

Ethical implications of Deforestation

Blake Newman and Aubrey Nielsen (Olga R. Kopp)

Utah Valley University, Department of Biology

Abstract:

Nearly 80,000 acres of tropical rainforest are destroyed daily globally. In addition, 50,000 plant and animal species are lost annually. That is 135 species a day lost indirectly, or directly because of deforestation. In the Amazon rainforest, permits are issued to mine, but an additional 9% of the entire amazon rainforest has been decimated due to mining without a permit. Deforestation is also occurring in the Congo, the second largest rainforest in the world, parts of China, Indonesia, and many other areas.

The purpose of this study was to address the ethical issues surrounding deforestation, including biodiversity loss, climate impacts, environmental effects such as soil composition changes, adverse human health effects, and unethical behavior of companies profiting from deforestation. Also included will be potential solutions and alternatives to deforestation that could sustain human populations located near rainforest regions. Analysis of literature published will be presented. Populations that live closer to the rainforest seem to have more positive attitudes towards the native species, while those citizens in more populated areas with less forest seem to have lower appreciation for those species. Soil composition diversity and soil usability decrease where deforestation occurs. Populations that depend on the rainforest as a food source are adversely affected with loss of forest because their diets depend on the rainforest. In addition, an analysis of tobacco companies who contribute to deforestation shows that some of these companies have made false claims related to their use of forest land. Their claims include false reforestation guarantees and zones of deforestation that inaccurately depict the amount of land being used for tobacco farming. We propose possible methods to sustain human life near rainforest areas, while protecting the fragile ecosystems of the forest.

Discussion/Ethical Implications:

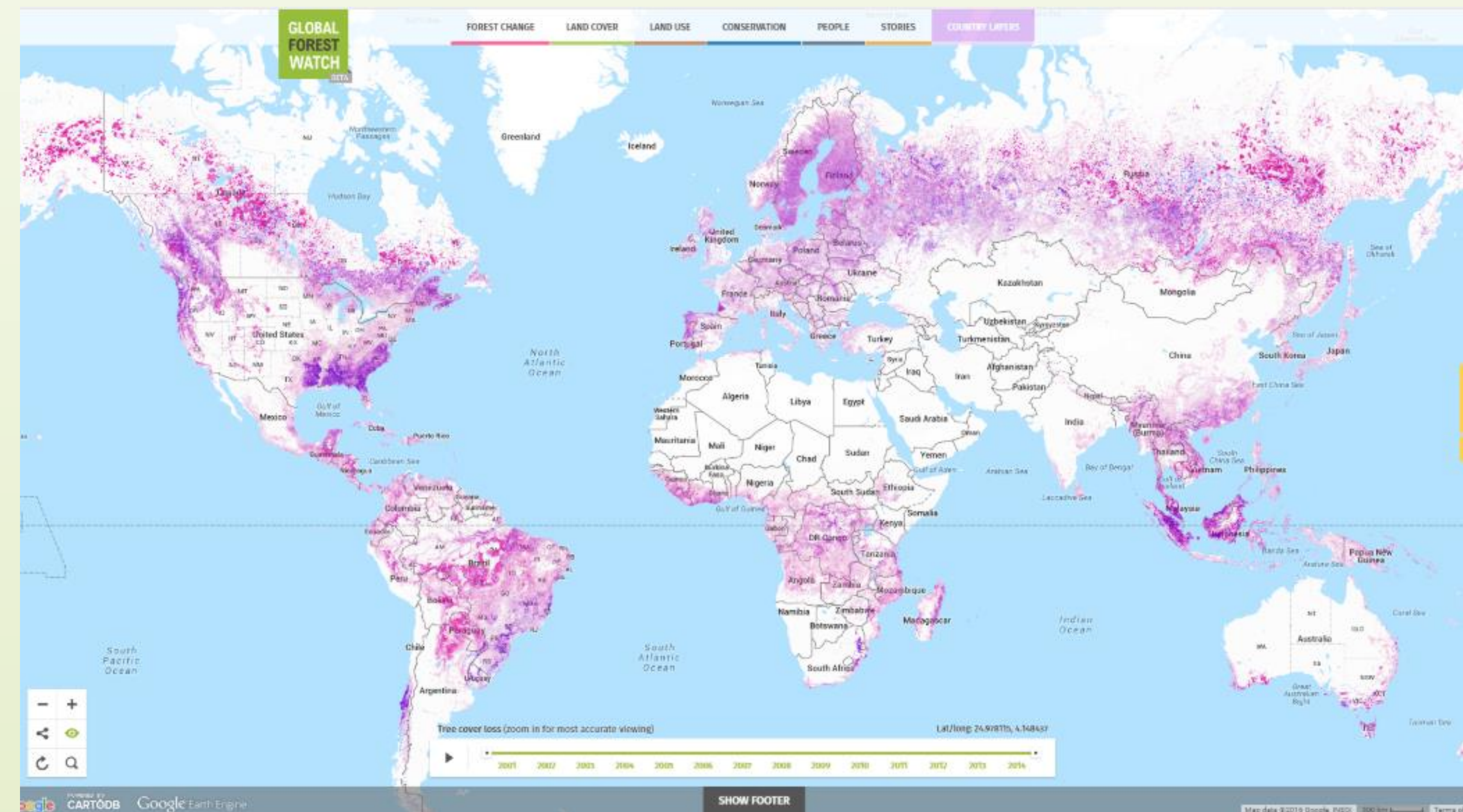


Figure 1. Tree cover loss from 2001-2014, darker purple color correlates to higher tree cover loss. (<https://www.wri.org/our-work/project/global-forest-watch>)

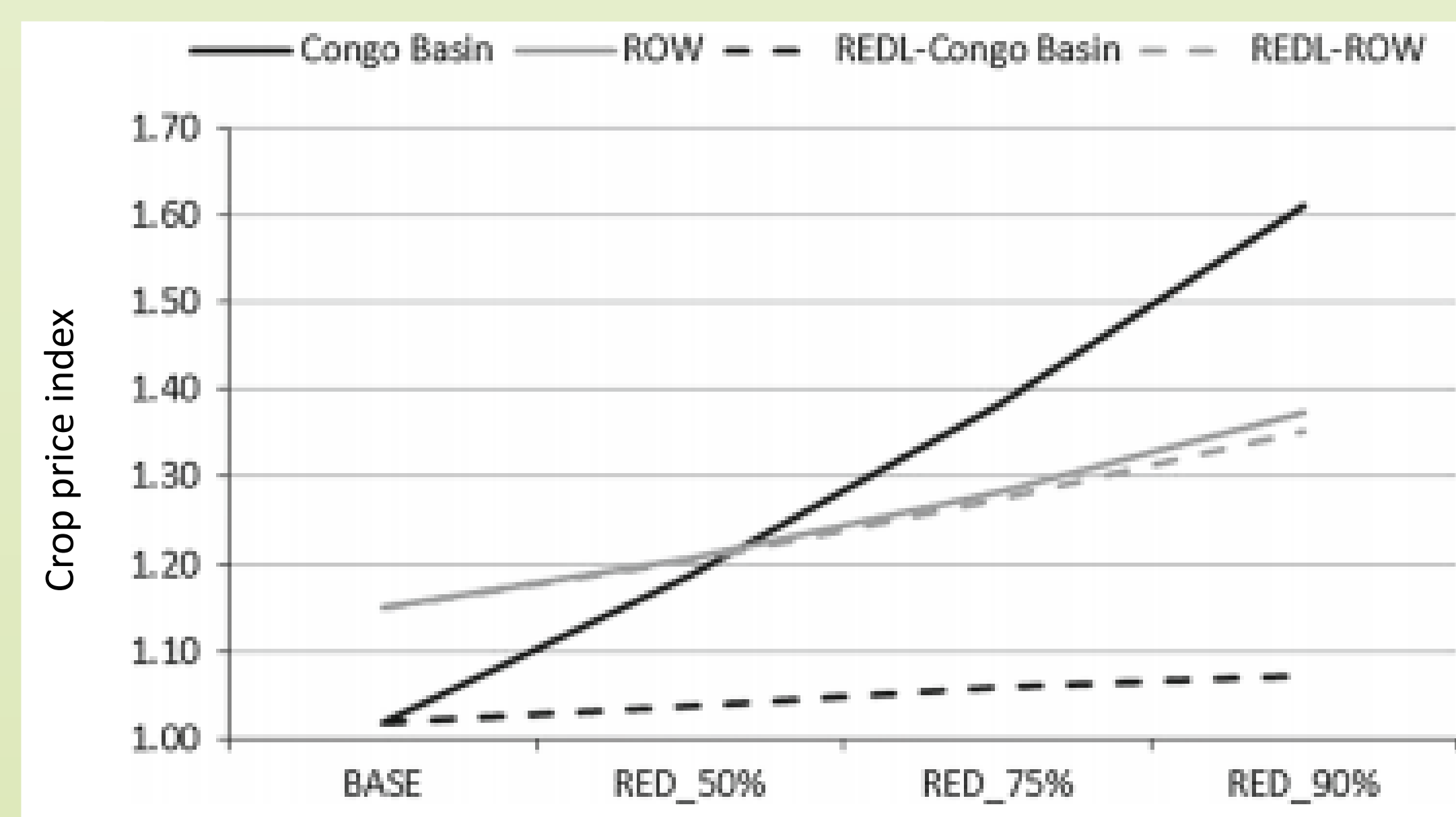


Figure 2. Crop price index in the Congo Basin and the Rest of the World in relation to RED (Reducing emissions from deforestation) Participating in the Reduced emissions agreement is not beneficial for the local people, because of increased crop prices, but is beneficial for the forest. (<https://link.springer.com/article/10.1007/978-94-007-9618-7>)

Solutions/Alternatives:

- Agricultural intensification in areas where forest is already gone. This means using roughly five times the amount of nitrogen fertilizer than normally applied. Using more nitrogen will increase crop production (Li et al 2015)
- Using more fertilizer in areas already being farmed is less harmful than cutting down forest for replanting
- Policies should be established to encourage reforestation
- Substantial punishment should be implemented for deforestation outside of permitted areas
- Increase education on benefits of the tropical rainforest in communities close to forest

Conclusions:

- Deforestation causes an increase in the release of greenhouse gases
- Causes changes in cloud coverage and the rain cycle
- Mineral mining and the Tobacco industry contribute to and rely on deforestation to provide tobacco crops for the world
- The native people depend greatly on the forest for diet contribution, when the forest is removed nutrition levels and overall health decreases
- Many native women depend on the forest for their income, when deforestation occurs their income disappears with it
- Many species end up on the endangered species list or go extinct before they are even fully discovered
- Strict regulations on deforestation can increase crop prices mostly for local communities
- Continued development of roads in the Congo will increase deforestation significantly
- There are models that show balance is possible between cutting back on deforestation, and still providing money and food for local economies
- The inability of local people to clear forest and farm is an infringement on their autonomy
- The forest, native species, and the human population are stakeholders whose nonmaleficence and justice are violated with increased carbon emissions from deforestation

Literature analyzed or cited

Moraes, E. C., Franchito, S. H., & Rao, V. B. (2013). Amazonian Deforestation: Impact of Global Warming on the Energy Balance and Climate. *Journal Of Applied Meteorology & Climatology*, 52(3), 521-530.

Mosnier, A. (2014). Modelling Impact of Development Trajectories and a Global Agreement on Reducing Emissions from Deforestation on Congo Basin Forests by 2030. *Environmental And Resource Economics*, 57(4), 505-525. doi:<https://doi.org/10.1007/s10640-012-9518-7>

Li, M., De Pinto, A., Ulimwengu, J. M., You, L., & Robertson, R. D. (2015). Impacts of Road Expansion on Deforestation and Biological Carbon Loss in the Democratic Republic of Congo. *Environmental And Resource Economics*, 60(3), 433-469. doi:<http://dx.doi.org/10.1007/s10640-014-9775-y>

Nijman, V., & Nekaris, K. I. (2010). Effects of deforestation on attitudes and levels of tolerance towards commensal primates (Cercopithecidae) in Sri Lanka. *International Journal Of Pest Management*, 56(2), 153-158. doi:10.1080/09670870903248850

Lee, K., Botero, N. C., Novotny, T., & Carrillo Botero, N. (2016). 'Manage and mitigate punitive regulatory measures, enhance the corporate image, influence public policy': industry efforts to shape understanding of tobacco-attributable deforestation. *Globalization & Health*, 12:1-12. doi:10.1186/s12992-016-0192-6

Galway, L. P., Acharya, Y., & Jones, A. D. (n.d.). Deforestation and child diet diversity: A geospatial analysis of 15 Sub-Saharan African countries. *Health & Place*, 5178-88. doi:10.1016/j.healthplace.2018.03.002

Koehn, Y., Tavakoli, M., & Akbarinia, M. (2018). Microbial/biochemical indicators showing perceptible deterioration in the topsoil due to deforestation. *Ecological Indicators*, 91, 84-91. <https://doi.org/10.1016/j.ecolind.2018.03.084>

Tian, J., He, N., Yu, G., Kong, W., Deng, Y., Feng, K., ... Kuzaykov, Y. (2018). Deforestation decreases spatial turnover and alters the network interactions in soil bacterial communities. *Soil Biology & Biochemistry*, 123, 80-86. <https://doi.org/10.1016/j.soilbio.2018.05.007>

Santner, L. J., Herrera, D., Barrett, D. J., Galford, G. L., Moran, C. J., & Soares-Filho, B. S. (2017, October 18). Mining drives extensive deforestation in the Brazilian Amazon. Retrieved September 16, 2018, from <https://www.nature.com/articles/s41467-017-00557-w>

Scott, C. E., Monks, S. A., Spracklen, D. V., Arnold, S. R., Forster, P. M., Rap, A., ... Wilson, C. (2018, January 11). Impact on short-lived climate forcers increases projected warming due to deforestation. Retrieved September 17, 2018, from <https://www.nature.com/articles/s41467-017-02412-4>

Methodology:

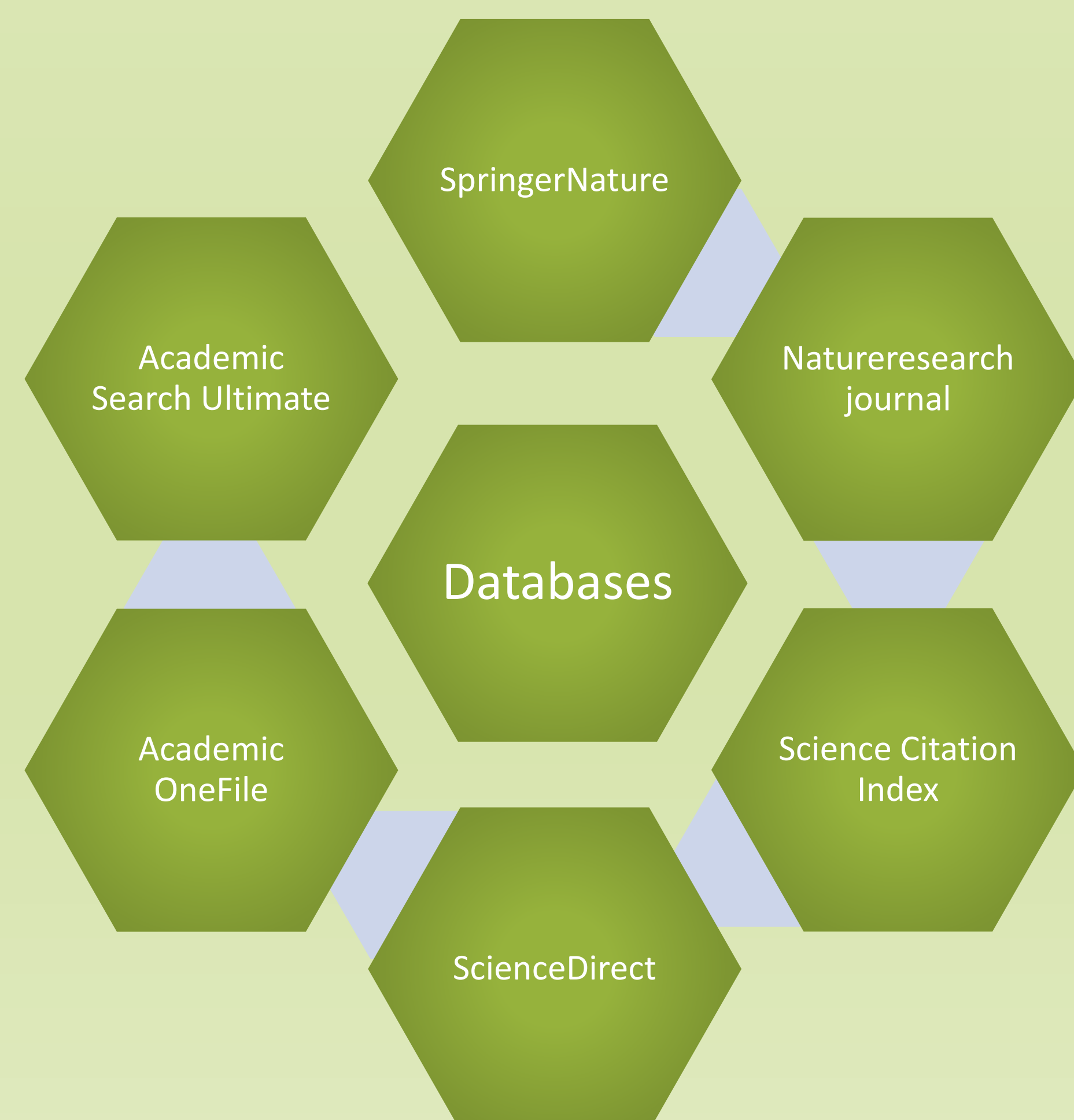


Table 1. Ethical matrix based on principlism ethical theories for the process of deforestation and its impact.

Stakeholders	Beneficence/ non-maleficence	Autonomy	Justice
Forest native population (e.g. Congo communities)	Air pollution can affect the health of individuals CO2 is released into atmosphere as more trees are cut down, increasing average global temperatures Increased Profits	Restrictions will affect their ability to decide themselves Diet limited by deforestation Inability to build roads restricts development and local economies	Cost of living increases, detrimental for quality of life Nutrition deficiencies and adverse health effects
Rest of the world		Restrictions due to illnesses	World cost of living increases, decrease of resources in future
Private companies (e.g. tobacco)	Increased Profits and company growth	Have the ability to grow crops where and when they want	Fewer regulations and laws to follow, easier to gain profits and support employees
Forest/native species	Change in cloud coverage and rain cycle, loss of habitat, plant/animal species diversity lost	Possible endangerment or extinction, loss of habitat forces species dependency on human crops/ food sources	Ability to survive becomes more difficult with habitat loss, ecosystem disruption, Should be protected