

Executive Summary

DEFORESTATION AND FOREST DEGRADATION have been occurring for thousands of years. Both deforestation, which completely removes the forest canopy, and degradation, which maintains the canopy but causes losses of carbon, are important sources of global warming pollution, as well as threats to biodiversity and to the livelihoods of forest peoples. Thus it is important to understand the causes of these changes—the “drivers” of deforestation.

In this report we focus on the economic agents that play a critical role in deforestation: soybeans, beef cattle, palm oil, timber and pulp, wood for fuel, and small farmers. We also examine the role of population and diet, which are key underlying factors in the

will eventually do so in developing countries as well. Thus both population and diet trends underlying the increasing demand for food are expected to diminish after several decades, lessening the pressure on tropical forests.

Tropical forests are not all the same. They vary from rain forests in areas with year-round rainfall to dry forests, which are leafless much of the year, to areas with several-month dry seasons. In general rain forests are found closest to the equator, transitioning to dry forests as one goes farther north or south. The combination of dry seasons and fire has converted large areas of dry forest to savannas, particularly in Africa. While rain forests contain large amounts of carbon, dry forests have smaller amounts and savannas even less.

The drivers of deforestation vary a great deal between continents: cattle and soy are important only in Latin America, while palm oil plantations are found almost exclusively in Indonesia and Malaysia.

The timber industry has a particularly important role in deforestation in Southeast Asia, where logging is often followed by conversion to plantations to produce palm oil or pulpwood.

demand for the tropical commodities causing deforestation. We conclude by describing successes in dealing with these drivers, and asking how the world can achieve development without deforestation.

Global population growth, which has already slowed considerably in recent decades, is projected to level off in the later twenty-first century and perhaps decline. The most important demographic phenomenon of our time is not population growth, but urbanization. Rural populations have actually started to decline in important tropical forest countries such as Brazil and Indonesia, and the sources of demand that lead to deforestation are now predominantly urban and export markets. Globally, diets have been shifting toward more consumption of meat and other livestock products, which require additional land to produce the same amount of food (particularly beef). However, this trend has started to level off in developed countries and

The drivers of deforestation vary a great deal between continents: cattle and soy are important only in Latin America, while palm oil plantations are found almost exclusively in Indonesia and Malaysia. The timber industry has a particularly important role in deforestation in Southeast Asia, where logging is often followed by conversion to plantations to produce palm oil or pulpwood.

Soybean production is heavily concentrated in three countries: the United States, Brazil, and Argentina. Expansion of large-scale commercial soy production into the Amazon in the 1990s was an important cause of deforestation, and Brazil became the largest soybean exporter in the world. However, pressure from civil society led to an industry moratorium on buying soybeans from deforested areas beginning in 2006, and recent data indicate that soy's role as an agent of deforestation has diminished greatly as a result.



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Deforestation is a threat to biodiversity

Reducing growth in the demand for commodities that drive deforestation will be important to future successes, but so will increasing the productivity of currently used lands and directing agricultural expansion into grasslands rather than forests.

Pasture expansion to produce beef cattle is the main agent of deforestation in Brazil, occupying more than three-quarters of the deforested area. Beef production in the Amazon tends to be extensive, with low levels of meat production per unit area. As with soy, civil society pressure in Brazil has led to a moratorium since 2009 on buying beef from ranches that have cleared forests to create pasture. Pasture expansion remains an important driver of deforestation in Colombia and other Latin American countries, although over much smaller areas than in Brazil. The cattle industry is not an important cause of deforestation in Africa or Asia.

The palm oil industry is heavily concentrated in two tropical forest countries, Indonesia and Malaysia, and has been expanding rapidly in recent years. Emissions from deforestation caused by palm oil plantations are particularly important in terms of global warming pollution, as considerable amounts of plantation expansion take place in peat swamps with very large amounts of carbon in the soil. The palm industry is dominated by large integrated companies that are also involved in timber cutting and establishing tree

plantations for pulpwood production, so Southeast Asian deforestation depends on complex interactions between logging and palm and pulp plantations.

Although only a small part of global timber production and trade, logging in tropical forests can be an important cause of forest degradation. In Southeast Asia, where many more tree species are commercially valuable, it leads to deforestation as well. In Latin America and Africa most clearing is for land, not timber, but logging is often the first step to complete deforestation of an area. Plantations of native species can supply large amounts of wood to take some of the pressure off of natural forests, but only if established in already cleared areas.

Firewood collection has often been blamed for deforestation, but although the volume of wood involved is large, most of it comes from already dead trees and branches, from non-forest areas, or from small trees and shrubs in the understory. Thus it is generally not causing deforestation or even significant degradation. However, charcoal production, particularly to supply nearby cities, can be a locally important driver of deg-

radation and eventual deforestation, especially in Africa. Firewood use is expected to diminish in the tropics in coming decades, and has already dropped considerably in Latin America. Charcoal production, on the other hand, is likely to grow.

Small-scale farming has become less important to deforestation in recent decades, as rural populations have leveled off or declined and large businesses producing commodities for urban and export markets have expanded into tropical forest regions. Africa is an exception to this generalization. However, deforestation rates and associated emissions there tend to be low compared with Amazonia and Southeast Asia, the other two large tropical forest regions. Traditional shifting cultivation has diminished over time in all three regions, and few tropical farmers are now subsistence producers.

In recent years, there has been a considerable decline in tropical deforestation. The clearest such “success story” is in the largest tropical forest country, Brazil, where moratoria on deforestation-linked soybeans and beef, the establishment of protected areas and indigenous lands, and Norway’s support for Brazil’s REDD+

(reducing emissions from deforestation and forest degradation, plus related pro-forest activities) program have played important roles. Data from Indonesia also indicate declining deforestation in the 2000s. Some tropical countries have actually reduced deforestation to zero and started reforestation, although in part this reflects the displacement of deforestation to other countries. However, emissions overall have diminished substantially, and are down by a third or more from the levels that prevailed during the latter decades of the twentieth century.

Reducing growth in the demand for commodities that drive deforestation will be important to future successes, but so will increasing the productivity of currently used lands and directing agricultural expansion into grasslands rather than forests. The spread of biofuel production, which would create a demand for deforestation not linked to food, could create strong new pressures on tropical forests. However, if recent successes can be duplicated in other tropical countries, we can envision the end of deforestation in the next few decades. This would be a truly historic achievement.

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Tropical forests help prevent both floods and droughts by regulating regional rainfall

