Empowering Local Youth to Tackle Tropical Deforestation via Space Data

Abstract

Tropical forests are key to help mitigate climate change globally. Efforts to help reduce deforestation will not be effective without including the youth living in tropical rainforest countries. They can be a real catalyst for tackling deforestation issues when they are empowered. Space data emerges as a key tool for such empowerment. Recent space technology advances make it possible for local young people to help monitor high-resolution forest changes. As two examples from Indonesia show, young people can help produce deforestation-related data via citizen science campaigns or crowdsourcing and also use such data in on-the-ground forest monitoring and activism.

Tropical forests are a powerful tool for the world's citizens in the efforts to mitigate climate change because of the carbon they hold and the cooling effect they provide locally. Approximately 8 percent of global emissions come from tree cover loss in tropical forests, but they can provide 23 percent of the cost-effective climate mitigation needed before 2030 (Gibbs et al 2018).

Efforts to help reduce deforestation and mitigate climate change will not be effective without the inclusion of those living inside or near tropical forests. Indeed, indigenous-tenured lands often have significantly lower rates of deforestation (Chhatre and Agrawal 2009). Further, logging and conversion of tropical forests into other land uses are frequently driven by local people's need for income and local and global economies needs for commodities. Working with these indigenous and local communities are important to prevent large scale deforestation while improving the livelihoods of these communities.

These communities are, unsurprisingly, made up by a large number of young people. Countries with large extent of tropical rainforests are also developing nations with surging youth populations. As an example, Indonesia, which has about 10% of the world's remaining tropical rainforests, is home to more than 63 million young people below 30 years old or almost a quarter of the country's population (World Bank 2020). The young people living inside or near forests can be a positive force for rainforest protection and climate change mitigation when provided with the knowledge and opportunities they need to thrive and take action.

The increasing role of youth in climate activism today merits special attention. Social media has made it easier for young people to drive social progress and propose innovative solutions to support sustainable development in their local communities. Importantly, recent youth-led climate movement, mostly in the West, has challenged the traditional rule of older people over the young and uphold the interests of future generations as equal to those of present ones.

If the youth in tropical rainforest countries join in the climate movement forcefully and in unison by demanding for better, more sustainable management of rainforests in their home countries, imagine the impact they could have in their own countries and globally. Their efforts could be further amplified if they have access to and produce data that would become the basis for well-informed action in the arena of rainforest conservation.

Major advances of space technology in the past three decades have led to the possibility for monitoring forest changes in high resolution across the entire globe, including in the tropical countries. Some of the young people, given their affinity and familiarity with the latest technology, can easily combine data from state-of-the art space technology with their passion to effectively protect tropical rainforests and mitigate climate change.

For example, Google Earth Engine as a cloud-based geospatial remote sensing processing platform with an extensive public data catalogue made it possible for users to write and execute scripts which can share and repeat geospatial analysis and processing workflows, such as land cover mapping based on NASA's high-resolution satellite imageries. This is one of the reasons behind the success of the Global Forest Watch (GFW). The algorithm developed by University of Maryland on the Google data set gave rise to the first globally comprehensive, hi-res map of forest changes, which became the backbone of the GFW database (Google n.d.).

The database has been crucial in revealing previously unknown deforestation hotspots across the tropics. Further technological innovation increases the usability of GFW. For example, the Global Land Analysis and Discovery (GLAD) alerts launched by GFW in 2016 provides weekly tree loss updates at a relatively fine spatial scale, making it possible for forest managers, law enforcement officials, and activists to protect endangered forests in a timely manner.

One of such activists is Farwiza Farhan (born in 1986), who in 2012 founded a homegrown Acehnese NGO named Forest, Nature & Environment Aceh (HAkA) to help protect the Leuser Ecosystem in Sumatra. Since 2016, Farwiza and her team have been using GFW's GLAD alerts system to quickly identify areas of likely deforestation on a weekly basis (Bourgault 2018). Combining the GLAD system with satellite imagery and expert knowledge of the area help them and their allies to be more effective in their investigation of harmful activity in the forests. The use of technology, combined with empowerment of local communities, legal action taken, and mobilization of local, national and global campaigns, have been the recipes for HAkA to help reduce deforestation and achieve true sustainable development for forest-dependent communities in Aceh.

Also in Indonesia, recently the significant potential of local youth to help protect rainforests has been highlighted through a citizen science campaign using a mobile gaming application called Urundata. The campaign has two main components. First, a rapid image assessment tool that allows users to classify satellite imagery by the type of land cover/land use visible or to examine pairs of images for detection of change over time, while the second component sends users to specific locations on the ground via a mobile device and asks for information related to land cover and evidence of land degradation (Savitri 2020).

Together, these two components have been used by local university students in the Indonesian provinces of South Sumatra and East Kalimantan to help validate land cover and land degradation maps of both provinces. While the project is ongoing, the 2019 campaign in South Sumatra alone was able to collect 1 million satellite image data interpretations with an accuracy rate of 77 percent. The Urundata team is planning to expand the approach to cover the whole country in an attempt to create more accurate land cover maps (hence improving policymaking) and raise awareness among the young people of the importance of Indonesian rainforests.

The activism led by Farwiza and the Urundata crowdsourcing campaigns show that, when empowered, youth in developing countries can be a real catalyst for tackling climate challenges. Space data is a key tool for such empowerment. Lessons learned from Indonesia could be useful for potential upscale.

References

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