The Root of the Problem
WHAT’S DRIVING TROPICAL DEFORESTATION TODAY?

Successes

Union of Concerned Scientists
Citizens and Scientists for Environmental Solutions
Chapter 10: Successes

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The drivers of tropical deforestation are varied, and different strategies to address them are necessary. However, there have been recent declines in deforestation and in the resulting carbon dioxide emissions. These success stories show that solutions are possible and how critical it is to continue reducing deforestation—the most effective approach for addressing global warming.

The Global Decline in Tropical Deforestation

Recent data indicate that global tropical deforestation has declined since the 1990s. In the first decade of the 2000s, tropical deforestation was down 18 percent from the level of the 1990s, dropping from 11.3 million hectares per year in the 1990s to 9.3 million hectares per year in the 2000s. Furthermore, the rate dropped from the first five years of the decade to the second five years, principally due to a dramatic decline in Brazilian Amazon deforestation. The rate of primary forest loss, not just total forest loss, has also declined (FAO 2010; Friedlingstein et al. 2010).

In annual estimates of emissions due to land use change since the 1960s, almost all came from deforestation. There was also a decline in emissions in the first decade of the 2000s (Figure 10.1). Emissions have fallen from an average of 5.32 billion tons of CO₂/year in the twentieth century (1960 to 1999), to just 3.23 billion tons in 2009. This is a decrease of 39 percent in just a decade, after four decades with no decrease at all. Furthermore, unlike the case for the previous four decades, the twenty-first century trend has been consistently downward; every single year since 2000 had the same or lower land use change emissions than the previous year (Friedlingstein et al. 2010; Global Carbon Project 2010).

The global decline in deforestation and emissions from land use change is encouraging, but this information hides differences from country to country, with some countries making more progress in reducing deforestation than others. Declines in deforestation in Brazil and Indonesia—the country with the most tropical forest and the country with the most deforestation, respectively—have greatly contributed to this global decline (Friedlingstein et al. 2010).

Brazil’s Reduction of Deforestation

In December 2010 the annual summary of data from the Brazilian National Space Institute, INPE, announced another substantial reduction in deforestation. From 2009, Brazil had reduced deforestation by an additional 14 percent, cutting deforestation to 6.451 km².
This reduction in emissions was the result of many factors. Brazil has invested in enforcement and monitoring to stop illegal logging activities. It has greatly expanded protected areas and indigenous reserves in the Amazon region, and now over half of the Brazilian Amazon is legally protected land, including indigenous lands, strictly protected lands, and sustainable-use areas. These lands have been effectively protected and deforestation has been reduced (Figure 10.3) (Soares-Filho et al. 2010). For small and medium landholders in the Amazon, Brazil is regularizing and establishing land titles and then monitoring these areas so illegal deforestation does not take place (SECOM 2010).

In addition, Brazil has used funds from the Amazon Fund, which was set up to help reduce deforestation, and from its National Climate Fund for a range of activities that help contribute to its reduction in deforestation. Through these funds, Brazil is supporting sustainable forest management and development, conservation, restoration of degraded lands, and many other activities to help reduce deforestation. Norway has made a $1 billion commitment to the Amazon Fund that will be disbursed between 2008 and 2015 for reductions in deforestation emissions (SECOM 2010).

Brazil’s citizens played a critical role in exerting pressure on government leaders and businesses that influence deforestation. The Zero Deforestation campaign, for example, which was launched in 2008 by a broad coalition of environmental, indigenous, rubber-tapper (traditional collectors of the sap of native rubber trees, which they sell for uses such as surgical gloves), human rights, and other NGOs, played an important role in pushing the federal government to act. In 2006 and 2009, Brazilian NGOs also conducted widely publicized exposés of the roles that the soybean (see Chapter 4) and beef (see Chapter 5) industries have played in deforesting the Amazon. The resulting publicity led to commitments from those industries to not sell products raised on deforested land (Amigos da Terra–Amazonia Brasileira 2009; Greenpeace International 2009). Research institutes in Brazil such as IPAM (the Amazon Environmental Research Institute) and IMazon (the Amazon Institute of People and the Environment) have been important in monitoring progress and showing how ranchers, farmers, and loggers can increase their productivity in ways that make deforestation unnecessary.

Brazil has made great progress in reducing deforestation, but the drivers of deforestation must be continuously addressed. Government policies could be
weakened, and increases in world soy and beef prices along with proposals to develop new roads and dams in the Amazon would create new pressure for deforestation. Thus, increased efforts are required to protect the progress made so far.

**More Progress: Additional Countries Reducing Deforestation**

Other tropical countries besides Brazil have made progress in reducing deforestation. For example, Indonesia greatly reduced its deforestation rate from 2000 to 2005 compared with the 1990s. From 1990 to 2000, Indonesia averaged 1.78 million hectares per year of forest clearing, while from 2000 to 2005 the annual average was reduced to 0.71 million hectares per year. However, over the years from 2000 to 2005, the rate of forest clearing gradually increased, so it was unclear whether the downward trend in deforestation rates would continue (Hansen et al. 2009). But preliminary information suggests that deforestation peaked in 2006 and has been gradually declining each year up until 2010 (Hammer et al. 2010).

There are also a few tropical developing countries that have undergone a “forest transition,” in which deforestation has slowed, reforestation is occurring, and on the whole the forest area in the country is increasing. In Vietnam, for example, forest area has grown from the early 1990s and continues to increase due to reforestation policies, better land management, and the intensification of small-farmer agriculture (Meyfroidt and Lambin 2009; Meyfroidt and Lambin 2008). Some of the deforestation that occurred in Vietnam was displaced to other countries since restrictions on wood extraction caused more wood imports from neighboring countries. However, more than half of the forest regrowth did not cause additional deforestation elsewhere, and thus Vietnam contributed a net gain to global forest cover (Meyfroidt and Lambin 2009). Other tropical countries that have undergone this transition include El Salvador, Gambia, Rwanda, and India (Meyfroidt, Rudel, and Lambin 2010). Mexico is another country in which a forest transition may be taking place (Klooster 2003).

**Implications of Success**

When efforts to counter the drivers of deforestation are successful, what will happen? How will deforestation change in terms of where it happens, who does it, how it is distributed, and what are its causes? How will the relative importance of deforestation versus forest degradation be altered, and where will new pressures develop?

Although we do not yet have models that allow us to answer these questions based on empirical data, there are some predictions that can be made and tested. We would expect that if efforts to counter the current drivers are successful, then future deforestation will:

- Be seen in smaller patches and on smaller farms and ranches. This is simply because as large deforesters are stopped, what remains is likely to consist more of smaller deforesters. The decreasing size of deforestation patches in Brazil since the early 2000s is a confirmation of this pattern (Figure 10.4, p. 6).

- Be due relatively more to forest degradation compared with deforestation. As deforestation decreases, more of the remaining emissions will be due to degradation.

- Produce a more mixed set of commodities, with less dominance regionally by single industries. Farms and ranches with a diversity of products and regions with a mix of producers are more likely to characterize where deforestation occurs, as large-scale industries such as soy or palm oil decline in importance as deforesters.

If these predictions are correct, then future reductions in deforestation will depend more on REDD+ programs and policies (reducing emissions from deforestation and forest degradation, plus related pro-forest activities) than in recent years. The large industrial drivers have not been compensated for their losses as they decreased deforestation, nor did they deserve to be.
Rather, countries have received compensation for lost tax income and the costs of sustainable development programs (e.g., Brazil through its REDD+ agreement with Norway). As the large enterprises diminish in importance, further progress will depend more on REDD+ support for smaller farmers, indigenous groups, and sustainable harvesters (e.g., rubber tappers).

**As Drivers Are Displaced**

Another prediction we can make with a good deal of confidence is that some of the drivers of deforestation will be displaced to other countries and continents. Leakage is not an accident; it is the inevitable result of economically driven deforestation in a globalized world. There is no way to prevent it from happening entirely; the point is to minimize it, restrict it, and guide it to places where it does the least environmental and social damage (Lambin and Meyfroidt 2011). It is difficult to generalize about the social effects of displacement, but in terms of climate change and biodiversity there are clearly better and worse places where deforestation can leak.

First, and most obvious, is that it is preferable for the displaced drivers to move into non-forested habitats. Forests, in the tropics and elsewhere, typically have the highest levels of both carbon and biodiversity in a region. While secondary and disturbed forests are likely to be lower in these factors than primary forests, they too can be important for wildlife and other species, and if allowed to restore themselves through natural succession will gain both carbon and biodiversity as time goes on. Thus it would be best to avoid forested areas entirely and have production moved to cleared lands.

But not all cleared lands are equal. Savannas and related biomes that occur naturally, such as the cerrado of Brazil, are often a mélange of ecosystems, some retaining high carbon and biodiversity and others quite degraded and dominated by a few, often exotic, species (see Chapter 3). The cerradão part of the cerrado, for example, is a highly diverse, carbon-rich vegetation type, while the campo limpo is a much lower-diversity grassland lacking trees and shrubs, often due to past overuse. Other things being equal, the second is preferable as a place for soybean production to move.

Looking at the tropics more broadly, cleared lands now dominated by grasses—particularly degraded ones with exotic grasses—are the logical places for agriculture to expand, at least from the biological and climate points of view. There are large areas of this kind in all three of the tropical forest continents—savannas in South America and especially in Africa, and grasslands dominated by cogon grass (alang-alang, *Imperata cylindrica*) derived from past clearing of forests in Southeast Asia. Social and economic questions, such as who owns or has traditionally used the land, should override purely scientific recommendations in specific areas, but overall the guidance should be: agriculture in grasslands, not forests.
References


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About the Union of Concerned Scientists
The Union of Concerned Scientists (UCS) is the leading science-based nonprofit working for a healthy environment and a safer world. UCS combines independent scientific research and citizen action to develop innovative, practical solutions and to secure responsible changes in government policy, corporate practices, and consumer choices. More information is available about UCS at www.ucsusa.org.

About the Tropical Forest & Climate Initiative
The Tropical Forest & Climate Initiative (TFCI) is a project of the UCS Climate and Energy Program. TFCI analyzes and promotes ways to cut global warming pollution by reducing tropical deforestation. To learn more about this work, visit www.ucsusa.org/forests.

Deforestation and forest degradation have been occurring for thousands of years. Both are important sources of global warming pollution, as well as threats to biodiversity and 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 currently play a critical role in deforestation, as well as agents that have played a historical role in deforestation (to determine their role today).

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The full report, executive summary, and chapters are available online (in PDF format) at www.ucsusa.org/whatsdrivingdeforestation.