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Focali Brief: 2015:03

Agricultural commodity consumption and trade responsible for over 40% of tropical deforestation

Commercial agriculture and timber extraction play an important role in causing tropical deforestation. However, information is scarce on the extent to which production and trade of 'forest-risk' commodities like beef, soy, palm oil and wood products are actually driving tropical forest loss. In a recent study the authors of this Focali brief show that in the period 2000-2011, the production and trade of four commodities in just seven tropical countries was responsible for 40 percent of global tropical deforestation and associated carbon emissions.

Approximately 10 million hectares of forests are lost in the tropics every year. Globally, tropical deforestation constitutes the single largest threat to biodiversity in terrestrial ecosystems and substantially contributes to climate change through annual emissions of around 4.5 $GtCO_2$. Locally, tropical forest loss has profound impacts on the provisioning of ecosystem services such as water, energy and food security, vital for 350 million people, many of them poor, relying on forests as a key source for their livelihoods.

The scientific literature indicates that the drivers of tropical deforestation have become increasingly commercialized and globalized in recent decades: commercialized as the agents of deforestation have shifted from smallholders clearing forest for subsistence farming to large-scale agricultural corporations clearing for profits; globalized as the agricultural commodities produced on the cleared land are increasingly destined for export rather than domestic markets.

Image: An aerial photo near Rio Branco, Acre, Brazil.
Photo by: Kate Evans/ CIFOR (CC BY-NC 2.0)

Increasing interest in the demand side

With the recognition of these developments, recent years have seen growing interest in halting tropical deforestation through measures targeting the demand side, i.e. the consumers of forest-risk commodities. Pressurized by environmental organizations and consumer advocacy groups—and increasingly financial actors—numerous companies have adopted 'zero-deforestation' policies. These include large multinationals like Kellogg's, Mars, L'Oréal, Colgate, Disney, McDonald's, Nestlé, Office Depot, Unilever, H&M, and IKEA, who pledged to rid their supply chains of products sourced from land recently cleared of carbon-rich forests.

There is emerging evidence that demand-side interventions can contribute to reducing tropical deforestation, as shown for instance by the Brazilian Soy Moratorium or regulations targeting trade in illegal tropical timber. However, to exploit the full potential of demand-side measures we need a better picture of how and where global supply-chains link consumers of forest-risk commodities across the world to forest destruction in tropical countries.

About this brief

This Focali brief is written by U. Martin Persson, Sabine Henders and Thomas Kastner and is mainly based on their article: Trading forests: land-use change and carbon emissions embodied in production and exports of forest-risk commodities. Environmental Research Letters (in Press)

Mapping deforestation-production-trade links

In an attempt to map these links between deforestation, production, and trade, we have analyzed four principal forest-risk commodities—beef, soybeans, palm oil and wood products—in seven high-deforestation countries—Argentina, Bolivia, Brazil, Paraguay, Indonesia, Malaysia and Papua New Guinea—in the period 2000-2011.

Our approach builds upon the rapidly growing data on deforestation rates and drivers across the tropics, and a novel method for estimating the land-use change foot-

print of agricultural commodities. We find that in our seven case countries, an area of 3.8 Mha (roughly the land area of Switzerland) was deforested annually due to the production of our four case commodities. The carbon emissions associated with this forest loss amounted to 1.6 $GtCO_2$ per year. This represents roughly 40% of total tropical deforestation and associated carbon emissions throughout the same period (2000-2010).

Beef production in Latin America was the main driver of forest loss (see figure below), accounting for nearly 60 percent of deforestation embodied in production in 2011, and just over half of embodied carbon emissions. Soybeans, which have mainly expanded in woodland and savannah biomes in Latin America rather than in carbon-rich rainforests, were the second most important driver of forest loss. In 2011, 0.6 Mha of cleared forest was embodied in soy production in our Latin American case countries.

The second largest source of embodied carbon emissions, 330 $MtCO_2$, was due to the expansion of oil palm plantations into the very carbon-rich tropical forests of Southeast Asia, where drainage of peatlands also contributes substantially to the high carbon losses.

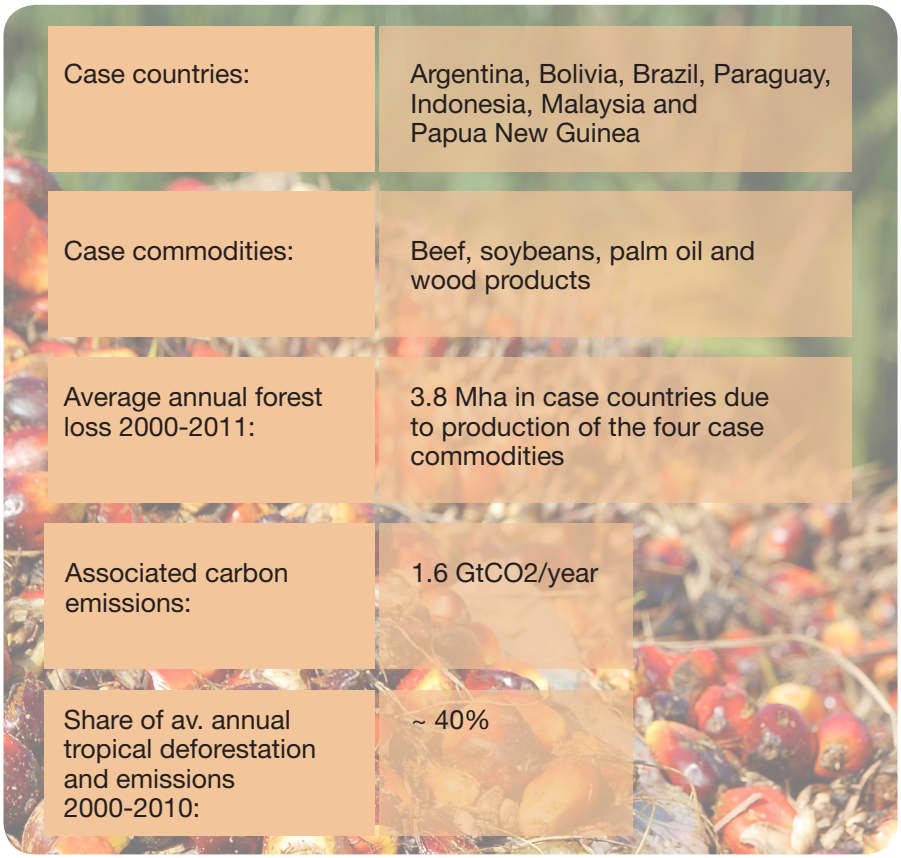
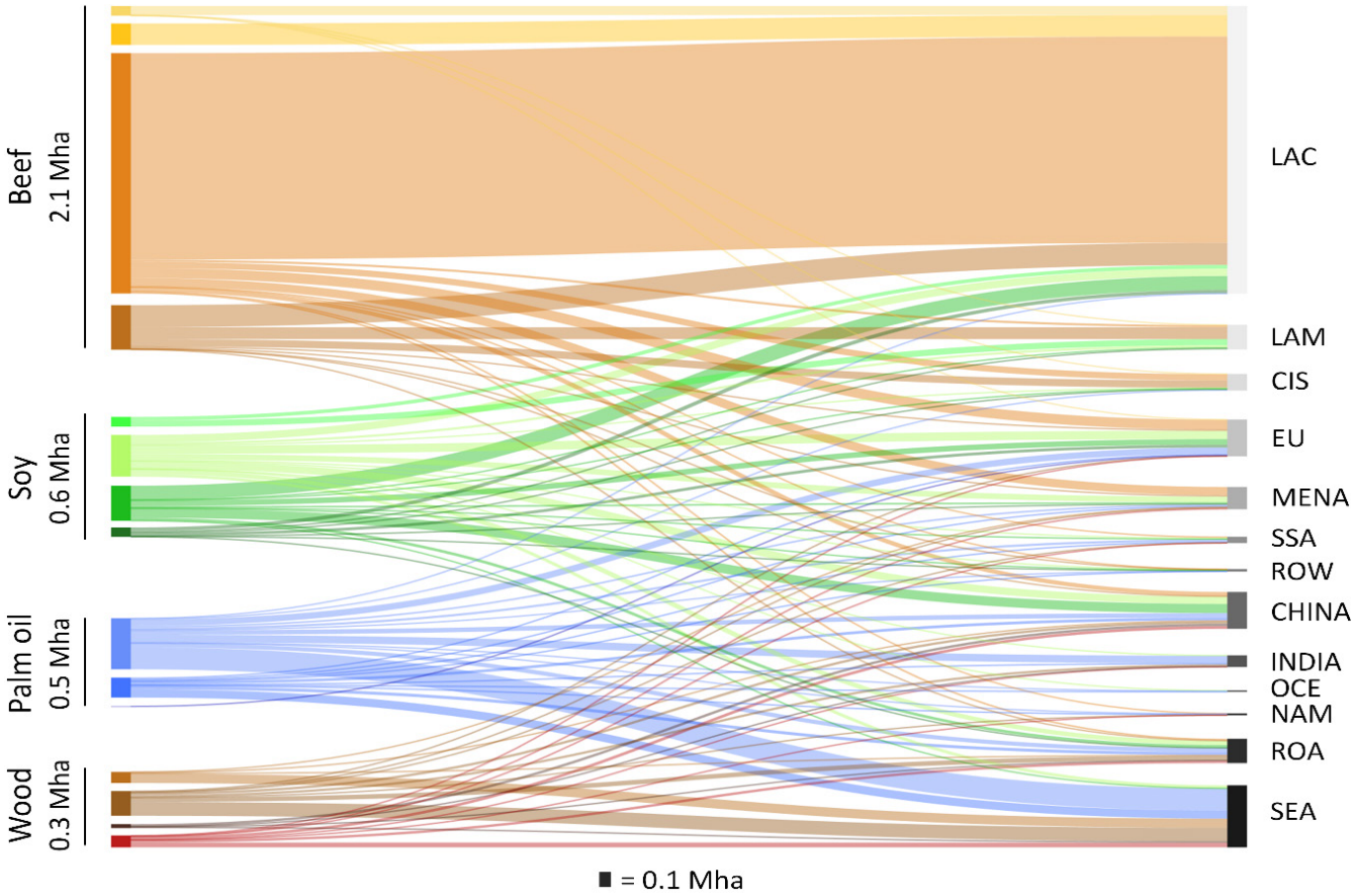


Photo of palm oil by Tim Cronin/ CIFOR (CC BY-NC-ND 2.0)



Deforestation flows in 2011: the figure shows major flows (larger than 1 000 ha) of land-use change embodied in production (left side) and consumption (right side) of beef, soybean, palm oil and wood products. Producer countries (left side) are displayed in the following order (from top to bottom): beef and soy – Argentina, Bolivia, Brazil, Paraguay; palm oil – Indonesia, Malaysia, Papua New Guinea; wood products – Brazil, Indonesia (timber), Malaysia, Papua New Guinea, Indonesia (pulp and paper). Consumer regions (right side): LAC = Latin American case countries, LAM = rest of Latin America, CIS = Commonwealth of Independent States (former Soviet republics), EU = European Union, MENA = Middle East & North Africa, SSA = Sub-Saharan Africa, RoW = Rest of the World, OCE = Oceania, NAM = North America, RoA = Rest of Asia, SEA = Southeast Asian case countries.

The rising role of export markets

Across all commodities and countries studied, nearly two thirds of the deforestation was driven by domestic demand. However, the figure above shows that this is principally due to the fact that most beef produced in Argentina, Bolivia and Brazil is destined for domestic markets. For the three other commodities, on average 60 percent of deforestation occurred for export production. As can be seen in the figure, major importers of these flows of embodied deforestation are the EU and China together with other Asian countries.

More importantly, while the total deforestation area embodied in agricultural commodity production remained fairly stable during the period 2000-2011, the share embodied in exports doubled. This trend is almost exclusively driven by increasing trade volumes in the commodities analyzed.

The limits to demand side measures

The rising trend of deforestation embodied in trade implies a certain risk of domestic forest conservation policies in tropical countries being overridden by the growing global demand for land in general and agricultural commodity supply in particular. Also, it highlights the fact that national policies, if effective, might simply lead to a shift of deforestation to other countries with less strict (or poorly enforced) forest conservation policies, a process often termed leakage. Complementing domestic, supply-side forest conservation policies with demand-side measures therefore seems promising for more effective forest conservation.

However, it should be acknowledged that demand-side measures such as certification schemes or zero-deforestation pledges face similar limitations as supply-side policies. For instance, most of the commodity production occurs on land that has not been cleared recently (in our analysis, more than 85 percent of beef, soy and palm oil production occurs on land not cleared in the last ten years).

Therefore, unless market coverage of zero-deforestation standards is close to universal, the risk is high that the small market share represented by products from recently cleared land is simply diverted to markets without these standards. Leakage of this kind has already been documented under the Brazilian Cattle agreement, where non-compliant ranchers simply sell their cattle to slaughterhouses not participating in the agreement.

Links to explore further

Our findings indicate that effective forest conservation in the tropics is likely to require a combination of supply and demand-side policies. A key question for the future is how these policies can complement each other. A better understanding of the links between demand and supply-side policies can hopefully contribute to the design of demand-side policies that leverage support for supply-side regulations and exploit potential synergies.

This brief can be quoted as:
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The study shows that beef production in Latin America was the main driver of forest loss (see figure to the left), accounting for nearly 60 percent of deforestation embodied in production in 2011, and just over half of embodied carbon emissions. Photo by: Kate Evans/ CIFOR (CC BY-NC 2.0)

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Cleared peatland in Indonesia. Photo by: Ryan Woo for CIFOR. (CC BY-NC-ND 2.0).

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