

Indonesia's deforestation is logical, but misunderstood



Mention tropical deforestation, and most people will think of the Amazon, and of Brazil. It's true that the Amazon is the world's largest rainforest basin, and that Brazil is the most forest-rich country in the world. But with 7% of the world's rainforest, Indonesia is the third-most forest-rich country. The bad news is that Indonesia's annual rate of deforestation is worse than Brazil's, at around 6% a decade (FAO 2011).

Brazil and Indonesia account for nearly half of the world's tropical forest (FAO 2011), and for more than half of the global warming due to deforestation (Boucher et al., 2011). Together, they were responsible for around 60% of all humid tropics deforestation between 2000 and 2005 (Hansen et al. 2008). Yet little is really understood about the loss of Indonesia's rainforests.

Deforestation in Indonesia matters for a number of reasons

Tropical forests are an important contributor of water to the hydrocycle, providing a vital input to rainfall and crop cycles. Changes in the hydrocycle can cause monsoons to fail, as well as more than usually intense downpours, resulting in the sort of flooding seen in Jakarta and elsewhere in Indonesia in recent months. Soil stability is also undermined by deforestation: the roots of rainforest trees are rather shallow, holding a thin layer of top soil in a horizontally expansive network. Without trees to hold the soil in place, it is easily washed away. Resulting landslides exacerbate flooding.

Rainforest is also an important carbon sink, not just in its living biomass, but also in the carbon-rich peat beneath the forest floor (Handayani & Von Boordwijk., 2008; Page et al). When the rainforest is felled and burned, there is a double effect: the loss of the carbon-sink, and the release of the carbon from the peat and vegetation (Harrison et al., 2009).

Deforestation results too in the loss of animals and plants that live there. In Indonesia's rainforest this is a particular threat owing to its remarkable geography. Indonesia is an archipelago of over 17,500 islands, so much of its already rich biodiversity is also endemic (Resosudarmo & Subiman, 2003). This means that when one island is deforested, many of the species living there are lost forever. Indonesia's rainforest should therefore not be considered as one mass, but as multiple pockets of unique, irreplaceable biodiversity. To lose one percent of Indonesia's rainforest may mean the loss of multiple species.

Palm oil is driving deforestation in Indonesia

The main cause of Indonesia's deforestation is the growth of palm oil plantations (Yaap et al, 2009; Gibbs et al, 2010; Brühl & Eltz, 2011; Turner et al, 2011; FAO, 2011). Palm oil is a cash crop. It is the most widely used cooking oil in Southeast Asia, and is a very common ingredient in a large number of Western consumer products ranging from crisps, biscuits and chocolate, to soaps, cosmetics and toothpastes. The palm oil industry is an important part of the Indonesian economy.

Palm oil causes deforestation because of the land required to grow it. Oil palms are grown in vast monoculture plantations. Land is prepared for this, by clear-cutting rainforest, extracting any commercially valuable timber, and by burning the vegetation and peat soil that remains.

As well as causing the loss of ecologically valuable rainforest, oil palm plantations cause far-reaching damage in other ways too. They are very thirsty plants (Koh et al, 2009), but do not have the moisture generation of rainforest, so the hydrocycle is fundamentally changed. Rainforest is a temperature regulator, and its loss, even to plantation forest, causes a notable increase in local temperatures (Turner et al., 2011). Oil palm plantations feature significant daily micro-climatic fluctuations (ie temperature and relative humidity) compared with closed canopy forests (Koh et al., 2009) and increase the vulnerability of rainforest edges to wind, desiccation and fire (Yaap et al., 2009). Many keystone species are unable to tolerate even small changes to the usually-constant humidity and temperature of the rainforest, and this has a knock-on effect on the wider ecosystem. And because monocultures have to be supported with fertilizers, pesticides and herbicides, which pollute the groundwater and soil, it is impossible for the plantation to be part of a healthy, normally functioning rainforest ecosystem (Danielsen & Heegaard, 1995; Turner et al., 2011).

Deforestation is logical but misunderstood

Deforestation happens for logical reasons, but conservation programmes often ignore them, taking too simplistic an approach to protecting the rainforest. Conservation programmes often attempt to ring-fence areas of forest for protection, and to offer financial incentives against the activities that cause deforestation (Norway-Indonesia REDD+; Heart of Borneo). The main failing of schemes like this is that they operate one-dimensionally, instead of responding to the reasons for deforestation. It's often assumed that people deforest because they don't know any better, or that a financial incentive should be sufficient to stop whatever activity is causing deforestation. But deforestation is not a one-dimensional act: people and corporations often clear the forest for good reasons, usually economic ones (Boucher et al., 2011), and economic issues don't live in a vacuum. They are dependent on their conditions.

Deforestation in Indonesia is due to economics, politics, culture and history

Indonesia's development has always been resource-based, but deforestation has changed from a "state-initiated" process to an "enterprise-driven" one (Rudel 2007), and this enterprise-driven process is shaped by culture, politics and history. Since the 1960s, forest resources have formed the basis of Indonesia's economic engine. It's not a very sustainable engine: growth based solely on resource extraction is a short-term game that contributes little to long-term growth or wellbeing. But nevertheless, Indonesia's economic apparatus is built on resource-extraction and the export of basic commodities. To shift to a more sustainable, robust system would require difficult choices that would be hard to enforce, including establishing trade barriers, and restricting forest industries at all levels.

For historical reasons, it's very difficult to restrict the activities that cause deforestation at local levels. Revenues from forest industry have historically benefited foreigners and the political elite, especially during Suharto's time (1966-1998). Ordinary people, and those living in and around forested areas, had very few rights. Over time, resentment at this injustice grew. In

the reform process (*Reformasi*) which followed Suharto's fall in 1998, there was a rush to decentralise forest industries, with the aim, at least on the surface, of giving control, revenue and decision-making back to the people. However, mechanisms to ensure transparency, balance and accountability were not set up at the same time, leaving a forest system full of holes and contradictions and badly in need of reform (Barr et al., 2006). Because of this, and the highly emotive legacy of Suharto, any attempt to reform the sector is quickly seen as political recentralisation. To those who profit from the present flawed system, and to those who remember Suharto's control of forest resources and revenues, attempts to rein in forest activities are a threat. That risks the political and social stability of the country.

The easy choice, in the short term, is to continue with the status quo.

To stop deforestation in Indonesia, we will need to better understand these factors.

Deforestation will continue in Indonesia, until there are logical reasons to stop. Logical, long-term alternatives to deforestation can only be developed if the drivers are fully understood (Wood et al., 2000). Understanding the drivers of deforestation, and their interactions with regional and global economies, will help us design sustainable ways to meet market demands, and conserve precious resources. (Boucher et al., 2011) It makes financial, historical and political sense for Indonesia to deforest. Conservation measures can only succeed if they understand the context in which deforestation takes place, and provide sustainable, long-term alternatives that themselves make financial, historical and political sense to Indonesia.