

Undergraduate Thesis Prospectus

Engineers in Action Footbridge Capstone: Río K'ellu Mayu
(technical research project in Civil Engineering)

To Petition and Listen: How NGOs have
championed land use rights in the Amazon
(sociotechnical research project)

by

Calvin Reeves

October 27, 2023

technical project collaborators:

Jessica Brown
Sacha Choubah
Ronald Orellana
Gabriel Witter

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Calvin Reeves

Technical advisor: Jose Gomez, Department of Civil Engineering

STS advisor: Peter Norton, Department of Engineering and Society

General Research Problem

How can international nonprofits protect the Amazon basin's ecological system and people?

Deforestation is prevalent in the Amazon basin. A centuries-old issue, the Brazilian INPE (National Institute for Space Research) states major deforestation has been continuing into the 2020's (2022). Transforming the Amazon into other land uses ecologically changes the landscape. Land use is found to be linked to social inequality metrics in the Amazon (Coomes et al, 2016). The people of the Amazon are intertwined with the ecosystem's current state of destruction and eventual fate. Various nonprofits have projects that target Amazonian people coupled with advancing pro-Amazon protection agendas.

Engineers in Action Footbridge: Río K'ellu Mayu

How may safe cross-river connections over the Río K'ellu Mayu, best be established?

A partnership between the Footbridge Capstone Team at UVA and US based NGO: Engineers in Action (EIA), plans to design and construct a footbridge across the Río K'ellu Mayu in Bolivia. The project is through UVA's Civil and Environmental Engineering Department and is advised by Jose Gomez. Rupa Patel (Thornton Tomasetti) and Leo Fernandez (TYLin) are the professional advisors. Brenton Krieger is the liaison to EIA.

EIA gives university-level students the chance to take part in engineering and social engagement through its bridge program. Programs like these have built many bridges which, "boost local economy and increase income" for rural groups (EIA Bridges, 2023). Bridge designing as an educational activity is a cost effective and beneficial way to provide bridge design services at the scale that is needed (many are needed). Rural groups can suffer from lack of access to medical care, isolation, and have transportation difficulties in river-saturated areas

(Bogle, 1977). Relieving these concerns is the hope of footbridge and related infrastructure projects in rural areas.

The goal is to a) provide engineering services to design and build a footbridge and to b) recognize and respect cultural aspects of the Pocona community. Giving college students the chance to take part in real engineering design projects is unusual. Students learn from genuine experiences – ones that have real effect. EIA's Bridge Program gives students the opportunity to gain this experience. Professionals like Leo and Rupa expressed the atypical nature of designing in third world countries has been a different experience for them. This aspect comes with its own challenges, which makes for a unique experience independently.

Knowing seasonal site conditions will limit the team in giving the best design. Locals provided site photos and EIA gave a basic plan layout of the site. The team will do its best in using the given information. Historic water level data was not given. The team will design per the EIA Standard Design. Based on site features, a Custom Design may be fabricated by the team. This will include alternate abutment design features due to height differences on the two riverbanks and the span length. The design will be completed in tandem with BridgeEDU design modules. EIA uses BridgeEDU as a training platform to educate new bridge designers. Courses include specific bridge design problems and construction management courses. The team will use AutoCAD for drafting and will print a design set. A construction schedule and cost analysis will also be created.

To Petition and Listen: How NGOs have championed land use rights in the Amazon

How have NGOs focusing on deforestation in the Amazon basin advanced their agendas?

How do NGOs strive for environmental protection? Deforestation in the Amazon has been a major concern for decades. Deforestation curbs carbon emission reductions with the Amazon being a carbon sink (Zaman, 2022). The result of this deforestation will not only affect the region or continent, but also the worldwide climate. The Amazon links to the global climate change battle. Human rights issues extend to this topic as indigenous communities often live in the Amazon Basin and suffer the consequences of deforestation practices (Moore, 2022). Overlooked native groups seek protection as many are mis- or under-represented at the government level in their countries. NGOs seek to combat industrial-based deforestation and protect human rights.

Understanding how interest groups (specifically NGOs) work is important to grasping their role in the Amazon land use issue. Providing networks of like-minded interest groups is backed by Toohey (2012), showing this in the context of Amazon land use. Stetson (2012) suggested indigenous peoples should participate in land use decisions. This indicates the people must vocalize – something done powerfully through NGOs. Knowing how land use perpetrators procure the land from the Amazon and its people is important. Often illegal loggers will “land grab” by falsifying land title records (May et al., 2016). Once a logging operation is complete in an area, large-scale farming parties procure the land. This is a common approach to land use violations whereby more land is illegally logged and repurposed.

The term “indigenous peoples” will cover the groups of native peoples in the Amazon. Not a singular group, this term is a collective of multiple tribes and peoples that have stake in Amazon land use rights. Nobel Prize candidate Raoni, as a representative of the Kayapo people

but also of Amazonian indigenous peoples, expressed concern on the issue: “My concern is for the environment. Today everyone is worried.” (Boadle, 2019). As a cultural symbol for indigenous groups, his words represent the overall message proclaimed by native Amazonians. Government agencies participate in the Amazon power struggle as do specific politicians and platforms. Former Brazil President Bolsonaro supported, “proposals to give property titles to land grabbers, allow mining in indigenous lands and loosen environmental licensing” (Rocha et al., 2022), contrary to indigenous and NGO motives. Often deforestation can be a political issue.

NGOs promote land protection focusing on indigenous peoples’ rights as part of the solution. An NGO called Survival International is, “campaigning to end carbon offset projects in Protected Areas where the rights of Indigenous peoples are violated” (Survival International, 2023). Development into the Amazon basin affects the quality and span of the habitat. People living in these regions often relocate due to development. Protecting the rights to indigenous peoples’ land is what NGOs like Survival International strive for. Amazon Watch, a nonprofit founded in 1996, promotes specific issues such as: “Amplifying the power of Indigenous women’s leadership” (Miller, 2023). Amazon Watch focuses on the wellbeing of indigenous groups and empowers them to protect the Amazon basin’s ecology. The International Work Group for Indigenous Affairs (IWGIA) states, “We will increase and consolidate efforts to get land rights and related human rights violations exposed and denounced at all levels” (IWGIA, 2021). This group also focuses on indigenous rights as its main target. NGOs like these follow the notion that protecting indigenous groups and preserving the Amazon’s ecological environment are one in the same.

References

- Amazon Watch. (2023). Stop Amazon Destruction. amazonwatch.org/work#stop
- Boadle, Anthony. (2019). Brazil's Amazon chief Raoni calls on Bolsonaro to step down. *Reuters*. www.reuters.com/article/us-brazil-politics-indigenous-idUSKBN1WA2I0
- Bogle, J. E. (1977). Infrastructure for rural development. *Ekistics* 43(257), 195–198. JSTOR.
- Coomes, O. T. et al. (2016). Forests as landscapes of social inequality: tropical forest cover and land distribution among shifting cultivators. *Ecology and Society* 21(3). JSTOR.
- EIA. (2023). Engineers in Action. Why Bridges? *EIA Bridge Program*. www.eiabridges.org/why-bridges
- INPE. (2022). National Institute for Space Research. Monitoring Deforestation in the Brazilian Amazon Forest by Satellite. www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes
- IWGIA. (2021). International Work Group for Indigenous Affairs. Land Defense and Defenders. iwgia.org/en/land-defence-defenders
- Moore, Thomas. (2022). Including Indigenous Peoples in Geospatial Services. *Frontiers in Climate* 4. www.frontiersin.org/articles/10.3389/fclim.2022.810428
- May, P. et al. (2016). Forests, land use trends and drivers of deforestation and degradation. In *The context of REDD+ in Brazil: Drivers, actors and institutions* 3, 1–23. JSTOR
- Rocha, Camilo, et al. (2022). Deforestation is accelerating in Brazil as Bolsonaro's first term ends, experts say. *CNN World*. www.cnn.com/2022/09/20/americas/brazil-bolsonaro-deforestation-term-intl-latam/index
- Ross, R. L. (1970). Relations Among National Interest Groups. *The Journal of Politics* 32(1), 96–114. JSTOR.
- Stetson, G. (2012). Oil Politics and Indigenous Resistance in the Peruvian Amazon: The Rhetoric of Modernity Against the Reality of Coloniality. *The Journal of Environment & Development* 21(1), 76–97. JSTOR.
- Survival International. (2023). Decolonize Conservation: Indigenous people are the best conservationists. www.survivalinternational.org/conservation
- Toohy, D. E. (2012). Indigenous Peoples, Environmental Groups, Networks and the Political Economy of Rainforest Destruction in Brazil. *International Journal of Peace Studies* 17(1), 73–97. JSTOR.

Zaman, Khalid. (2022). Environmental cost of deforestation in Brazil's Amazon Rainforest: Controlling biocapacity deficit and renewable wastes for conserving forest resources. *Forest Ecology and Management* 504. ScienceDirect.