participants in HEIs about the benefits are discussed using themes, descriptions and sample quotations. The benefits were examined in terms of quality of access and outcomes considered as key indicators of quality education and the findings revealed the following themes:

Table 3: Partnership and Quality of Access

| Themes | Theme Description | Grounding | Sample Quotations |
|---|---|------------------|---|
| Financial support to students and staff | Some partnership agreements provide scholarship to students in the form of tuition fee and research grants to staff | 17 | “Some of our grants covers students’ fees or part of the fees for those that are eligible”, “Some partnership projects sponsor research projects for academic staff and students”. |

| | | | |
|-------------------------|---|----|--|
| Students' mobility | Partnership enables collaboration between the University and other institutions at home and abroad | 16 | <p>"Partnership enable students to get full scholarship for their thesis"</p> <p>"Students are opportune to have exchange programmes within the country and out of the country".</p> <p>"Students have the opportunity to work with students from different institutions and countries which improves on skills acquisition",</p> |
| Networking | Access to other human resources such as lecturers and researchers from industries and other institution in and out of the country | 20 | <p>"Students have the opportunity to work with their teachers and other experts in their field who are not part of the institution".</p> <p>"Students and teachers have the opportunity to carry out research activities with experts form other institutions and industries"</p> |
| Internship sites | Collaboration with industry give students the opportunity to gain industrial and field experience | 24 | <p>"Partnership with industries enable students to carry out internship programme",</p> <p>"collaboration industries give students the opportunity for industrial training in their field of study", "collaboration with industries and other institutions provides opportunity for staff and students to carry out impactful projects",</p> <p>"Students have the opportunity to go for internship programmes out of the country"</p> |
| Instructional materials | Partnership enables departments and faculties to purchase didactic materials and laboratory equipment | 20 | <p>"Partnership provides materials resources that facilitates the teaching-learning process".</p> <p>"Students and teachers are able to co-publish with partners".</p> <p>"Encourages co-supervision of students with member of the partner institutions"</p> |
| Mentorship | Provide mentorship to start ups especially private HEIs | 25 | <p>"Some staff assist in building and setting up laboratory for partner</p> |

institutions which brings income to the individuals and the department”.

“We mentor the programmes of private universities that brings income to the faculty”.

An analysis of the benefits of partnerships to access was captured using six broad themes including: Financial support to students and staff; students’ mobility; networking; internship; instructional materials and mentorship as seen in table 3. Access was mostly conceived from the support that staff and students received through partnerships. As seen in table 3, a majority of the respondents indicated that quality of access is mostly fostered through internship and mentorship opportunities.

This data was complemented by quantitative data from partner institutions as majority 41 (95%) agreed that partnerships with universities encourage collaborative research activities with partner institutions and among teachers. Similarly, 37 (86%) also agreed that partnerships also provides the partner institutions with manpower; encourages infrastructural development in the universities 31 (72%); financial support to faculties for projects 26 (60%); and to students through tuition fees 25 (58%);

When the benefits of partnership to employability was considered, findings revealed the following as seen in table 4:

Table 4: Partnership and the Fostering of Employability Skills

| Themes | Themes Description | Grounding | Sample Quotations |
|----------------------|---|-----------|---|
| Group activities | Collaborative skills are acquired as students work together in a project, work with other students and experts in their field of study. | 23 | “students’ are able to develop collaborative skills as the work together”, “In working together, students learn to assist one another which enable timely completion of work and team spirit”. “Students are assigned to independent research activities but they are compelled to work and understand each other’s research work which encourage collaboration”. |
| Project presentation | Students develop skills in public speaking and leadership | 21 | “Students have seminars each month during the project where they present their work”. |

| | | | |
|---------------------|--|----|---|
| Networking | Communication skills | 19 | <p>“Most at time, the teacher is a facilitator, the students are able to assign duties to one another and coordinate projects to the end”,</p> <p>“Students form social groups such as WhatsApp where they associate and communicate on project activities which enable them to meet deadlines”.</p> <p>“students’ are able to carry out field work and bring back positive report”.</p> <p>“During projects, students are able to liaise with our partners effectively on the progress of work”.</p> <p>“They work with companies and farmers in rural areas</p> |
| Mentorship | Students with different abilities work together and mentor their mates from other universities as well as partner institutions | 18 | <p>“The more experienced students are usually paired with the less experienced ones”.</p> <p>“Some students are recommended to mentor their mates from other universities in project activities”,</p> <p>“Some students mentor farmers in the field on how to improve on crop yields”.</p> |
| Use of technology | Students prepare conference reports, analyse and present data Attend zoom meetings and conferences | | <p>“Students are obliged to present their reports on projects very regularly using power point projections which improve on their computer skills”.</p> <p>“Students are trained on how to analyse and present data, report writing”,</p> |
| Hands on activities | Application of theory to practice | 16 | <p>“students’ are able to carry out relevant practical training in their area of study and related areas which improve on their know how”, “provide hands-on-skills to students”.</p> |

An analysis of the extent to which partnerships foster the acquisition of employability skills was captured in six broad themes: group activities, project presentation, networking, mentorship, use of technology and hands-on activities which enables students to gain skills in collaboration, public speaking and leadership, communication, mentorship, ICT and practical skills respectively. According to the participants, partnerships required certain activities that fostered several of these skills amongst staff and students as seen on table 4.

An analysis of the quantitative data revealed a similar trend as majority of the respondents 41 (95%) agreed that partnership with HEIs enable students to develop essential skills within their area of specialty; enables students work with external experts which build their technical, conceptual and interpersonal skills, and also the development of leadership skills such as public speaking, interpersonal relationship and the ability to take up initiatives and companies to recruit highly skilled manpower 40 (93%).

Challenges of Partnerships in HEIs in Cameroon

Interviews with participants in HEIs and partner institutions indicated several challenges. A focus on the challenges faced by HEIs in partnerships indicated the following as presented in table 5:

Table 5: Challenges of Partnerships in HEIs

| Themes | Themes Description | Grounding | Sample Quotations |
|---|---|-----------|---|
| Inadequate funding | HEIs and partner institutions provide inadequate funds to foster partnerships | 29 | "Large proportions of students cannot benefit due to inadequate funds to pay for their expenses especially in exchange programs", "We are unable to pay supervisors at internship sites so most turn to refuse our request for partnership". |
| Limited opportunities for infrastructural development | Partner institutions usually tend down request for infrastructures | 23 | "Most partnerships refuse to fund infrastructural facilities which are the most urgent needs of faculty establishments". "Very minimal funding is slated for infrastructure even in research grants", |
| Unfavourable immigration policies | Some immigration policies prevent students from benefitting from international mobility opportunities | 20 | "Some students are not given visas when they have been awarded scholarship opportunities through partnerships". |

| | | | |
|---------------------------|---|----|--|
| Armed conflict | Current armed conflict in the South West and North West regions of Cameroon limits partnerships | 19 | <p>“Partners do not support us in securing visas for travel”.</p> <p>“We are unable to carry out research in risky areas so our grants are nullified”.</p> <p>“Many partners fear living in Cameroon due to the crisis”,</p> |
| Limited priority of needs | North-South partnerships especially, do not prioritise the needs of HEIs in Cameroon | 19 | <p>“There is need for more South-South partnerships because North-South do not prioritise our needs”.</p> <p>“Need for more local partnerships”,</p> |
| Unscalable | Most partnerships can include only a few students or staff. | 18 | <p>“In our department with 92 students, only 10 could receive a scholarship making it difficult to fund the activities of the others”</p> <p>“Partnerships mostly benefit only a few and personally”</p> |

Regardless of the benefits of partnerships with regards to access, policies and employability, the challenges of partnerships in HEIs in Cameroon are enormous as seen in table 5. These challenges were captured in six broad themes including; inadequate funding; limited opportunities for infrastructural development; unfavourable immigration policies; armed conflict; limited priority of institutional needs; and unscalable. Participants mostly agreed that inadequate funding is one of the dominant challenges as it prevented HEIs from expanding their internship needs. Supervisors (from these internship sites and institution) within the country require finances to run minimal cost such as travel and communication essential in supervision but this is very challenging for the institution. On the other hand, while partnerships provide staff and students with exchange opportunities, it is difficult for the institutions to support these staff and students with funding for travel and others.

Interestingly, partner institutions view these challenges slightly different as indicated on table 6:

Table 6: Challenges Faced by Partner Institutions

| Themes | Groundings | Quotations/Responses |
|---------|------------|---|
| Finance | 10 | <p>“Finance and time for activities”.</p> <p>“Financial challenges as well as time to coordinate daily activities”.</p> <p>“The number of internships demanded by the institution each year is generally greater than our</p> |

| | | |
|---|---|--|
| | | means. So, we are forced to select students for internship through some selection criteria which is even doubtful". "Financial obligation". "Finance". |
| No respecting of agreement terms | 1 | "At times, the terms of the partnership are not respected by the partner institution". |
| Inadequate supervision of student on internship | 1 | "Most of the higher institutions failed to carry out proper supervision of the students they send on internship". |
| Short duration of internship | 1 | "Short term internship programmes". |
| Delay in programmes approval | 1 | "Waiting for approval for other programmes" |
| No granting of full autonomy | 1 | "Mentoring the university for so long without providing full autonomy is a major challenge". |
| Lack of motivation | 1 | "Lack of motivation". |
| Policy disparities | 1 | "Policy disparity which results to policy clashes that should be harmonized accordingly". |
| Vetting of exams | 1 | "Vetting of exams usually poses some difficulties". |

Based on challenges faced by organizations in partnership with HEIs, many of the participants in partner institutions complained of lack of finance while other challenges are no respect of agreement terms, inadequate supervision of student on internship by HEIs, short duration of internship, delay in programmes approval, lack of motivation, disparities in policies, difficulty in vetting exams and the fact that some organization has not been giving full autonomy by the higher education institution they partner with.

Discussion of Findings

With global outcry to reduce poverty and enhance individual freedom by 2030, quality education is central to achieving all other sustainable development goals. With regards to the nature of partnerships in HEIs in Cameroon, findings indicated that HEIs have both academic and cooperate partnerships. Academic partnerships dominantly provide mentorship. Business and corporate partnerships are hosted by local or national partners and international partners. Local business and corporate partnerships dominate higher education partnerships in Cameroon.

Interestingly, most of the needs of these local partnerships are similar to those of HEIs which is expected as they are in the same environment with similar challenges. While this may be beneficial for exchanges and networking as evident in the work of Adelman and Tylor (2006), they do not suffice to meet the priority needs of funding, infrastructure and availability of equipment which is necessary to ensure access to all students and guarantee job acquisition upon graduation. It is therefore essential that the HEIs prioritize institutions that can readily satisfy their most pressing needs.

The procedures for establishing partnerships in HEIs in Cameroon are unclear or standard so HEIs engage in any partnerships that are offered to them with little or no background check beyond tendered files submitted by individuals or organisations seeking for partnerships. Therefore, there is no doubt that while there is a host of partnerships and a history of them, the benefits are not scalable as the priority needs and shared values are given a limited place in the procedure for establishing partnerships. HEIs in Cameroon need a clear and standard process of establishing partnerships. Regardless of this, there are some benefits of partnerships that enhance quality education through access and employability. At the top of the list is training grounds as HEIs benefit from partner institutions who serve as training grounds for their students. This is essential in meeting one of the goals of higher education which is the training of youths. On one hand these partnerships enhance access and employment of graduates as they select the best students reward them with scholarships, bursaries or jobs. This is in line with the views of Aloysius et al. (2018). However, on the other hand, it is also challenging as many of these training institutions can receive only a few students due to their own funding challenges. This limits and restricts the number of students who can benefit from such opportunities, again hindering access and employability at a scalable rate.

It is also worth noting that while these partner institutions are only aiming to strive, HEIs have a more integral mission of impacting the lives of individuals and any errors made will be detrimental to the society. Partnerships in HEIs are beneficial with regards to equality of access and outcome but they are plagued with several challenges. These challenges are integral in all the processes of partnership including coordination, cooperation, collaboration and partnerships. This calls for more global partnerships and cooperation for sustainable quality of HEIs. In curbing these challenges and enhancing the quality of education through partnerships, we propose the following model as seen in figure 4:

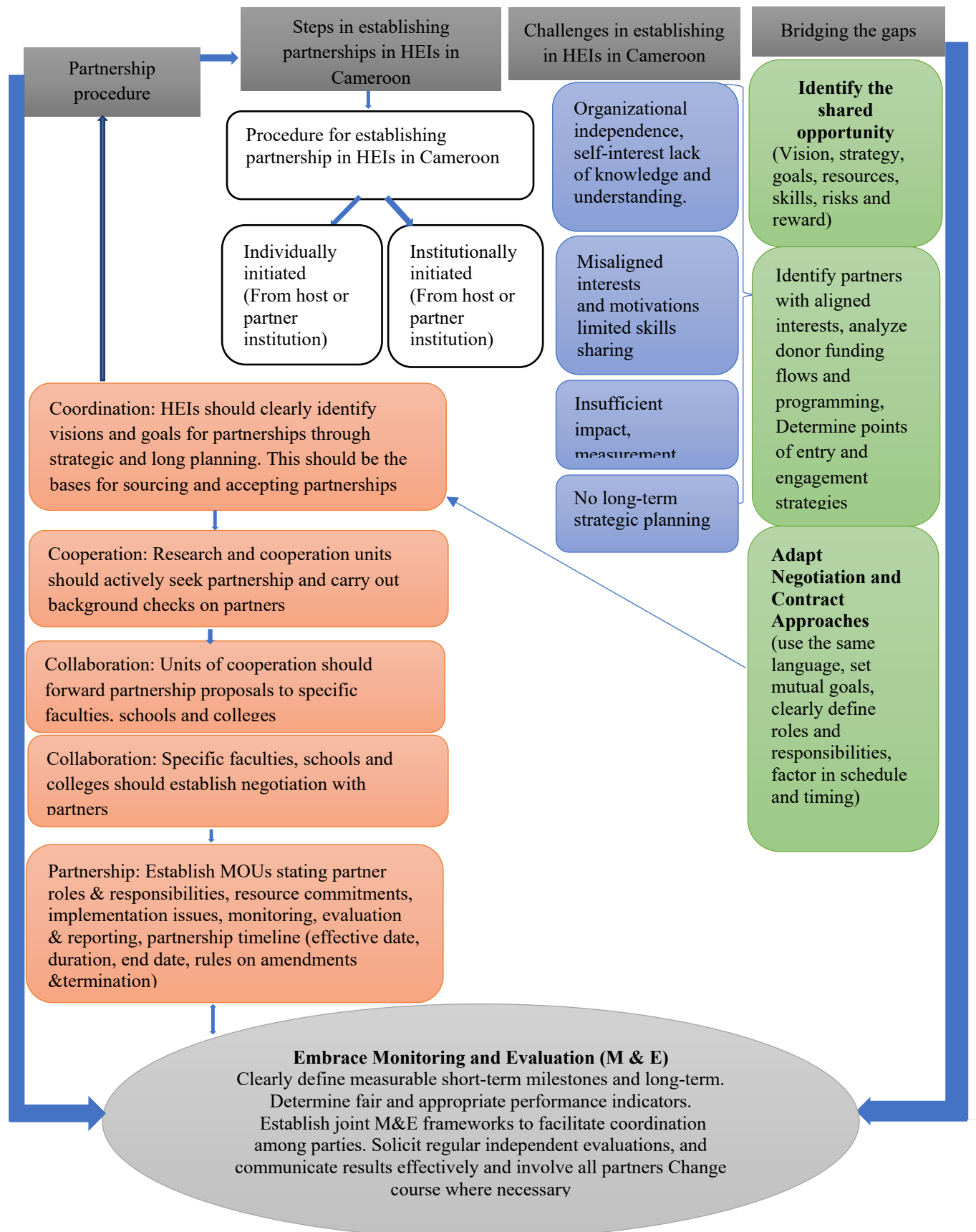


Figure 4: Proposed Model for Partnerships in HEIs

In figure 4, we advise for clear stages in the process of partnerships that incorporates; identifying and clearly defining the partnership needs of specific HEIs guided by institutional vision, mission, goals and objectives. This will include strategic and long-term goals of partnership formed well ahead of partnership sourcing. These needs will guide the sourcing and acceptance of partnerships initiated by HEIs (staff, institution, ministry) or partner institutions. These intended partnerships must be well verified before continuing to collaboration. At all stages faculties should be included but it is only when institutions are sure of the benefits, can they sign MOUs and establish full partnerships.

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The Impact of Decentralization on Creating Enabling Environments: Whole-of-Society Implementation of the United Nations 2030 Agenda for Sustainable Development

Simo Krsmanovic (Canada)

Abstract

Does the degree of decentralisation in a state impact its implementation of the United Nations' 2030 Agenda for Sustainable Development (2030 Agenda)? The 2030 Agenda calls for a commitment from states to pursue the creation of an enabling environment for sustainable development at all levels and by all actors (United Nations 2015, para 63). To achieve this, there are requirements for coordination and complimentary actions between governments, civil society and businesses to ensure involvement across a wide range of sectors and communities. This study aims to analyse how decentralised governance structures affect the ways states create enabling environments to support cooperative implementation of the 2030 Agenda. To date, little research analyses how levels of decentralisation and systems of governance influence implementation of the 2030 Agenda and its 17 Sustainable Development Goals (SDGs). This study is to contribute towards this analysis through a multiple case study of three federations (Canada, Switzerland, and Germany) and their federal sustainable development implementation strategies. It finds that these decentralised states use common frameworks and multi-level governance arrangements to manage jurisdictional barriers and competing priorities between their levels of government. Canada, Switzerland, and Germany all demonstrate common challenges in supporting cooperative implementation of the 2030 Agenda among their state and non-state actors due to complex administrative processes and competing priorities, making it difficult to coordinate the mutual dependency between their levels of government and align strategic planning across jurisdictions. They address these challenges in a number of similar and unique ways.

Keywords: Sustainable Development Goals; Governance; Decentralization; Multi-level Governance; Regional Development; Subnational Governments

Introduction

In 2015, all 193 United Nations (UN) member states adopted the 2030 Agenda for Sustainable Development (2030 Agenda) and its 17 Sustainable Development Goals (SDGs) as a framework and plan of action for people, planet and prosperity. The 2030 Agenda recognises an indivisible balance across the three dimensions of sustainable development: economic, social and environmental – with its goals ranging from ending poverty and hunger to reducing inequalities and taking urgent climate action. The 2030 Agenda is an ambitious global framework designed to coordinate national action on sustainable development through time-bound indicators, targets and objectives that require collaborative partnerships. It calls for a commitment to pursue an enabling

environment for sustainable development at all levels and by all actors (UN 2015, para 63). Achieving the necessary cross-sectoral collaboration and coherence requires complementary actions across all stakeholder groups including governments, civil society and businesses and for them to mobilise under a shared understanding of how collective action can be operationalised (Sachs et al., 2019).

Many national governments around the world are looking at ways to achieve these goals by either mainstreaming the SDGs into their existing government plans, or by developing entirely new plans and strategies aimed at specifically addressing the 2030 Agenda and its SDGs. For example, the Government of Mexico and the Government of Canada launched national strategies for implementing the 2030 Agenda in November 2019 (Government of Mexico, 2019) and in February 2021 (Government of Canada, 2021), respectively.

These strategies highlight several actions that respective federal governments are taking to implement the 2030 Agenda, including mechanisms to mobilise their stakeholder groups to create an inclusive, enabling environment that leverages all sectors of society. Both strategies focus on the importance of multi-stakeholder partnerships with reference to the unique challenges they face as federations in creating harmony across their three levels of government (federal, regional and local). For example, Mexico's 2030 Agenda national strategy underscores challenges the federal government faces in creating public policies that work efficiently across federal and subnational levels of government due to jurisdictional barriers, which can result in sectoral and disjointed approaches (Government of Mexico, 2019).

This study aims to explore how countries with decentralised systems of governance (specifically Canada, Switzerland and Germany) are creating enabling environments to support whole-of-society implementation of the 2030 Agenda. To date, there is a lack of research exploring the effects of governance systems and degrees of decentralisation on the creation of enabling environments to achieve the 2030 Agenda and its SDGs. While all countries are reviewing their progress on implementing the Goals and targets through a common Global Indicator Framework, the 2030 Agenda calls for countries to define success based on their own unique characteristics and national contexts. This study aims to review how decentralised systems of governance could impact a state's ability to create an enabling environment when implementing the 2030 Agenda and to identify potential global and domestic barriers and their impact on achieving the SDGs. While this will not be a comprehensive investigation given the unique and often complex systems of governance that exist around the world, this study will attempt to provide a preliminary analysis to support future studies.

This study first presents a brief overview and definition of decentralisation, outlining its main types and forms using internationally recognised definitions from the Organization for Cooperation and Development (OECD). It acknowledges the large extent and variation of subnational autonomy that can exist in both federal and unitary states and for this reason does not attempt to develop rigid guidelines, categorise nor rank countries by their degrees of decentralisation.

The study will then outline the selection criteria for the three federal states that were selected for the case study, including Canada, Switzerland and Germany. The states are all found to be highly fiscally, administratively and politically decentralised and rank among the highest scoring states on the Regional Authority Index (RAI), which is a recognised index for measuring states' regional autonomy (Cole et al., 2019) (OECD, 2019). The study then analyses the 2030 Agenda implementation strategies of the selected federal states and their approaches to creating an enabling environment. Using a qualitative analysis of these case studies, this paper will finally assess evidence for or against the argument that decentralised states require unique institutional frameworks that support cooperative implementation of the 2030 Agenda and that recognise and account for subnational, administrative and jurisdictional barriers at the local and regional levels. Through a multiple-case study on the 2030 Agenda sustainable development strategies of Canada, Switzerland and Germany, it is demonstrated that these decentralised states have common frameworks and multi-level governance (MLG) arrangements specifically to work around jurisdictional barriers between their levels of government in empowering stakeholders and implementing the SDGs. As a result of their federal governance structures, the three states demonstrate common challenges to support cooperative implementation of the 2030 Agenda among its state and non-state actors. These challenges include: 1) complex administrative processes to operationalise collective and complementary action between government and non-government stakeholders and 2) competing priorities making it difficult to align strategic planning across jurisdictions.

Canada, Switzerland and Germany are all found to use MLG arrangements to coordinate collective action on the SDGs and manage shared responsibilities across levels of government. In these cases, these arrangements have created challenges in coordinating mutual dependence between levels of government and complex administrative processes to coordinate collective action given the breadth of stakeholders involved and the broad framework of the 2030 Agenda. This study aims to answer the following questions: 1) how are these states approaching the creation of an enabling environment for implementation of the 2030 Agenda; 2) while decentralised and federal states vary widely in their political systems and processes, do these states face common challenges associated with their decentralised governance structures; and 3) does decentralisation matter in the effective implementation of the SDGs?

Decentralization- What it is and Why It Matters?

Terms and Concepts

According to the OECD (2019, p. 11), decentralisation refers to the transfer of powers, and some degree of autonomy, from central governments to subnational entities (for example provinces, other regional governments, municipalities, etc.). While this definition captures the essence of decentralisation in a straightforward sense, decentralisation is a complex process that involves constructing relationships between all levels of government to create strong cooperation and coherence in implementing national directives and mandates. Degrees of decentralisation are varied, and depend on the level of political, administrative and fiscal powers that are transferred from central to subnational governments. For the purpose of this study:

- Political decentralisation is characterised by the OECD as “setting the legal basis of decentralisation, which refers to the way in which subnational administrators are selected – i.e. by appointment or by election.” (2020, p. 18).
- Administrative decentralisation is characterised by the OECD as transferring “operational responsibility from a higher level to a lower level of organisation” without transferring full decision-making power (2020, p. 18). Administrative decentralisation does not transfer full decision-making power and can be further divided into administrative delegation and devolution (OECD, 2020).
 - Administrative delegation provides some autonomy by shifting the responsibility of service delivery and administration from the national to subnational level (OECD, 2020).
 - Administrative devolution provides autonomy through the transfer of decision-making and fiscal responsibility to subnational governments, with only indirect control from central governments (2020, p. 19).
- Fiscal decentralisation is characterised by the OECD as devolving “spending and revenue responsibilities from central governments to subnational tiers of government” (2020, p. 19).

The system of “mutual dependence” between national and subnational governments as a result of decentralisation defines a state’s institutional structure, culture and relationships, which can create challenges for central governments in implementing national mandates and complex frameworks (Devas and Delay, 2006). For example, countries with high degrees of decentralisation may experience fragmented or overlapping public policies, a lack of administrative capacity to manage jurisdictional cooperation and underfunded responsibilities given competing priorities and budgets (OECD, 2019).

Decentralisation can exist in different structural arrangements depending on if the system of governance of a state is federal or unitary. The terms ‘federalism,’ ‘federal states’ and ‘federations’ refer to a system of shared sovereignty between the central federal government, and its self-governing subnational entities. The system is characterised by one or more constitutions that divides political authority between a central government and its regional and subnational governments. The self-governing, subnational governments are entitled to binding decisions that may not be altered by the central, federal government, and are granted separate powers and responsibilities (Reich, 2021). Based on the classification by the Forum of Federations, there are 25 federal countries in the world today (Forum of Federations, 2022). Collectively they include roughly 40 percent of the world’s total population and cover 45 percent of the world’s landmass although literature on the precise taxonomy of federalism is ambiguous, and open to interpretation given the large variety of federal forms and structures that exist (Hueglin, 2013).

In contrast to federal states, a unitary state is characterised by a central government with greater degrees of political authority and sovereignty that is not shared with its subnational governments. This does not mean that subnational governments in unitary states do not have autonomy or decision-making power, but rather the granted autonomy has been directly delegated to them by the central government. For this reason, subnational entities in unitary states can be characterised by either high or low degrees of political sovereignty and autonomy, creating large variation in their degrees of decentralisation (OECD, 2019).

Why It Matters

In 2019, a Decade of Action was called forward by the UN Secretary-General during the UN High-Level Political Forum for Sustainable Development, calling on all sectors of society to mobilise for a decade of action on three levels: global action, local action, people action (2019). Understanding the common barriers between these institutional levels will support a more comprehensive dialogue of what is required of states with complex governance systems to support whole-of-society action and accelerate sustainable solutions.

In the context of the 2030 Agenda, the transfer of powers as a result of decentralisation is an important mechanism that empowers subnational governments to implement the SDGs in their own local contexts as the level of government closest to the individual. Local implementation is integral to achieving the 2030 Agenda and operationalising national sustainable development policies. Given the nature of the broad Agenda, measured through its 169 targets and 232 unique indicators, implementing the SDGs is a complex undertaking that requires coherence between all levels of government, from national to local, to link the 17 SDGs and their targets and indicators with existing plans, strategies, policies and goals (Fourie, 2018). This study hypothesises this process to be much more challenging in states characterised by large and complex democracies with decentralised systems of governance, such as those found in many federal states. While federal states are more decentralised than unitary states, it is important to note that this is not always the case, and that this distinction could also be partly attributed to federalism being more common in developed countries (Treisman, 2006).

Collaborative partnerships are an integral component of achieving the 2030 Agenda, and is most notably measured through SDG 17: Partnerships for the Goals, and its targets and indicators. The next section of this study will analyse the 2030 Agenda national implementation strategies and sustainable development strategies of three federations. It will look to determine how decentralisation impacts their respective federal implementation of the SDGs – in particular, how a few of the most decentralised, federal states are implementing enabling environments to ensure inclusive participation from all sectors of society. Despite this study's focus on developed economies from the global North, enhanced partnerships between the global North and the global South are instrumental in achieving the 2030 Agenda given the interconnected nature of the SDGs and the broad framework of the 2030 Agenda, which requires joint action and the sharing of best-practices at all levels. It is for this reason that enhanced partnerships should be a major outcome of the "Why it Matters" 2022 Conference to further our understanding of the complexities involved in SDG implementation, and how factors like systems of governance influence the ability

to leverage and accelerate complimentary action at the speed and scale required to achieve the SDGs.

It is to be noted that there is no clear-cut standard by which states are ranked by their degree of decentralisation, given the complexity of defining, attributing and interpreting appropriate indicators. The RAI is used in this study to provide a general idea of the states that are among the most decentralised. It measures regional autonomy in its dataset across a number of dimensions including institutional depth, policy scope, fiscal autonomy and law making – among other dimensions – and aggregates scores to the country-level (Schakel, 2022). Among the variety of indexes of decentralisation, the RAI is considered as the current international standard (Cole et al., 2019), and is used by the OECD in measuring decentralisation (OECD, 2019). The federal states that were selected for this study were chosen based on governance systems characterised by political, administrative and fiscal decentralisation and their high annual scores of regional authority aggregated by country under the RAI. Given the positive correlation between government effectiveness and high scores on the RAI (OECD, 2019), developed, federal countries were among the highest scoring in the index, and it is for this reason that the states chosen for this case study are all federations. This study does not aim to generalise its results using the dichotomy of federal and unitary states but does recognise that decentralisation is more common in federal systems, and for this reason also recognises that federal states will share many common governance characteristics.

Creating Enabling Environments in Decentralized States- A Case Study of Canada, Switzerland, and Germany

While most states are mainstreaming the SDGs into their existing government sustainable development plans and strategies, a number of states are developing entirely new plans dedicated to implementation of the 2030 Agenda and its SDGs. This section of the study seeks to analyse the sustainable development plans and 2030 Agenda national strategies of three federal states whose scores of aggregated regional autonomy rank highly on the RAI: Canada, Switzerland and Germany. It will first look to provide a brief overview of each states' governance structure and characteristics of their political, fiscal and administrative decentralisation. It will then provide an overview of the initiatives, mechanisms and approaches highlighted in their plans and strategies that support creating an enabling environment for cooperative implementation of the 2030 Agenda. It will aim to answer the first aforementioned research question: how are decentralised states approaching creating an enabling environment for implementation of the 2030 Agenda?

Canada

Overview of Decentralised Governance in Canada

Canada is a federation characterised by its cultural diversity and is considered by many to be one of the world's most decentralised federations (Simeon, 2002) (Bird and Tassonyi, 2003). Canada is made up of ten provinces and three territories at the regional level, all of which vary greatly in

size and economies. Sovereignty in Canada is shared between federal and regional governments, with both holding legislative and executive power, granting authority for both levels of government to enact and implement their own legislation (Simeon, 2002).

While Canada's provinces and territories are highly decentralised, its local governments are centralised in comparison, as they fall under the exclusive jurisdiction of the provinces (The Constitution Act, 1982, section 92[8]). In addition to its federal, regional and local governments, Indigenous governments exist across Canada, and their inherent right to self-government is recognised under Canada's constitutional framework (The Constitution Act, 1982, section 35). Conceptualising a jurisdictional framework between Indigenous and non-Indigenous governments in the context of Canada's settler-colonial history remains a challenge (Pasternak, 2014) and an ongoing process that the Government of Canada recognises as part of its evolving system of cooperative federalism and distinct orders of government (Justice Canada, 2021).

In addition to highly decentralised legislative and executive powers, Canada is also very fiscally decentralised. Provinces have access to almost all tax bases, and significant revenue raising powers. This is further supported by an equalisation system that compensates provinces with tax revenues if they fall below the minimum national standard (Department of Finance, 2011). Given its decentralised governance structure, implementation of the 2030 Agenda in Canada requires coherent policies and complementary action among all its levels of government.

Canada's 2030 Agenda National Strategy and Federal Implementation Plan

Since the inception of the 2030 Agenda, the federal Government of Canada has released a number of products to support its implementation of the 2030 Agenda. In 2019, the Government of Canada launched *Towards Canada's 2030 Agenda National Strategy*, an interim strategy developed through nationwide consultations. To contribute towards an enabling environment and a whole-of-Canada strategy, it recognises the shared responsibility of sustainable development between all three levels of government, with federal actions on the SDGs aimed to complement and support initiatives taken by other Canadian levels of government (Employment and Social Development Canada [ESDC], 2019). It recognises the important role that provincial and territorial government policy makers and regulators play in advancing sustainable development, given their jurisdictional lead over a number of key policy areas (for example education, skills development, health systems, justice, social services, road safety, affordable housing and sustainable infrastructure). Provinces and territories as well as local governments are responsible for measuring and aligning their progress and reporting on the 2030 Agenda. In the interim strategy, the Government of Canada identifies existing forums such as Federal-Provincial-Territorial Ministers' Roundtables as a potential means for collaboration and for sharing best practices on the SDGs (ESDC, 2019). Given the political decentralisation in Canada, and competing priorities between the federal and provincial governments, co-implementing and administering whole-of-government and whole-of-society policies among a wide network of stakeholders in Canada is often a complex and challenging process, usually with difficulty in creating formal structures to manage all relationships (Tamtik, 2016).

In 2021, the Government of Canada launched *Moving Forward Together: Canada's 2030 Agenda National Strategy* and *Canada's Federal Implementation Plan for the 2030 Agenda*, which acknowledge the responsibility of all Canadians in implementing the 2030 Agenda, under the guiding leadership of the federal government. The explicit objective of the national strategy aims to create and foster an enabling environment for ongoing dialogue and participation for all sectors of Canadian society to take action to implement the 2030 Agenda (ESDC, 2021).

The strategy outlines the roles and responsibilities for all sectors of Canadian society and includes the federal government's core objectives for engagement and action to support the creation of an enabling environment. This includes supporting federal policy coherence and accountability through the identification of departmental leads and co-leads for each of the 17 SDGs, including their roles and responsibilities. It also includes the administration of an SDG Funding Program amounting to \$4.6 million annually to support governments and stakeholders in implementing the SDGs, including through supporting a national SDG forum that brings together diverse stakeholders to collaborate on innovative approaches to advance progress on the 2030 Agenda in Canada. The Government of Canada engages closely with three National Indigenous Organisations through funding agreements to support engagement capacity with Indigenous Peoples and to ensure Indigenous perspectives are integrated in Canada's implementation of the 2030 Agenda. The federal government will also establish an external advisory committee for sustainable development that is representative of different segments of society to advise the federal government (ESDC, 2021).

Switzerland

Overview of Decentralised Governance in Switzerland

Switzerland, like Canada, is a culturally diverse federation characterized by complex governance between its three layers of government. Its federal structure includes over 2,000 communes at the local level, 26 cantons at the regional level and the confederation – or the national level of government (Dafflon, 1999). The confederation and cantons each hold their own constitutions, which express subnational sovereignty for its cantons and communes. All three levels of government in Switzerland maintain executive, legislative and judicial powers and all hold the right to revenue raising and levying tax (Dafflon, 1999).

Unlike Canada, communes at the local level in Switzerland are highly decentralised. In principle, the administration of public services is largely granted to communes, with cantons only taking over responsibilities that communes themselves cannot carry out (Leptien, 2013). This level of decentralisation is likely the result of the many constitutions held at the regional level that grant communes the power to coordinate and finance these services. Federal legislation in Switzerland is often delivered in the form of frameworks that avoid excessive detail to leave room for interpretation by cantons. This level of autonomy allows for horizontal cooperation between local and regional levels of government to support for fiscal equivalence as well as the efficient use of public services that require inter-communal or inter-cantonal cooperation (Dafflon, 1999). Like in Canada, equalisation policies are used to address regional disparities, such as population size,

and economies. However, in the past there has been a low dependency from cantons and communes on transfer payments reflecting a large degree of financial autonomy across all levels of government (Dafflon, 1999).

Switzerland's 2030 Sustainable Development Strategy

In 2021, the Government of Switzerland launched its *2030 Sustainable Development Strategy* (SDS), setting guidelines for its sustainability policies, and cementing sustainable development as a priority area for all federal policies. The SDS is not solely a 2030 Agenda strategy, but rather uses the 2030 Agenda as a reference framework to guide federal policies and provide strategic direction for areas under federal purview (Federal Office for Spatial Development [ARE], 2021). Similar to Canada's 2030 Agenda National Strategy, it recognises that successful implementation of the 2030 Agenda requires whole-of-society action, given the degree of competencies and jurisdictional authority among its decentralised levels of government. For this reason, it invites Swiss cantons, communes, stakeholders and its general population to join the confederation in pursuit of the SDGs (ARE, 2021).

Through the SDS, the confederation aims to create an enabling environment for whole-of-society implementation of the 2030 Agenda, but as mentioned above, recognises both cantons and communes as similarly responsible to support creating an enabling environment given their level of decentralisation and jurisdiction over a number of key services and policy areas (ARE, 2021). The Swiss confederation is implementing a number of mechanisms to support the creation of an enabling environment. Federally, this includes the appointment of a 2030 Agenda Steering Committee made-up of high-level representatives of the leading federal departments responsible for implementing the 2030 Agenda to support cross-sectoral tasks and policies. The committee not only coordinates all federal departments in implementing the 2030 Agenda, but also consults with cantons, communes and all other stakeholders such as those representing civil society, academia and businesses (ARE, 2021).

A key federal concern noted in the SDS is applying the principles of sustainable development at all levels of Swiss government, given cantons and communes are primarily responsible for many policy areas of relevance to the 2030 Agenda. To address this, the confederation will be using a few structured tripartite cooperation mechanisms to coordinate cooperative and complementary action between their three levels of government. This includes through their Conference of Cantonal Governments (representing the 26 Swiss cantons), the Conferences of Cantonal Directors (representing different cantonal policy areas), the Cantonal Sustainable Development Network (representing cantonal and federal governments) and communal networks that engage both locally as well as internationally. The SDS notes that coordination between Switzerland's three levels of government is still developing and being further strengthened (ARE, 2021).

The SDS recognises the integral role of civil society, academia, businesses and other whole-of-society stakeholders in creating synergies for sustainable development. The mechanisms it uses to promote partnerships and dialogue include active consultation on plans and reports, an annual Sustainable Development Forum as well as the appointment of a 2030 Agenda Advisory Group.

The objective of the advisory group is to represent the interests of non-state actors and ensure effective cooperation and complementary action with all levels of Swiss government. The members of the advisory group represent different sectors of society, including academia, civil society, business and youth (ARE, 2021).

Germany

Overview of Decentralised Governance in Germany

Germany is a federation with three levels of government represented by the federal level, the Länder at the regional level and its local level of government. Under its constitution, Germany's subnational governments have high levels of autonomy with all three levels of government having their own distinct legislative, executive and judiciary bodies (Basic Law for the Federal Republic of Germany, Articles 71, 72, 73 & 74). While the federal government is responsible for much of the policy formulation in Germany, the Länder is mostly responsible for policy implementation and service delivery (Fleischer et al., 2018).

Given that the Länder have autonomy over their organisational structure, there is a high degree of variation amongst Germany's regional governments. Administration of the Länder is usually characterised by a two or three-tier system including a central level, meso-level and lower level (the two-tier system is usually without the meso-level) (Fleischer et al., 2018). While local governments in Germany are considered part of the Länder, they are a distinct third level of government that is similarly administered in a two-tiered system – characterised by counties at the upper level and municipalities at the lower level. Based on this dualistic model, the implementation of legal provisions from the Länder is delegated to local governments. Decentralisation in Germany requires high levels of collaboration through both vertical and horizontal collaboration to organise collective and complementary policy implementation. This is organised through both formal and informal channels such as the Conference of Prime Ministers, Treaties between Länder, working groups and advisory boards, among others (Fleischer et al., 2018).

Germany has high degrees of fiscal decentralisation with all three levels of government maintaining expenditure and revenue raising authorities. Three quarter of all tax revenues are shared between the three levels of government, with each level of government also collecting some taxes separately. Similar to Canada and Switzerland, financial equalisation payments are made to support financially weaker Länder, and also in the form of grants administered from the federal to the local level (Fleischer et al., 2018).

Germany's Sustainable Development Strategy

In 2016, the Government of Germany launched its first *German Sustainable Development Strategy* (GSDS), with additional updates launched in 2018 and most recently in 2021. The GSDS is the central framework for the implementation of the 2030 Agenda and its SDGs in Germany, and is considered a continuous work in progress (Government of Germany, 2021). The vision of

the GSDS is a sustainable Germany that is characterised by a high quality of life, effective environmental protection and inclusive opportunities for the equal participation of everyone in all areas and at all levels (Government of Germany, 2021, p. 15). It has six sustainability principles and six areas of transformation informed by dialogues held with German stakeholders, organisations and individuals.

The GSDS aims to support the creation of an enabling environment and recognises that implementing the 2030 Agenda requires action and a commitment from all political levels, stakeholders and the public (Government of Germany, 2021). It recognises governance as a key lever for its implementation, with each level of government – federal, Länder and local government – having a joint responsibility given their level of autonomy in the German federal system. Given the authority of the Länder to pass and administer legislation on sustainable development, they are recognised as critical in achieving Germany's sustainability targets, and are called on to develop their own sustainable development strategies and to align them with the GSDS (eleven Länder are currently in the process of developing sustainable development strategies) (Government of Germany, 2021). In 2019, the Federal Chancellor and the Länder Heads of Governments issued a joint declaration on working together to achieve the SDGs, with both intending to align their political activities with the federal strategy (Government of Germany, 2021). Local governments are also recognised as a driving force for implementing the SDGs in their own contexts. Given that local governments have high degrees of authority and that sustainability communications primarily occur at the level of the Länder, it is argued in the GSDS that further contributions should be made by municipalities to support the alignment of sustainability objectives (Government of Germany, 2021). A number of mechanisms are used to support cooperation and complementary action horizontally as well as vertically between Germany's three levels of government. At the federal level, ministers are appointed to serve as Ministry Coordinators for Sustainable Development to support policy coherence across federal ministries. At the Länder level of government, several forums are used to support coordination between the federal government and the Länder including the Federation-Länder Exchange on Sustainable Development, which supports the alignment of sustainability directives and the Regional Hubs for Sustainability Strategies, which coordinate local action on the SDGs between all levels of government and stakeholders. There are a number of umbrella organisations that support dialogue on sustainability at the local level, including the Association of German Cities, the Association of German Counties and the German Association of Towns and Municipalities (Government of Germany, 2021).

The GSDS aims to integrate a multi-stakeholder approach as an important principle in achieving the SDGs. Mechanisms have been created to support stakeholders in taking cooperative and complementary action. These include a Sustainability Forum held annually to support dialogue between the government and stakeholders on the 2030 Agenda and the creation of a Dialogue Group consisting of 15 institutions representing the fields of business, environment, society and international affairs to discuss and advise on sustainable development with the federal government. To support the integration of scientific expertise into 2030 Agenda planning, the Scientific Platform for Sustainability 2030 was launched to support implementation of the GSDS (Government of Germany, 2021).

Results

The findings from this case study suggest that Canada, Switzerland and Germany as decentralised states have unique institutional frameworks and MLG arrangements in place, both formally and informally, to navigate the jurisdictional barriers between their levels of government to support an enabling environment for the SDGs. The division of power embedded in their federal and regional constitutions has granted high degrees of autonomy to their local and regional governments. As a result of their federal governance structures, the three states show that they face common challenges in creating an enabling environment to support cooperative implementation of the 2030 Agenda and its SDGs.

These challenges are characterised by 1) complex administrative processes to operationalise collective and complementary action between government and non-government stakeholders and 2) competing priorities making it difficult to align strategic planning across jurisdictions. This section of the study will aim to answer the second and third research questions: “do these federal states face common challenges associated with their decentralised governance structures when creating an enabling environment to implement the 2030 Agenda,” and “does decentralisation matter in the effective implementation of the SDGs?”

Multi-level Governance and Complex Administrative Processes

In decentralised states, and notably federations, a lack of clear and effective administrative processes can often result in disjointed information, conflicting objectives and the loss of developing ideas (Kerber and Eckardt, 2007). While a state’s system of governance creates the architecture that guides the coordination of its policies and frameworks, it is the regular administrative practices that operationalise engagement and action (Tamtik, 2016). The broad policy and growing stakeholder base of the 2030 Agenda requires administrative processes that are incredibly complex as they aim to navigate policy sectors, levels of government, stakeholders and the public, in a way that is responsive to the ever-changing landscape of sustainability priorities. These administrative processes require formal structures and MLG arrangements between all actors to ensure clear and transparent collaboration.

The decision-making processes involved in the implementation of public policies are becoming increasingly complex, with individual governments lacking the resources and governance structures to address modern policy challenges (Daniell and Kay, 2017). The MLG approach is a process gaining traction in recent decades (Allain-Dupré, 2020) characterised by frequent interactions between state and non-state actors to tackle complex challenges and policies that require effective partnerships, such as climate change, the Covid-19 crisis, or in this case the 2030 Agenda. Its dynamics take into account the roles and responsibilities of all levels of government and their competing jurisdictions to leverage optimal action on shared goals, with examples such as Germany’s Federation-Länder Exchange on Sustainable Development, and Switzerland’s Conferences of Cantonal Directors. MLG has become an imperative in addressing complex policies and in understanding decentralisation mechanics (Allain-Dupré, 2020). While MLG supports cooperative governance in decentralised states when coordinating broad and

complex frameworks like the 2030 Agenda, it can also present obstacles including clear lines of accountability and competing priorities between levels of government (Daniell and Kay, 2017). Canada, Switzerland and Germany all use MLG arrangements to coordinate collective action on the SDGs and manage shared responsibilities across levels of government. In these cases, these arrangements have created similar challenges as a result of decentralised governance. These challenges include difficulty in coordinating the mutual dependence between national and sub-national governments and their respective public policies and complex administrative processes to coordinate collective action given the breadth of stakeholders involved and the broad framework of the 2030 Agenda.

In the case of Germany, MLG arrangements are used to support coordination between their federal and Länder governments, given the authority of the Länder to pass and administer legislation on sustainable development. With sustainability as a joint responsibility among all levels of government, Germany's GSDS calls for both the Länder and local governments to develop and align their own unique sustainability strategies in collaboration with local, regional and federal governments (Government of Germany, 2021). The mutual dependence of levels of government in Germany creates a need for interconnected strategies and plans that cannot be mandated at any given level and are non-binding. In addition to a reliance on cooperation, the level of administration required to coordinate joint strategies and action between local, regional and federal levels, in collaboration with stakeholders, creates a web of administrative processes across competing jurisdictions.

Similar administrative challenges associated with MLG arrangements are reflected in both the Swiss SDS and Canada's 2030 Agenda National Strategy as a result of their decentralised governance. In Switzerland, many of the levers to implement sustainability policies are administered at the local level but require regular collaboration. This includes through inter-communal, inter-cantonal and tripartite cooperation mechanisms with the federal government – in addition to stakeholder dialogues that are administered at all levels of government to advise and support policy action and reporting (ARE, 2022). Canada faces similarly complex administrative processes given the autonomy and jurisdiction of its provinces and territories in key sustainability policy areas as well as its ongoing engagement with Indigenous Peoples and governments on sustainability policies and frameworks, which also require horizontal collaboration amongst local, provincial, territorial and federal governments (Bowie, 2013).

All three states aim to create similar formal MLG arrangements to streamline their administrative processes – for example through 2030 Agenda advisory committees, sustainability forums and inter- and intra-governmental processes, among others – creating an incredibly extensive network of organisations with competing levels of authority that can make it difficult to track how day-to-day progress is being operationalised. This is especially true when one considers the vast assortment of informal coordination arrangements that are happening in tandem between government and non-government actors on the 2030 Agenda that are not outlined in the national strategies (United Nations Department of Economic and Social Affairs, 2020).

Competing Priorities and Jurisdictions

Political decentralisation creates a potential for competing priorities and depending on the constitutional arrangement between regional and local governments can make it difficult to align strategic sustainability frameworks. Given the degrees of political, administrative and fiscal decentralisation characterised in Canada, Switzerland and Germany, the three states share similar challenges in aligning their 2030 Agenda national strategies and frameworks with those of their local and regional governments. The different jurisdictions, regional characteristics, population dynamics and economies often create competing priorities for their constituents in comparison to other levels of government, for example at the federal level. Political autonomy also creates additional challenges noting that priorities and political interests are also susceptible to change along party lines, which can impact the ability to align sustainability efforts (Hickmann, 2021).

In the case of Switzerland, the SDS notes the concern of applying aligned sustainability principles across all three levels of government, given the level of autonomy of its cantons and communes (ARE, 2021). These challenges are addressed in similar ways in both Germany's GSDS and Canada's 2030 Agenda National Strategy, which both call on its local and regional governments, as equally responsible implementers, to track and report on their progress in implementing the 2030 Agenda and its SDGs and to align their work at all levels (Government of Germany, 2021) (ESDC, 2021).

All three states use MLG arrangements to support alignment of their sustainability priorities with their governments including sustainability forums and federal-regional-local cooperation mechanisms. In the case of Germany, the GSDS addresses this challenge at the Länder level of government through a formal joint declaration on working together to achieve the SDGs, with both federal and Länder governments intending to align their political activities with the federal strategy (Government of Germany, 2021). In this case, Länder governments function in a similar role as partner states with their federal government to achieve cooperative objectives. Despite this progress, challenges in aligning sustainability priorities remain, with the GSDS arguing that further contributions should be made by municipalities to support the alignment of German sustainability objectives (Government of Germany, 2021).

Canada, Switzerland and Germany have all clearly identified the shared jurisdictional responsibility for the 2030 Agenda among levels of government. Successful implementation will require coordinated and cooperative action – through strategic planning and policymaking or other instruments – that can address unique domestic contexts. Each of the three states seeks to progress towards the SDGs through these various instruments, some similar and others not. In the states analysed in the above case study, it is clear that decentralisation has a significant impact on the frameworks needed to coordinate collective action among levels of government and non-state actors on the 2030 Agenda. The findings also suggest that the three decentralised states face similar challenges relating to administrative complexity, subnational autonomy and managing competing priorities and jurisdictions. While in these cases of Canada, Switzerland and Germany it is clear that decentralisation matters in their effective implementation of the 2030

Agenda, further research is required with a greater number of case studies to determine the extent to which it plays a role in other states' SDG implementation efforts.

While the three states in this case study represent states that have made domestic progress and are seen as global leaders in implementing the 2030 Agenda and its SDGs, these findings suggest administrative and political complexities inherently reflected along governance lines and their relationship in coordinating complex policies, like the 2030 Agenda. The broad nature of the 2030 Agenda, and the administrative challenge of coordinating the sheer volume of diverse stakeholders across its 17 SDGs, is a separate, yet equally important discussion in conversations on implementing enabling environments in decentralised states.

Research Limitations

It is noted that while these findings cannot be attributed to all decentralised states, given the sample size in the case study and the variety of governance systems that exist among both federal and unitary states, they are suggestive of common challenges associated with implementing broad and complex frameworks amongst whole-of-society stakeholders. This study recognises that the states that were selected represent highly developed economies given the positive correlation between government effectiveness and high scores on the RAI. This is not reflective of the experiences of all federations or decentralised states (OECD, 2019). It also recognises the complexity of measuring decentralisation, and the potential ambiguity in interpreting its indicators. Given the findings of the case study, more research is needed with additional states representing diverse economic status and both the Global North and the Global South to provide a more comprehensive analysis on the extent to which decentralised governance impacts enabling environments for the SDGs. This future research would also contribute to the broader discussion as to how a country-level analysis, grouped via similar systems of governance, might offer insights to better understand and compare progress across countries in implementing the 2030 Agenda and highlight new pathways for inclusive partnerships.

Conclusion

Achieving the 2030 Agenda and its SDGs requires a tremendous undertaking at all levels and across all stakeholder groups – from local governments to international organisations. The administration of such an undertaking at the national level is incredibly complex given the local and regional discrepancies that exist within a state, and its own competing priorities and jurisdictions.

This article has analysed and discussed the impacts of decentralisation on a state's ability to create an enabling environment for collective and complementary action on the SDGs through a case study of three federations including Canada, Switzerland and Germany. Its aim is to contribute towards an understanding of how systems of governance affect the way in which national governments address global challenges, with a specific focus on decentralised governance. Using a qualitative analysis, this paper seeks evidence for or against the argument that decentralised states require unique institutional frameworks that support cooperative

implementation of the 2030 Agenda and that recognise and account for subnational, administrative and jurisdictional barriers at the local and regional levels. It aims to answer the following research questions: 1) how are these states approaching and creating an enabling environment for implementation of the 2030 Agenda; 2) while decentralised and federal states vary widely in their political systems and processes, do these states face common challenges associated with their decentralised governance structures; and 3) does decentralisation matter in the effective implementation of the SDGs?

The findings suggest that Canada, Switzerland and Germany as decentralised states have unique institutional frameworks and MLG arrangements in place, both formally and informally, to navigate the jurisdictional barriers between their levels of government to support an enabling environment for the SDGs. The division of power embedded in their federal and regional constitutions has granted high degrees of autonomy to their local and regional governments. As a result of their federal governance structures, the three states show that they face common challenges in creating an enabling environment characterised by 1) complex administrative processes to operationalise collective and complementary action between government and non-government stakeholders and 2) competing priorities making it difficult to align strategic planning across jurisdictions.

Given the degrees of political, administrative and fiscal decentralisation characterised in Canada, Switzerland and Germany, the three states share similar challenges in aligning their 2030 Agenda national strategies and frameworks with those of their local and regional governments. Canada, Switzerland and Germany are all found to use MLG arrangements to coordinate collective action on the SDGs and manage shared responsibilities. In these cases, these arrangements have created challenges as a result of decentralised governance including difficulties in coordinating mutual dependence between levels of government and complex administrative processes to coordinate collective action given the breadth of stakeholders involved and the broad framework of the 2030 Agenda. The mutual dependence in policies and relations among levels of government creates a need for interconnected strategies and plans that cannot be mandated at any given level and are non-binding, and the horizontal and vertical coordination among stakeholder groups creates an incredibly extensive network of organisations with competing levels of authority that can make it difficult to track how day-to-day progress on the 2030 Agenda is being operationalised. The different internal jurisdictions, regional characteristics, population dynamics and economies of each of the states can create competitive priorities between the different levels of government. For example, regional authorities may seek to meet the direct demands of their constituents while federal authorities navigate the challenge of creating functional policy for the nation at large.

While facing common challenges, due to the different national contexts and governance frameworks, the three states address these challenges in similar and unique ways. While Canada, Switzerland and Germany recognise joint responsibility and call on all levels of government in implementing the 2030 Agenda in their 2030 Agenda national strategies, Germany uses a joint declaration between its federal and Länder levels of government to align political activities and action on the SDGs (Government of Germany, 2021). All three states use similar formal MLG

arrangements to coordinate collective action on the SDGs including 2030 Agenda advisory committees and annual, national SDG forums to bring together whole-of-society actors to coordinate action and report on progress. Germany and Switzerland use arrangements such as the Federation-Länder Exchange on Sustainable Development (Government of Germany, 2021), and the Conferences of Cantonal Directors to coordinate action with all levels of government (ARE, 2021), while Canada uses an SDG Funding Program to support governments and stakeholders in coordinating and implementing the SDGs including funding arrangements with National Indigenous Organisations to support engagement capacity with Indigenous Peoples and to ensure Indigenous perspectives are integrated in Canada's implementation of the 2030 Agenda (ESDC, 2021).

From the case study, it is clear that decentralisation has a significant impact on the frameworks needed to create an enabling environment to coordinate collective and complimentary action among all levels of government and non-state actors on the 2030 Agenda in Canada, Switzerland and Germany. Further research is required with a greater number of case studies to determine the extent to which decentralisation plays a role in other states' SDG implementation efforts, using both developed and developing states to account for a greater degree of varying political and socio-economic characteristics, among others.

The findings highlight factors that could improve our understanding of global barriers and their impact on progress to date in achieving the SDGs. According to the OECD (2019) and RAI country-level aggregated data (Schakel, 2022), RAI-scores for American, European and Asian states has been increasing significantly since 1950, with "average regional authority 55% higher in 2010 than in 1950" and 64 percent of all states covered experiencing a net increase in the rate of regional authority (Schakel, 2022 p.79). Given that this data demonstrates a significant trend in increasing levels of decentralisation around the world, there is a need to further understand the unique challenges faced by decentralised states in the implementation of complex frameworks like the 2030 Agenda. While global indicators are used to measure progress, they do not capture the complexities that exist in the day-to-day administration between various levels of government in achieving the SDGs. Creating partnerships and forums between decentralised states, specifically to address their common administrative and jurisdictional challenges is one potential avenue to support information exchange and best practices in the field. Collaborative solutions, evergreen strategies and equitable partnerships are all essential components if we are to accelerate global action to achieve the 2030 Agenda and its SDGs at a more ambitious pace.

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An Assessment of the University of Buea as a Hub of Excellence and a Center of Partnerships for the SDGs

Horace Manga Ngomo (University of Buea, Cameroon)

Abstract

In this paper, we assess the University of Buea as a hub of excellence for SDG 17, “Partnership for the Goals” through an analysis of the research work at the University in the past two decades to demonstrate the strong, historical engagement with the SDGs. Analysis revealed that 13 of the 53 partnership projects signed by the University within the last decade, impacted 16 SDG’s. Secondly, a survey was carried out to evaluate the engagement of Establishments’ research projects on the SDGs and to highlight how partnerships have been critical to their successful implementation. Results showed the Establishments’ interests and priorities—their priority SDGs; partnerships with the most impact; structures for long-term partnerships; SDGs for partnerships at the local/national, continental, and global levels. The results showed that research projects in the Establishments impacted all 16 SDGs, and their interconnectedness was evident. Thirdly, we analyzed the themes of the abstracts submitted to this UN Conference and determined that they covered 14 out of the 17 SDGs. With one of the usual challenges of SDGs being impacts assessment and interconnectedness, the success of this approach resides in its possible application as an alternative framework for SDG impact assessment as well as its affirmation of the necessity of the multi stakeholder approach for economic development. Furthermore, given the interconnectedness of the SDGs, their ranking by impacts and other criteria, allows us to establish the resources that underpin their implementation in order to strengthen or shift these resources to enhance the SDGs outcomes.

Keywords: partnership; epicenter; interconnection; impact assessment

Introduction

The University of Buea (UB) was created in 1993 as one of six new Universities in the country, which before then, had a lone University of Yaoundé. Although it started with four Faculties, today, it hosts eleven Faculties and Schools, which provide quality education in classical and professional programs in the areas of Pure Sciences, Social Sciences, Arts, Engineering and Technology, Education, Agriculture and Veterinary Medicine and Health Sciences. It also hosts the pioneer Advanced School of Translation and Interpretation on the continent, to which was added the Translation and Conference Interpreting section of the Pan African University Institute for Governance, Humanities and Social Sciences (PAUGHSS) by the African Union in 2012 (ref). With this expansion have come Language Centers, Science and Engineering Workshops, Research Laboratories, field experimental stations, etc. The rapid expansion of the University consequently increased its training capacity and created the necessity, at that very early stage of its growth, for partnership and international cooperation to cope with its training and research

needs. This not only strengthened the capacity of the University of Buea as a training and research institution, it equally encouraged partnership and multidisciplinary research.

Compliance with Government Policy Objectives

The Law on the Orientation of Cameroon's Higher Education Institutions of 2001, Law 2001/005 of 16th April 2001, assigned to higher education the mission to transmit, produce and disseminate knowledge while being mindful of national development goals in the various aspects and dimensions of its outreach activities (Ministry of Higher Education, 2018). These goals have been the subject of successive development strategy plans. In Article 2, Section 31(1) of the Law states that "*Higher education institutions shall maintain and promote cooperative relationships amongst themselves and with similar national and foreign institutions or bodies*". This legislation set the promotion of partnership as a policy objective for higher education.

The Government of Cameroon, envisioned joining the ranks of the countries with emerging economies in the world by 2035, as enunciated in its growth and employment strategy paper published in 2010 (ref). This Vision 2010 Paper is the blueprint for all the activities that needed to be carried out by the sectoral actors: education sector, energy sector, infrastructure, water and energy, forestry and wildlife, research and innovation, agriculture and livestock, tourism, to attain defined development goals and targets to lead Cameroon to economic emergence. In the blueprint, the Government of Cameroon assigned to higher education the responsibility to produce highly qualified manpower to accompany the implementation of this Vision. In the same vein, Cameroon's current National Development Strategic plan, code named SND 30 - an improvement of the 2010 Paper, Higher Education is given a similar role.

To effectively train highly qualified manpower, means effective skills transfer to learners. There was thus a paradigm shift in university education from implicit capacity building to professionalization of classical programs where curricula development became driven by industry with modifications as the needs change. Although with a long tradition of outreach activities, there were no deliberate attempt to develop indicators to measure their relevance of the educational system to populations' development. Calderon (2021) notes that, it is only since the 1990 that sustainability has taken center stage in understanding and measuring the impact of higher education institutions in their operational environment (ref). The 17 SDG's adopted by the United Nations in 2016 now oblige higher education to institutionalize sustainable development and to calibrate their research activities against the backdrop of their responses to the SDG's.

Institutional Organization to Enhance Research at the University of Buea

Creation of a Department of Cooperation to Facilitate Partnerships

The organizational structure of the University of Buea features a Department of Research and Cooperation, charged with the drafting of cooperation agreements and MoU's be they on behalf of the university as an institution, or between individual researchers and external organizations. The purpose is to provide expertise to the researchers to avoid risky partnership, while ensuring

at the same time that these accords conform with University policies on cooperation. To encourage partnerships, the department organizes, on an annual basis, capacity-building seminars and workshops for assistant lecturers intended to hone their skills on research problem identification, competitive grant writing, grant management, identification of national and international experts for various thematic, etc. This has improved the capacity of our researchers to win grants.

University of Buea Research Fund

The University of Buea operates a competitive research funds managed by the department of cooperation(ref). The Fund gets its resources principally from budgetary allocations by the University's management Council, and also by leveraging the support of international research Funds, assistance from industries and external donors. The institution of an *in situ* research Fund allows the research beneficiaries to align their projects with national development goals.

Research Planning Week

The University has instituted a research academic planning week. This seven-day period is dedicated to seminars on grant application writing for young researchers. One of the highlights of the week is the public presentation, to a team of experts, by the authors themselves, research projects which have made it to the final selection phase for university funding. This presentation ensures a transparent and participatory process from which aspects of implementation of relevant SDG's can be identified.

Research at the University of Buea

In execution of this mandate, researchers at the University of Buea, whether working together within Faculties research projects or as individual researchers, have had a wealth of experience in collaborative projects, which has earned the University the reputation it enjoys amongst its peers in Cameroon's higher education landscape. To stay relevant to the challenges of national development, its research activities have through the years espoused issues of multi stakeholder interests—skills training; economic development; natural resource transformation, sociopolitical stability, conflict resolution, environmental sustainability, good health; fight against poverty in its various dimensions and energy production, all issues related to the SDGs.

From the point of view that each SDG thematic is accomplished by choosing different resources from a pool of resources as well as the technology, skills, techniques, expertise, necessary for implementation, the interconnection between SDG's and reasons for their shared outcomes becomes evident. The major challenge for the Conference now becomes how to use the platform of the Conference to examine the complex interconnectedness between each of the factors to enable the SDG's deliver better on their goals. This process involves the determination of how each of the resources affects the overall outcome of the thematic. This is achievable through the sharing of expert knowledge in Panel discussions during the Conference on transversal issues.

An analysis of a questionnaire on the SDGs which the different Establishments of UB have been involved in during the past two decades and the SDGs with partnerships during the past decade, some of which will be sustained until 2030 and beyond, provide the reasons why SDG17 matters in the development of UB and Cameroon. The long-term benefits of these partnerships to the donors and to UB are a reflection of why SDG17 matters in the development of Africa and of Europe for a South-South and a North-South development as stipulated in targets and indicators of SDG17.

Objectives of the Study

The paper seeks to assess the University of Buea as a hub of excellence for the SDG's through the following:

- (1) A presentation of some 13 of the high impact multi stakeholder projects carried out in the past two decades from a list of 53 projects.
- (2) An evaluation of the University's research engagement with Partnerships for the SDGs and an assessment of the roles and benefits of the partnerships.
- (3) Carrying out a survey through the distribution of a questionnaire to the Establishments in order to evaluate the University's research engagement with Partnerships for the SDGs and to make an assessment on how the tools of partnerships have been essential towards the realization of the implementation of the SDGs they have impacted.
- (4) Report on two research projects as illustrative of the orientation of most of the research projects and how a triple helix framework can easily be developed to enhance their realization and benefits sharing. More importantly, for the University of Buea, this has been very important as collaboration has facilitated the mobilization of funds, expertise, technology, and shared knowledge.

Methodology

An Outline of the Growth of UB as a Hub of Excellence

The University of Buea (UB) was created in 1993 as one of six new Universities in the country, which before then, had a lone University of Yaoundé. It is presently one of eight State Universities and one of two Universities where instruction is in English. Although it started with four Faculties, today it hosts eleven faculties and Schools, which provide quality education in classical and professional programs in the areas of Pure Sciences, Social Sciences, Arts, Health, Engineering and Technology, Education, Agriculture and Veterinary Medicine. It also hosts the pioneer Advanced School of Translation and Interpretation (ASTI) on the continent to which was added the Translation and Conference Interpreting section of the Pan African University Institute for Governance, Humanities and Social Sciences (PAUGHSS) in 2012.

Although the University started with 3 Faculties, with 14 departments and a student enrolment of about 750, there are presently 11 Faculties and Schools (Establishments) with 74 Departments which run 265 degree programs at the undergraduate, graduate and post graduate levels. The academic staff strength during the 2021/2022 academic year is 625, a support staff strength of 630 and a student enrollment of about 25,000.

As a young Institution, it depended on partnerships for its growth with one of them being the University of Manchester in the United Kingdom, which from the start of the University, provided expertise in the areas of capacity building of Administrative and Academic staff over several years as a North-South partnership. South-South partnerships were also established with other Universities on the continent such as the University of Ibadan in Nigeria and the “mother University” of Yaoundé I, which was the sole University in Cameroon until 1993 when the University of Buea was created as explained above.

There is presently a strong component of quality research and outreach activities in the areas of Health, Agriculture and Fisheries, Clean Energy, Technology, Water Resources, Climate Change, Gender Issues, and Law as presented below. Some of its major research and teaching laboratories include the Emerging Infectious Disease Laboratory, which is accredited for COVID-19 for the South West Region of the country, the Biotechnology Laboratory, the Energy Transformation Laboratory, and the Volcano Monitoring Laboratory, which hosts the PERIPERIU Center for Disaster Management for the Central African Sub-Region. Researchers received externally funded grants of more than 100,000 USD during the past five years.

A Presentation of UB’s Projects Involving Partnerships within the Past Two Decades that have Impacted the SDGs in the Areas of:

- i. Funding (research, fieldwork, etc.),
- ii. Expertise (provision of expertise for teaching and research, improvement of the expertise of both academic and support staff) and of PG students, etc.
- iii. Capacity building, (of students, especially in the research of PG students), outreach and community engagements such as sensitization and awareness creation, etc.
- iv. Technology in terms of equipment (provision of lab and field equipment including drones, materials, reagents, etc.)
- v. Infrastructure (Construction of buildings such as laboratories, the library, classrooms, etc.)

The Educational Values that Need to be Developed in the SDG17

These values are reflected in the priority SDGs, which the Establishments of the University have shown preferences for, based on their interests and expertise. These have further been concretized by the partnerships they have created, especially those within the past decade, some of which will be implemented until 2030 and beyond, while others will most likely be renewed based on the aspirations and needs of both the donor partners and the University. This is further encouraged by the fact that most of these partnerships are in the areas of capacity building, research, and exchange of expertise and students as reflected below in the list of partnerships that impact the SDGs.

One of the major challenges for the research projects, as mentioned earlier, is how to relate the contribution of the projects developed in the Faculties and Schools in terms of SDG's. To assess the Impact Assessment of the projects on the SDG's, their interconnectivities are usually expressed in terms of Triple or Multiple Helix Framework (Lahi ,2019); (Etzkowitz and Leydesdorff, 1998) and the SDG Impact Tool Assessment Methodology as discussed by Castor et al. (2020) and attributed to the University of Gothenburg Centre for Sustainable Development (GMV). Briefly, the triple-helix model as a framework allows the formulation of the interdependence between actors sharing the same vision for the realization of SDG's.

Utilization of Questionnaire

For the purpose of the assessment of UB research projects through two decades with respect to their impact on the SDG's, we proceeded with the distribution of a questionnaire to Heads of Establishments. The questionnaire, which is a widely applied SDG Impact Assessment Tool, enables the assessment by the researchers themselves of the impact of partnerships as solutions, research activities, or projects on the Sustainable Development Goals (SDGs). On the basis of the researchers own knowledge, he/she are able to identify opportunities and risks and knowledge gaps. It is expected that an improved understanding of how the project responds to the SDGs will allow the researcher to be better equipped to prioritize actions ahead. This method of analysis has preferably been used for different research projects (Dalampira and Nastis, 2020); Salvia, et al.,2019).

For this study, a purposive assessment of the priority SDGs that Faculties and Schools are involved in was carried out using a questionnaire. These Establishments are as follows:

FAVM..... Faculty of Agriculture and Veterinary Medicines

FLPS..... Faculty of law and Political Sciences

FED..... Faculty of Education

COT..... College of Technology

FET..... Faculty of Engineering and Technology

FHS..... Faculty of Health Sciences

FS..... Faculty of Science

FSMS..... Faculty of Social and Management Sciences

FA..... Faculty of Arts

The Questions were formulated to enable the stratified evaluation of the University of Buea Research Projects based on their SDG-related impacts, which is essential to capture how researchers in these Establishments are aware of the 2030 Agenda and the SDGs.

The questionnaire was divided into seven blocks of questions. The first block requested the respondents to rank, on a scale of 1 to 5 (1 being the most important) amongst the 17 SDG's, which each establishment has been most involved with in the past two decades.

The second block of questions requested the respondents, based on the signed partnerships in the first block, to prioritize the ranked SDG's.

The third block of questions requested the respondents, where applicable, the priority types of Structures/organization with which the Faculty/School has established a partnership; structures such as Local Government Councils; Government Institutions in Cameroon; National Organizations in Cameroon; Foreign Governments; International/Foreign organizations and others.

The fourth block of questions required the respondents to rank (from 1 to 6) the nature of the benefits from the partnerships—Funding (for more research, community engagement; outreach); Expertise (academic and support staff); Capacity building (staff and students); Technology (equipment and materials); Infrastructure (buildings); and others.

The fifth block of questions requested the respondents to identify for each of the ranked SDGs, which organization or structure they would prefer to have for long term partnerships.

The sixth block of questions requested the respondents to explain how the partners in the fifth block of questions will benefit from sustained partnership with UB.

The seventh block of questions required the respondents to identify which SDG's could be built into the activities of UB for implementation at the National Level (Cameroon); Continental level; Global Level.

In summary the above approach was aimed at establishing:

- a. The priority SDGs the Establishments are involved in,

- b. The types of structures (Institutions/Organizations) which have signed partnerships with the Establishments during the past 2 decades,
- c. The partnerships which have impacted the Establishments,
- d. The types of structures to be considered for long term partnerships until 2030 and beyond,
- e. A ranking of the SDGs to be considered for partnerships at the local/national, continental and global levels, and
- f. The potential benefits of the partners/donors for such partnerships,

Analysis of the 30 Abstracts (proposals) Submitted

Thirty abstracts submitted by academic staff and students for evaluation for use in the proceedings, oral presentations and poster presentations of the WIM Conference were analyzed in order to identify the frequency of SDGs that were captured in these abstracts.

Results

A Historic Review of Partnerships with UB that have Impacted and Developed UB in the Areas of the SDG's

The Sustainable Development Goals (SDGs) came about in 2012 and in 2015, the 17 Sustainable Development Goals (SDGs) were adopted by UN Member States. After the adoption, Higher Educational Institutions (HEIs) have engaged in efforts to fulfill the SDGs and develop ways of assessing performance. Performance assessment in HEIs is possible by universities effectively reporting information about SDGs to the Times Higher Education (THE). The University of Buea (UB) is engaged in 244 partnerships in countries from five (05) continents in the area of expertise, technology, knowledge sharing and mobilization of financial resources. Thirteen (13) SDGs are impacted by these partnerships namely, SDG1, SDG2, SDG3, SDG4, SDG 5, SDG6, SDG7, SDG9, SDG10, SDG11, SDG13, SDG14, SDG15, SDG16. The partnerships in UB for the last decade as per SDG ranking are summarized in Table 1 (De la Poza et al., 2021)

Table 1: University of Buea Partnerships

| S/N | SDG IMPACTED | THE DEFINITION | INSTITUTIONS/ ORGANIZATIONS | RANGE OF PARTNERSHIP |
|------------|---------------------|---|------------------------------------|-------------------------------------|
| 1 | SDG 1 | No poverty. Focuses on university's research into poverty and its support | AFRILAND First Bank | Mobilization of financial resources |

| | | | | |
|---|-------|---|---|------------------------------|
| | | for poor students and the poor members of the local community. | Cameroon University Housing Corporation (UHC) Meyomessala | Infrastructure |
| | | | Cameroon Real Estate Development Agency (CREDA), Yaoundé | Infrastructure |
| 2 | SDG 2 | Zero hunger. Focuses on university's research into hunger, its teaching on food sustainability, and commitment to tackling food waste and addressing hunger in students and local communities. | GREFCON Group Ltd. Limbe | Knowledge sharing, Expertise |
| | | | Southwest Development Authority (SOWEDA) Buea | Knowledge sharing, Expertise |
| | | | Olive Foundation | Knowledge sharing, Expertise |
| 3 | SDG 3 | Good health and well-being. Focuses on university's research into the key conditions and diseases with a disproportionate impact on health outcomes worldwide, its support for healthcare professions, and the health of both students and staff. | Brain Research Africa Initiative (BRAIN) | Knowledge sharing, Expertise |
| | | | Institute of Medical Research and Medicinal Plants Studies (IMPM) Yaoundé | Knowledge sharing, Expertise |
| | | | Ministry of Public Health Yaoundé | Knowledge sharing, Expertise |
| | | | Mezam Clinique, Bamenda | Knowledge sharing, Expertise |
| | | | Centre Pasteur Yaounde | Knowledge sharing, Expertise |
| | | | Regional Hospital Buea | Knowledge sharing, Expertise |
| 4 | SDG 4 | Quality education. Focuses on university's contribution to early years and lifelong learning, its pedagogy research, and | University of Yaounde 1 | Knowledge sharing |
| | | | LVMT Business School, Douala/ UK | Knowledge sharing |
| | | | Ministry of Basic Education, Yaounde | Knowledge sharing |

| | | | | |
|---|-------|--|--|---------------------------------------|
| | | commitment to inclusive education | St. Jerome Catholic University Institute, Douala | Knowledge sharing |
| | | | University of Douala (FSJP) | Knowledge sharing |
| | | | African Institute for Mathematical Sciences, AIMS, Limbe, Cameroon | Knowledge sharing |
| 5 | SDG 5 | Gender equality. Focuses on university's research into the study of gender, its gender equality policies, and commitment to recruiting and promoting women. | Women's Empowerment and the Family Centre, Kumba | Knowledge sharing |
| 6 | SDG 6 | Clean Water and Sanitation. Focuses on the University's role to improve on water availability, sanitation and hygiene through research to inform policy and behavioral change. | Douala City Council, Ministry of Public Health | Knowledge sharing, Expertise |
| 7 | SDG 7 | Affordable and clean energy. Focuses on university's research into energy, its energy use and policies, and commitment to promoting energy efficiency in the wider community. | municipal councils of Southwest Region Cameroon | Knowledge sharing |
| 8 | SDG 9 | Industry, innovation, and infrastructure. Focuses on university's role to foster innovation and serve industry's needs. | ENEО Cameroon | Technology, Expertise, Infrastructure |
| | | | Cameroon Development Corporation (CDC) | Technology, Expertise, |
| | | | Oil Refinery Company (SONARA) | Technology, Expertise, |
| | | | National Hydrocarbons Corporation (SNH) | Technology, Expertise, |

| | | | | |
|----|--------|---|--|------------------------------|
| | | | MTN Cameroon | Technology, Expertise, |
| | | | ORANGE Cameroon | Technology, Expertise, |
| 9 | SDG 10 | Reduced inequalities. Focuses on university's research into social inequalities, its discrimination policies, and commitment to recruiting staff | Association of Commonwealth Universities (ACU); Association of African Universities (AAU); African Economic Research Consortium (AERC); Fullbright; DAAD Foundation; UNESCO; AUF; EU Erasmus Mundus. | Knowledge sharing, Expertise |
| 10 | SDG 11 | Sustainable cities and communities. Deals with the stewardship of resources to seek the university's role to sustain and preserve communities' heritage | Mount Cameroon Inter-Communal Ecotourism Organization Buea | Knowledge sharing, Expertise |
| 11 | SDG 13 | Climate action. Explores university's climate change research, its energy use, and preparations to deal with climate change consequences. | National Forestry Development Agency (ANAFOR) | Knowledge sharing, Expertise |
| 12 | SDG 14 | Life below water. Explores university's research into life below water, and its education on and support for aquatic ecosystems. | Cameroon Fish Farmers' Union (CAMFFU) | Knowledge sharing, Expertise |
| | | | Limbe Nautical Arts and Fisheries Institute (LINAFI) | Knowledge sharing, Expertise |
| 13 | SDG 15 | Life on land. Explores university's research into life on land, and its education on and | Mount Cameroon Inter-Communal Ecotourism Organization (MOUNT CEO) | Knowledge sharing |

| | | | | |
|----|--------|--|---|-------------------|
| | | support for land ecosystems. | National Forestry Development Agency (ANAFOR) | Knowledge sharing |
| 14 | SDG 16 | Peace, justice, and strong institutions. Focuses on how university can support strong institutions in the country and promote peace and justice. | Pan African University Institute for Governance, Humanities (PAUGHSS) | Knowledge sharing |

The overall score of the University of Buea using Africa as a benchmark for the 14 key performance indicators (KPIs) grouped into five areas namely, teaching, research, citations, industry income and international outlook is encouraging. However, as HEIs are now occupied with identifying and quantifying key indicators to fulfill the SDGs, the University of Buea will explore valuable broad based partnerships to achieve a better overall score in the KPIs comparable to teaching (30%), research (30%), citations (30%), industry income (7.5%), and international outlook (2.5%) by 2030 (De la Poza et al., 2021).

Results from the Analysis of the Answers from the Questionnaires

A ranking of the top five SDGs which Establishments have been involved with during the past two decades is indicated in Figure 1(a). These results are indicative of more involvement with the SDGs shown in Figure 1(b).

Figure 1a shows that for FAVM ranks the top five SDGs which it has been involved in, in the following order of importance, SDGs 2, 1, 14, 15,13, while for FED, the ranking of SDGs it is involved in is: SDGs 4,1,2,6,3 in that order.

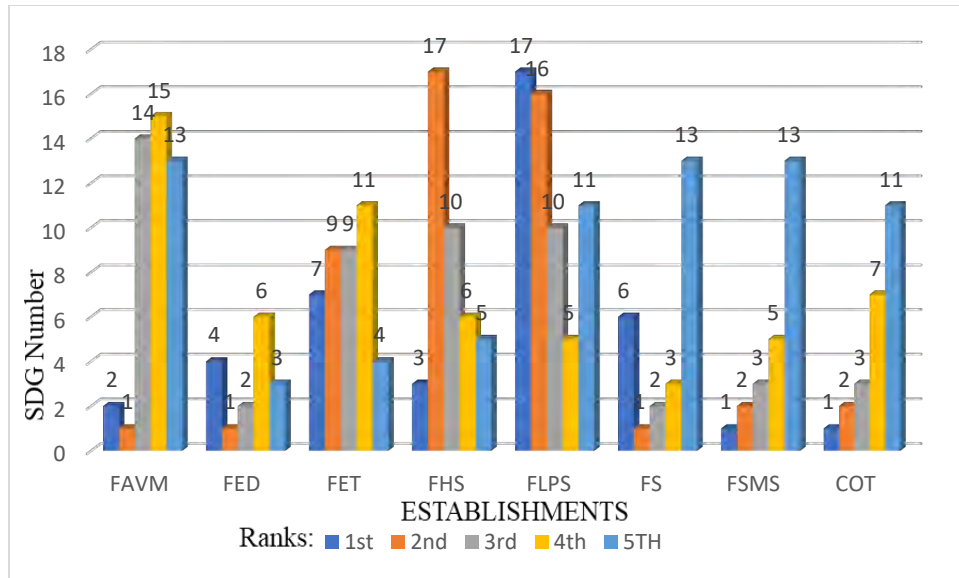


Figure 1 (a): Ranking of top five SDGs which establishments have been involved in during the past two decades

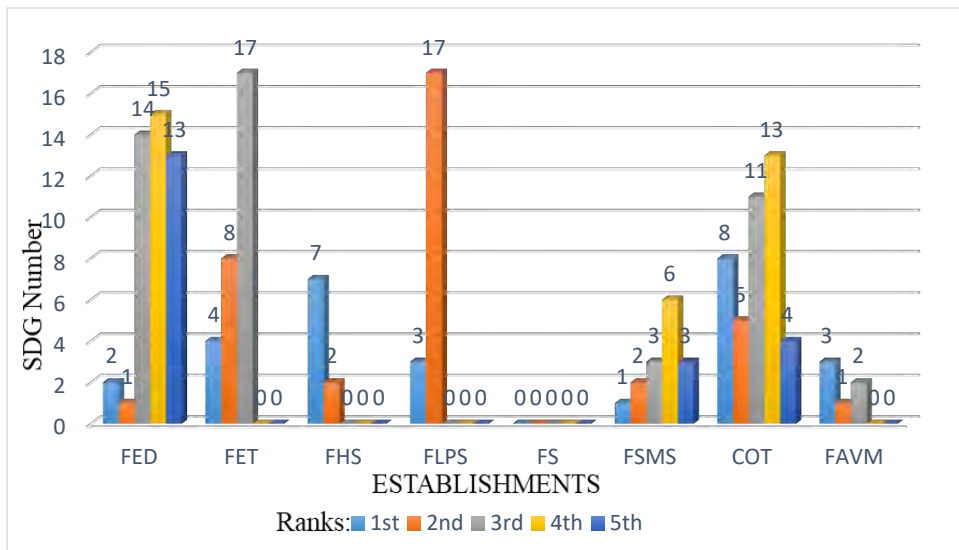


Figure 1 (b): Top five SDGs with signed partnerships

Figure 1(b) shows the classification by the Faculties and Schools of the ranked SDGs in Figure 1a, this time, in their order of priority. Hence, FSMS, for example gives priority to SDG 1; 2;3;6;3 in that order while FS apparently did not participate in the ranking. Nevertheless, it is observed that all the SDGs are given high priority as reflected in all Establishments. It thus shows the complexity of interconnectedness.

The major partnerships, which have had appreciable impacts in the University as expressed by the Establishments, are shown in Figure 2a while Figure 2b shows the major structures with which

the Establishments have established partnerships. Both figures indicate the priority areas for each Establishment.

Figure 2a, for example indicates that for the Faculty of Arts (FA) it's the priority for established partnerships was motivated by the benefits of Funding, Capacity building, and Infrastructure. Figure 2b clearly indicates that Councils (Local governments), Foreign gov'ts, international organizations, NGO's, National Institutions constitute the choice of structures for partnerships, to varying degrees, by these Establishments.

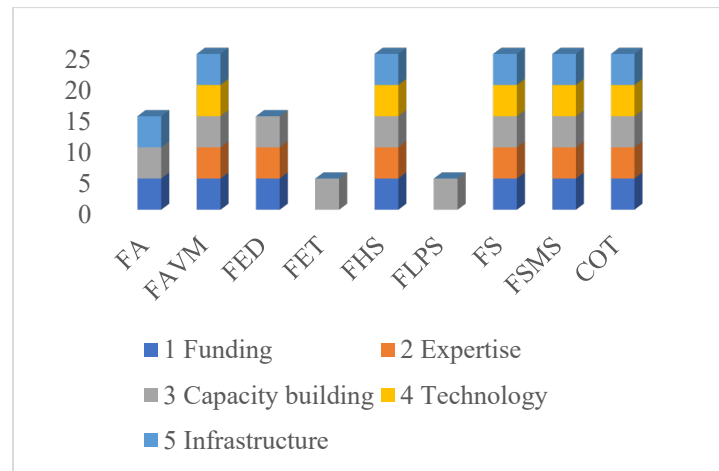


Fig 2a: Partnerships which have impacted Establishments

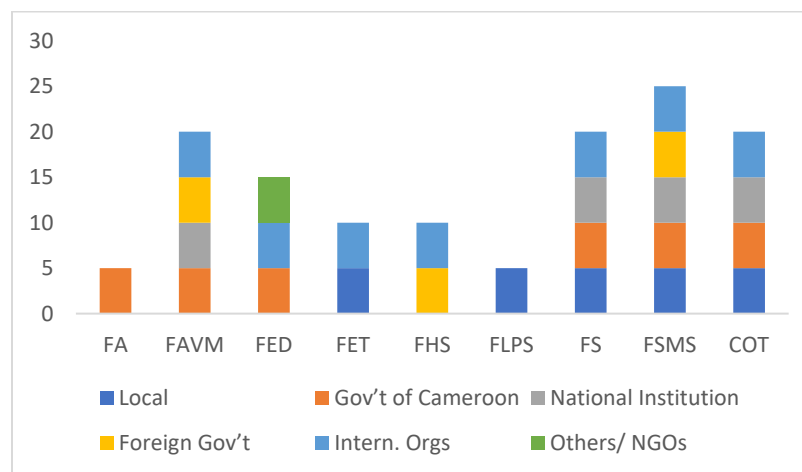


Fig 2b: Priority types of structures (institutions, organizations, etc) which have signed partnerships with Establishments

From the foregoing, one can identify the most suitable stakeholders who could be considered by the University for long term partnerships towards the implementation of the SDGs in question until 2030. These, according to the Establishments are indicated in Figure 3.

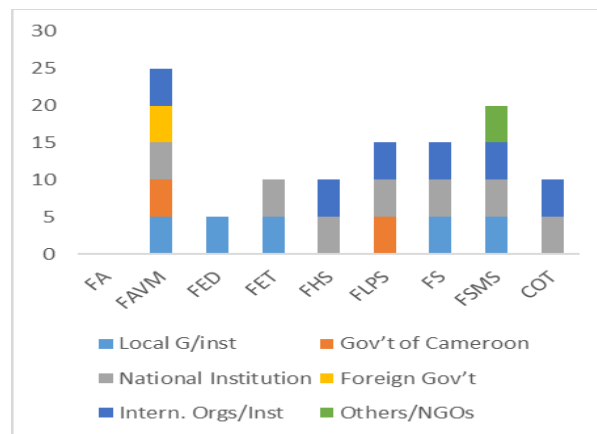


Fig 3: Types of structures to be considered by Establishments for long term partnerships until 2030 and beyond

The SDGs which, according to the Establishments, could be considered for implementation at the Local/National, Continental, and Global levels are indicated in Figure 4. This clearly identifies the SDGs which the University has the potential of engaging with to ensure their implementation by 2030.

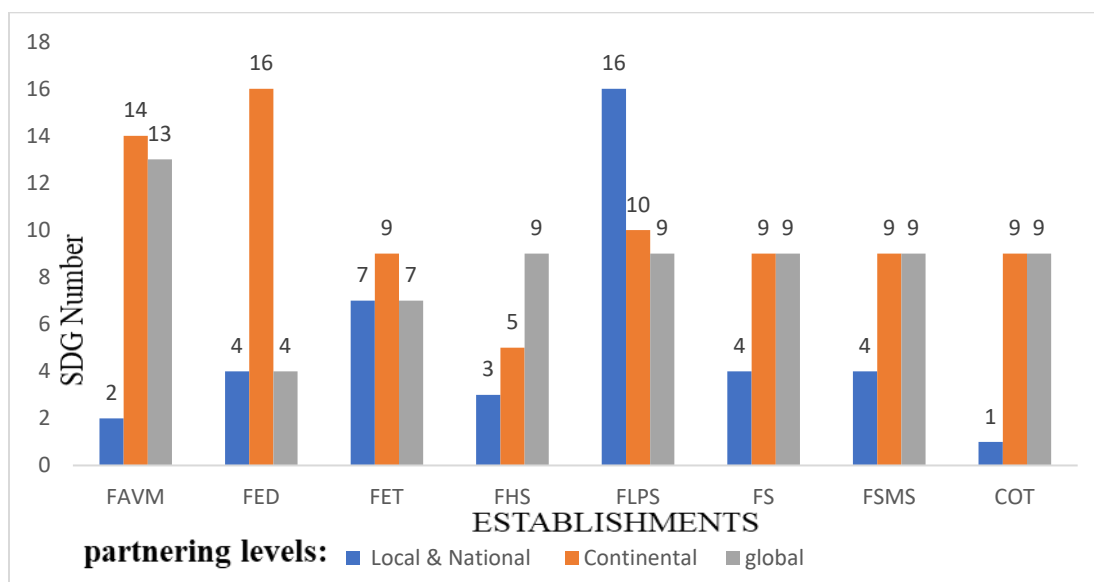


Fig 4: Ranked SDGs to be considered for partnerships at various levels

The potential benefits of partners/donors from sustained or renewed partnerships with the University until 2030 and beyond are as follows (Figure 5):

- 1) Staff development through mobility and exchange visits by staff and students.
- 2) Joint research projects

- 3) Exposure to global issues (legal, political, and other perspectives)
- 4) Exchange of experiences and knowledge sharing through forums such as fieldtrips, meetings, workshops, conferences, etc.
- 5) The realization of the mission of donor such as; transfer of expertise and technology

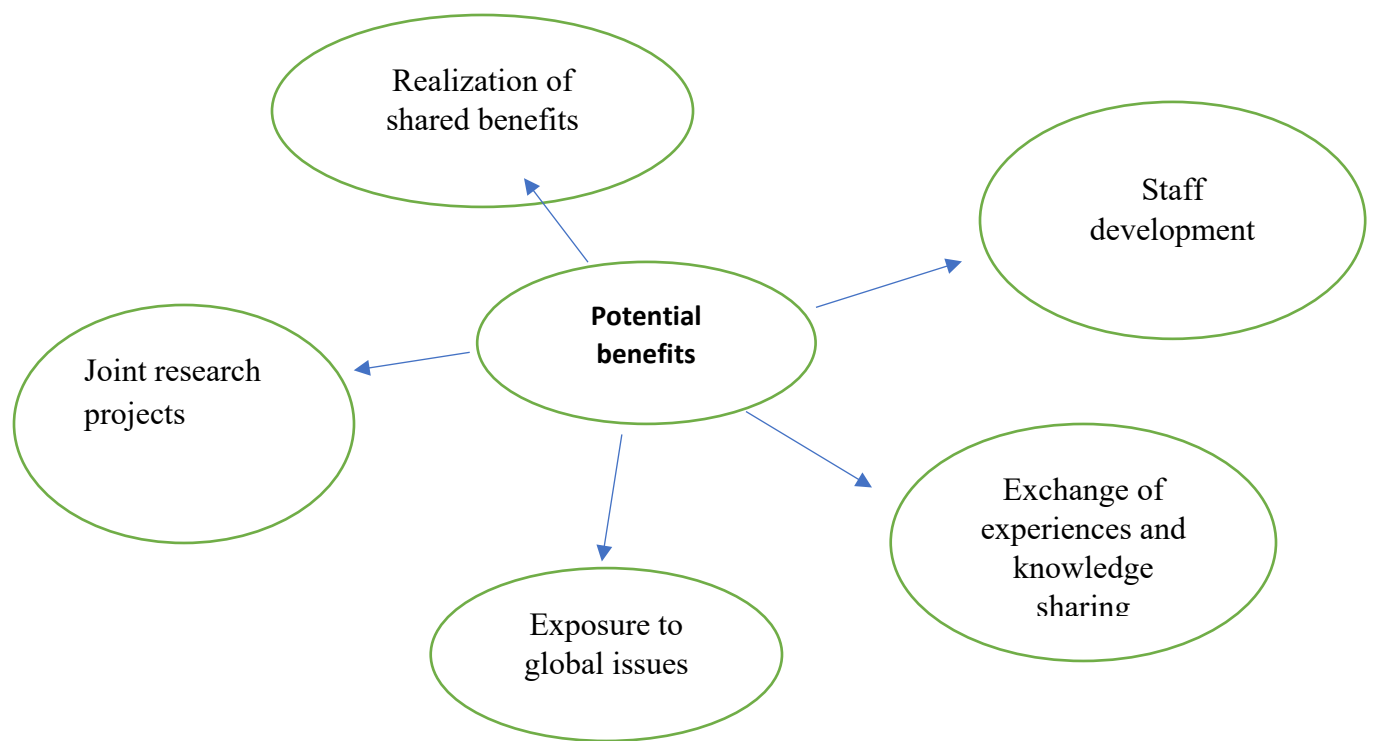


Fig 5: shared benefits of partners from sustained partnerships with UB until 2030

Presentation of Abstracts Submitted to the United Nations Conference on Partnerships for the SDGs, Why It Matters

The contributions of staff and students at the University as a hub of excellence, towards this vision has accordingly been based on their proficiencies and experiences as exemplified in the 30 abstracts/proposals, which were submitted, from which 28 out of 30 were accepted (13 for full papers, 8 for oral presentations and 7 for posters presentations), giving an overall success rate of 93.3% (Tables 2,3 and 4).

Table 2: List of Abstracts Submitted for Full Papers and Corresponding SDGs Treated

| Titles of Abstracts | SDGs Treated |
|---|---------------------------|
| Improvement of the livelihoods of rural populations of Sub-Saharan Africa through post-harvest and cook technologies powered by renewable resources | SDG 7 |
| Renewable Energy for Rural Electrification of Sub-Saharan Africa: Why it matters | SDG 7 |
| Trends of malaria in the South West Region of Cameroon | SDG 3 |
| Diarrheal diseases and evaluation of inhabitants' knowledge and practices | SDG 3 |
| State of Food Security and Nutrition : Building Climate Resilience for Food Security and Nutrition in the South West Region, Cameroon | SDG 2, SDG 3 SDG 13 |
| Enhancing quality education through partnerships: Why it matters in Higher Education in Cameroon | SDG 4 |
| Addressing the growing gender inequalities in new conflict areas in Africa | SDG 5, SDG 10 |
| Problems of climate change-related hazards in African coastal communities | SDG 11 |
| Monitoring and predicting future eruptions of Mount Cameroon to ensure sustainable development in towns and communities | SDG 11 SDG 17 |
| Expanding economies, and employment in Saharan Africa: a comparative study of Cameroon, Côte d'Ivoire and Kenya | SDG 8 |
| Partnering to maximize the impact of technological innovation in post-harvest | SDG 1. SDG 2, SDG 9 |
| Partnering to Achieve Reducing Inequalities and Attaining Peace, Justice and Strong Institutions in Central Africa | SDG 10, SDG 16 |
| The University of Buea as a Hub of Excellence and an Epicenter of Partnerships for SDG 17 | SDG 17 |

Total number of abstracts =13; Number accepted for full papers =13; Success rate =100%

Table 3: List of Abstracts Submitted for Oral Presentations and Corresponding SDGs Treated

| Titles of Abstracts | SDGs Treated |
|--|---------------------|
| Reversible hydrogen-to-electricity technology as a Renewable Energy option | SDG7 |
| The urgent need to standardise and valorise the usage of African Herbal Medicine | SDG 1 SDG 3 |

| | |
|---|-----------------|
| Adapting beneficial microbes and plant bio-active materials to control the invasive fall armyworm pest in maize production systems | SDG 2 |
| Engineering beneficial microorganisms to rebuild the rhizosphere microbiome and improve the nutritive value of soybean to mitigate hidden hunger | SDG 2 |
| Vegetable crop production and livelihood strategies in Cameroon: A case study of the Noun plateau | SDBG 1 SDG 2 |
| Managing Urban Growth in Sub-Saharan Africa: The Neglected Dimension of Urban Poverty | SDG 1 SDG 11 |
| Meeting the Challenges of Gender Inequality and Poverty for Persons with Disabilities: Lessons to be learnt from Best Practices in Cameroon | SDG 5 |
| The Urgent need for Multisectoral Action on Antimicrobial Resistance Surveillance | SDG 1 SDG 3 |
| Transformational Changes in Health Care Services Delivery in sub-Saharan African Countries to Achieve Good health and Well-being in the Context of COVID-19 | SDG 1 SDG 3 |

Total number of Abstracts =9; Number accepted for Oral Presentation=8 ; Success rate =88.8%

Table 4: List of Abstracts Submitted for Poster Presentations and Corresponding SDGs Treated

| Titles of Abstracts | SDGs Treated |
|---|---------------------|
| Rain-to-Electricity Conversion System | SDG 7 |
| Intrusive and None-intrusive Energy Harvesting Techniques from Water Distribution Networks: The case of Buea in Cameroon | SDG 7 |
| Advanced HIV disease in people living with HIV under antiretroviral treatment at the Buea Regional Hospital and coinfection rate of <i>Mycobacterium</i> spp. and <i>Cryptococcus</i> spp | SDG 3 |
| Urinary Tract infection in pregnant women in the Limbe Health District of Cameroon: A Phenotypic and Biochemical analytic study | SDG 3 |
| Fight against a communicable disease (Covid-19), its response strategies and effectiveness in Buea Municipality, Cameroon (SDG 3) | SDG 3 |
| Food insecurity status of households, associated hazards and risk reduction strategies as determinants for sustainable development, in South West- Cameroon (SDG 2 and 3) | SDG 2 SDG 3 |
| Potential of ornamental fishes in the Lower Guinea Rainforest Rivers | SDG 14 |
| Pay as you go solar module equipped with adapted online maintenance: Case study of Cameroon | SDG 4 SDG 7 |

Total number of abstracts =8; Number accepted for Oral Presentation=7; Success rate =87.5%

A synopsis of the above abstracts/proposals is indicative of emphasis in the following priority goals:

- SDG 1: No Poverty
- SDG 2: Zero Hunger
- SDG 3: Good Health and Well-being
- SDG 4: Quality Education

- SDG 5: Gender Equality
- SDG 6: Clean Water and Sanitation
- SDG 7: Affordable and Clean Energy
- SDG 9: Industry, Innovation and Infrastructure
- SDG 10: Reduced Inequality
- SDG 11: Sustainable Cities and Communities
- SDG 13: Climate Action
- SDG 14: Life Below Water
- SDG 15: Life on Land
- SDG 16: Peace, Justice and Strong Institutions

These results are indicative of prioritized SDGs which Establishments have been engaged in, and which can be integrated into their curriculum for continuous capacity building in the areas of the SDGs in which this Institution is already embarked on. Such implementation could be at the level of Cameroon, Africa, and even at the global level since the University has already established several partnerships at the global level as indicated earlier.

It is worth noting here that the prioritized types of SDGs which the University is involved in, will equally be relevant for most developing countries, and that is why it matters that the University continues to develop its capacity to be a Hub of Excellence for the promotion and implementation of the SDGs.

Relevance of Activities of UB for the Sustainable Development Goals

All facets of sustainable development require partnerships between governments, the scientific committee, the private sector and the civil society. Thus, the various stakeholders of development namely: governments' industries' institutions and communities have the responsibility of supporting the achievement of the SDGs.

A holistic presentation on the contributions of the University of Buea within its context as the member of the scientific committee responsible for SDG 17 is indicative of a wide range of involvement in 14 out of the 17 SDGs based on the 30 proposals submitted for consideration for the conference (Tables 2,3 and 4). These SDGs constitute a system of universally accepted indices of human development, which can only be achieved through such partnerships.

The University of Buea as an Epicenter of Partnerships for the SDGs

Thus, SDG17, “Partnerships to achieve the goals”, which the University of Buea represents on the Hub of the Scientific Committee of the WIM22 conference, underscores the fact that all the goals cannot be achieved without the mobilization of funds for capacity building, expertise, and technology for infrastructure and shared knowledge by all.

The contributions of staff and students of the University of Buea in this endeavour, have accordingly been based on SDG 17 thereby rendering this Institution an Epicenter for Partnerships towards the realization of nearly all the goals. This has been based on the proficiencies and experiences of the staff and students/youths as exemplified in the 30 abstracts/proposals, which were submitted, from which 28 were accepted (Tables 2,3 and 4). Furthermore, the results of the purposive administration of questionnaires to Heads of Establishments were analyzed in order to establish the priority SDGs that the Establishments are involved in amongst other attributes as presented earlier.

A Historic and Current Reviews of Partnerships with UB for the SDGs

Since the creation of this Institution, it has been involved in a total of 167 partnerships at the national, continental and global levels as shown below:

- Cameroon – 65
- Africa – 25
- USA – 53
- Europe – 20
- Australia – 1
- Latin America -3

The types of partnerships are indicated in the pie chart below.

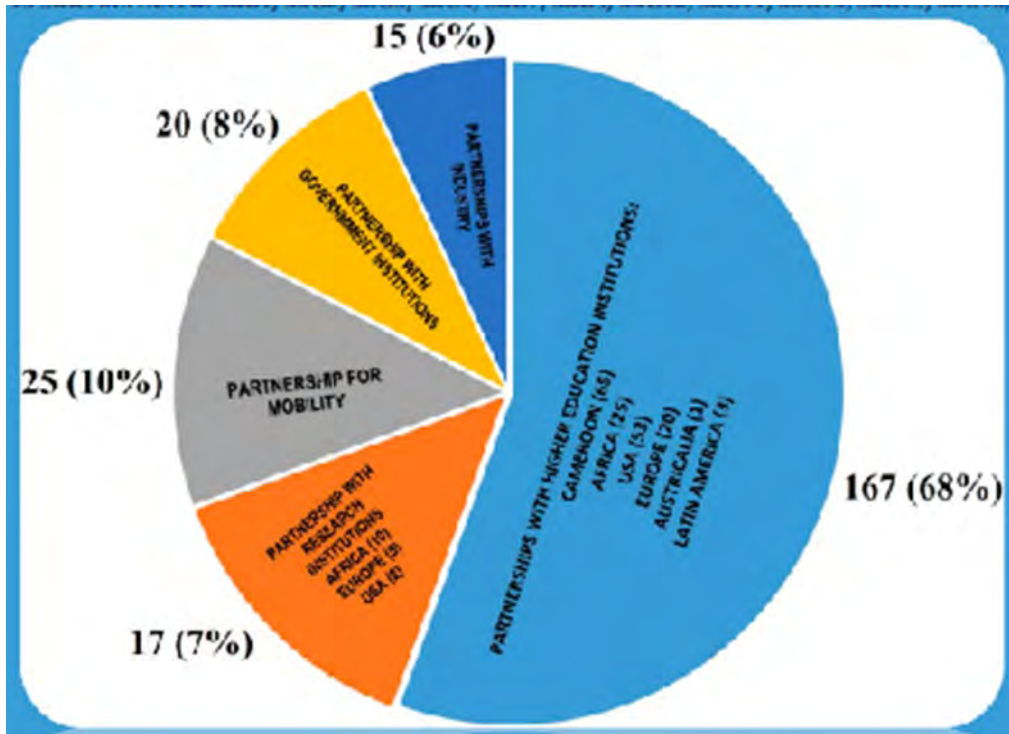


Figure 1: A pie chart showing the global distribution of partnerships signed with the university of Buea since 1993

These results are further indicative of the fact that the prioritized SDGs which Establishments have been engaged in, and which can be inbuilt in their activities for further implementation of these SDGs for development in this Institution, Cameroon, Africa, and at the global level, are relevant for the needs of the country, for Africa and for most developing countries.

The results are further indications of the availability of competent resource persons who, through their expertise, exposure, and scientific productivity, have, throughout the years, been involved with these partnerships at all levels and can therefore be expected to continue with the implementation of the SDGs they are involved in during the next 8 years until 2030.

Interconnectedness of the Goals through SDG 7 and SDG 2

It is however important to stress the fact that for these partnerships to be relevant, impactful, and sustainable, they must address the interconnectedness of the SDGs. An analysis of the interconnectedness of the SDGs presented in the 30 abstracts submitted to the WIM Conference as presented in Table 1 provides a means of proposing a conceptual framework of various models of partnerships.

Interconnectivity of SDG 7: Affordable and Clean Energy with other SDGs

By providing Affordable and Clean Energy (SDG 7) which is one of the priority goals of this Institution and since this goal impacts at least seven other SDGs amongst which five are amongst

the top priority SDGs, SDG 17 can therefore be said to be at the epicenter of these goals This is because energy directly or indirectly facilitates the attainment of the following SDGs through:

- I. Ending Poverty (SDG 1), and thus Zero Hunger (SDG 2),
- II. Providing Good Health and Well-being; (SDG 3),
- III. Providing Access to Quality Education; (SDG 4),
- IV. Building Industries, Innovation and Infrastructures, (SDG 9)
- V. Ensuring Sustainable Cities and Communities (SDG 11), and
- VI. Facilitating Climate Action (SDG 13) and
- VII. Combating Climate Change (SDG 13) by reducing the pressure on forest exploitation to provide firewood for rural populations, combats desertification and halts biodiversity loss, which is a consequence of the depletion of forests resulting in the loss of the natural habitat of wildlife.

This matters because the availability of electricity to both rural and urban populations provides a lever to poverty alleviation, improves the well-being of the population, facilitates inclusive economic growth through the creation of enterprises, facilitates industrialization and fosters innovation as well as helps in combating climate change.

Interconnectivity of SDG 2: *Zero Hunger*, with other SDGs

The realization of Zero Hunger (SDG 2) directly impacts Good Health and Well-being (SDG3) and indirectly impacts the following ten SDGs: This is because communities with “no hunger” generally have:

- i. Low Poverty Levels (SDG1),
- ii. Get Quality Education (SDG 4)
- iii. Clean Water and Sanitation (SDG 6)
- iv. Reduced inequality (SDG10)

Furthermore, lack of sustainability of some economic and industrial activities which are designed to achieve “zero hunger” negatively impact

- v. Change (SDG13),
- vi. Life Below Water (SDG14),
- vii. Life on Land (SDG15),
- viii. Responsible Consumption and Production (SDG12), and
- ix. Sustainable Cities and Communities (SDG11) and
- x. Peace, Justice, and Strong Institutions (SDG 16).

It is hoped that this assessment of the interconnectivity of some SDGs which were presented in the 30 proposals would be useful towards considering the interrelationship of these SDGs. It is hoped that this approach could constitute a framework for assessing the opportunities that will be available for the implementation of the SDGs during the next 8 years until 2030, instead of treating each SDG in isolation, especially as some of the interconnections can be expressed in a . Multi Helix Framework.

The approaches to be adopted during this conference towards the mobilization of funds from the various sources, through partnerships with various stakeholders at various levels as indicated in the example for the University of Buea (Figures 1 and 2) will, therefore, be streamlined to cater for interconnected SDGs rather than for individual SDGs.

Example of Partnerships for the Goals from Various Schools and Faculties

These are partnerships which have been established by the various Establishments of the University, and which impact, and will continue to impact the University in the implementation of the SDGs until 2030.

Partnerships For the Goals at College of Technology, University Of Buea

The College of Technology, University of Buea, has engaged in partnership with the Africa Loss Prevention Society (ALPS) and Cameroon's Power utility company, ENEO, for the Training of World Engineering Technicians (TWCET). The range of the partnership includes expertise, technology and knowledge sharing and three SDGs are impacted namely, SDG1, SG8 and SDG9. The partnership aims at designing and delivering training courses for Engineering Technicians to World Class Standards. Initiation of the partnership follows observation that the transition from expatriates to local technicians in most African public or para public companies some years after independence left a huge skills gap that affected the productivity of the companies. First, the transition created, with time, a fall in training standards and, secondly, technological advancement demanded retraining of technicians in the new industrial technologies if the companies were to deliver on their mandate and continue to expand.

This program is thus conceived to make up for the observed critical deficits in essentials skills needed to meet the whole range of operational challenges inherent in their business. It is expected to help strengthen the competitiveness of the local manufacturing and services industries by providing short training courses for the initial and continuous development of technical manpower. This program is built on the sectoral strategies laid down in the 2010 Growth and Employment Strategy Paper of Cameroon as well as the corresponding Strategy Papers developed in several African countries between 2005 and 2010.

This program is intended to cover short courses up to between 1 week and twelve months duration in the following domains:

- 1) Construction and Maintenance of Electric Power Networks
- 2) Internal Electrical Installations
- 3) Maintenance of Mechanical Equipment
- 4) Maintenance of Electrical Equipment
- 5) Operation and Maintenance in Process Industry
- 6) Techniques of Effective Supervision
- 7) Health and Safety at Work
- 8) Environmental Considerations in Construction, Maintenance and Operations

The industries covered will include Power utility; Telecommunications; Oil and Gas Exploration, Production; Refining and Distribution; Water, Land and Air Transportation; Metallurgy; Food and Drinks Processing; Meat and Poultry; Mining; Entertainment; Textile; and Urban Development.

New Approach based on Partnerships

The College of Technology, University of Buea has adopted a new approach for the training of high skilled workforce by partnering with a professional body and industry. The professional partner is Africa Loss Prevention Society comprised of engineers in diverse sectors, while the industry partner is ENEO, Cameroon for the training of Power Utility Linemen. The outcomes of the training are as follows:

1. High quality support services for maintenance
2. Low rate of breakdown failures
3. Low accident levels

4. Small down time

Future Perspectives on Partnerships and Impacts on SDGs at the College of Technology by 2030

Presently, the College of Technology, University of Buea uses its meagre financial resources and donations from power utility company, ENEO Cameroon to positively impact the power utility sector of the economy. With increased funding and broad-based partnerships, the training could be extended to the Central African sub region in the power utility sector and with the involvement of companies in the other sectors, most of the industries mentioned in section 3.1.1 will be positively impacted by 2030. With well-trained maintenance crew, it is expected that the country will have reliable power supply, which is a major resource across the board for the SDG 7 and a determinant for industrial development.

Why It Matters

Capacity building in the energy sector matters because the array of companies to be impacted is limitless as virtually every company utilizes electrical energy, which is so critical to industrial productivity, expansion and economic development of the African continent. The implication for job creation, reduction in employment and poverty alleviation are evident. Energy is essential to the realization of majority of the SDG's and uninterrupted provision of energy continues to pose a challenge in most African countries. Capacity building in such a vital sector in this industry-university-government partnership is a model that can be replicated in several African countries with the well-known impacts on the SDG's.

An Example of Partnerships in the Faculty of Science on Monitoring Active Mountains in Cameroon and in the Democratic Republic of Congo

Two partnership agreements on SDG 11(Sustainable Cities and Communities) which involve *Monitoring and predicting future eruptions of Mount Cameroon* and on *the health impacts of volcanic and flood hazards around Mount Cameroon (Cameroon) and Mount Nyirangongo (Democratic Republic of Congo)*.

These partnerships were aimed at ensuring sustainable development in communities in towns within these areas which, from past disasters, are exposed to hazards from volcanic eruptions such as lava flows and earthquakes which impact society and infrastructures. Modern societies are reliant on dependable functioning critical infrastructure and lifelines, which are vital for effective emergency response and recovery during volcanic eruptions (Grant, 2015). Hence, the partnerships were aimed at ensuring the sustainable cities and communities within these areas, where volcanic risks have been of major concerns for policy makers and the communities, especially with regards to conducting developmental projects.

Mount Cameroon (MC) in particular is one of the most active volcanoes in Africa, having erupted seven times during the last 100 years. Hazards from its 1999 eruption, caused significant

environmental and infrastructural damage estimated at 750 million FCFA (Wantim et al., 2018). These eruptions are usually preceded and accompanied by earthquakes (Ubangoh et al., 1997); emissions of sulphurous gases, increase temperature of vents which affect the quality and physical properties of water bodies.

Volcanic eruptions are difficult to predict, but progress has, been through volcanic surveillance in order to reduce the impact of its hazards on society (Brown et al., 2015). Monitoring these precursory parameters will help predict future eruptions at MC, which host major cities, and over 63 villages at its flanks characterised by increasing population caused by the presence of several higher institutions of learning such as the University of Buea, companies and plantations.

The sensitisation of the population on how to cope with future eruptions of this mountain therefore matters in order to ensure the sustainable developments within these areas. A recently designed Earthquake Building Code and Building Regulations for the mount Cameroon area was therefore necessary. The two partnerships below have been useful in these endeavours in facilitating the implementation of some targets of SDG3, SDG6, SDG9, and SDG13.

A PERIPERI – U partnership agreement with the USAID on Hazards and disasters associated with the eruptions of Mount Cameroon which provided funding for:

- a. Technological transfer,
- b. Capacity building of the population through workshops and
- c. Support towards the training of MSc and PhD students,
- d. Short courses in GIS
- e. The design of an Earthquake Building Code for the Mount Cameroon area,
- f. Infrastructural development and equipping of the Volcano Monitoring Laboratory, and
- g. The design of a degree programme in Disaster Risk Management.

Swedish Partnership Grant on Leading Integrated Research on Agenda 2030 (LIRA 2030) which provided funding which was used for workshops on urbanisation, on health and human wellbeing (SDG 3), Food security (SDG 2), the impacts of climate change on water resources (SDG 6 and 13).

Why these Partnerships Matter

The continuous monitoring aimed at predicting the eruptions of these mountains and the associated hazards in an attempt to sensitise the population and prepare them for subsequent disasters matters since this will:

- 1) Ensure the continuous monitoring and surveillance of the hazards from these mountains aimed at the sensitisation of the population and alerting them in the cases of eminent eruptions.
- 2) Provide capacity building of students on disaster risk management.
- 3) Ensure the construction of buildings and related infrastructure which respect the standard Building Code and Regulations approved for volcanic areas. and
- 4) Provide information which is relevant for investment confidence within the population

Conclusion

A holistic presentation on the contributions of the University of Buea within its context of its membership of the scientific committee responsible for SDG 17 is indicative of a wide range of involvement in 14 out of the 17 SDGs based on the 30 proposals submitted for consideration for the conference (Figure 2). The results of the analysis of our survey of the engagement of Faculties and Schools projects in the SDGs involving a purposive administration of questionnaires, provides a powerful framework to distinguish the interconnectedness of the SDG's and the relevance of partnerships.

Since all facets of sustainable development require such partnerships, the multiplicity of interconnectedness which were not evident in the projects before this analysis, validate the applicability of this methodology as an alternative Framework for SDG Impact Assessment. It further reiterates the need for partnerships for the optimal implementation of the sixteen SDGs, which constitute a system of universally accepted indices of human development, and that is why it matters.

Thus SDG17, "Partnerships to achieve the goals", which the University of Buea represents on the Hub of the Scientific Committee of this WIM22 conference, underscores the fact that all the goals cannot be achieved without the mobilization of funds, expertise, technology, and shared knowledge by all. The various stakeholders of development namely: governments, industry, institutions, and communities therefore have the responsibility of supporting the achievement of the SDGs.

Furthermore, from the point of view that each SDG thematic is accomplished by choosing different resources from a pool of resources as well as the technology, skills, techniques, expertise, necessary for implementation, the interconnection between SDG's and reasons for their shared outcomes becomes evident.

The major challenge for the Conference now becomes how to use the platform of the Conference to examine the complex interconnectedness between each of the factors at the national, continental and global levels to enable the SDG's deliver better on their goals. This process will involve the determination of how much each of the resources (Funding, expertise, infrastructure, technology, and the appropriate capacity building approaches, etc.) affects the overall outcome of the thematic. In addition, commitments aimed at ensuring the stability of socio political systems, promoting gender equality, advocating human rights, and ensuring healthy environments, amongst other attributes will enhance the attainment of the goals. This is achievable through the sharing of expert knowledge in Panel discussions during the Conference on transversal issues.

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