

# Latin American and Caribbean Forests in the 2020s:

## Trends, Challenges, and Opportunities



Edited by Allen Blackman



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# Innovations in Approaches to Forest Conservation and Recovery

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# Index

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**23 Causes of Deforestation**

**26 Three Approaches to Forest Conservation**

Domestic Policies and Programs

Market Transformation

Results-Based Payments

**28 Case Studies**

Brazil

*Domestic Policies and Programs*

*Market Transformation*

*Results-Based Payments*

Costa Rica

*Domestic Policies and Programs*

*Market Transformation*

*Results-Based Payments*

Ecuador

*Domestic Policies and Programs*

*Market Transformation*

*Results-Based Payments*

Peru

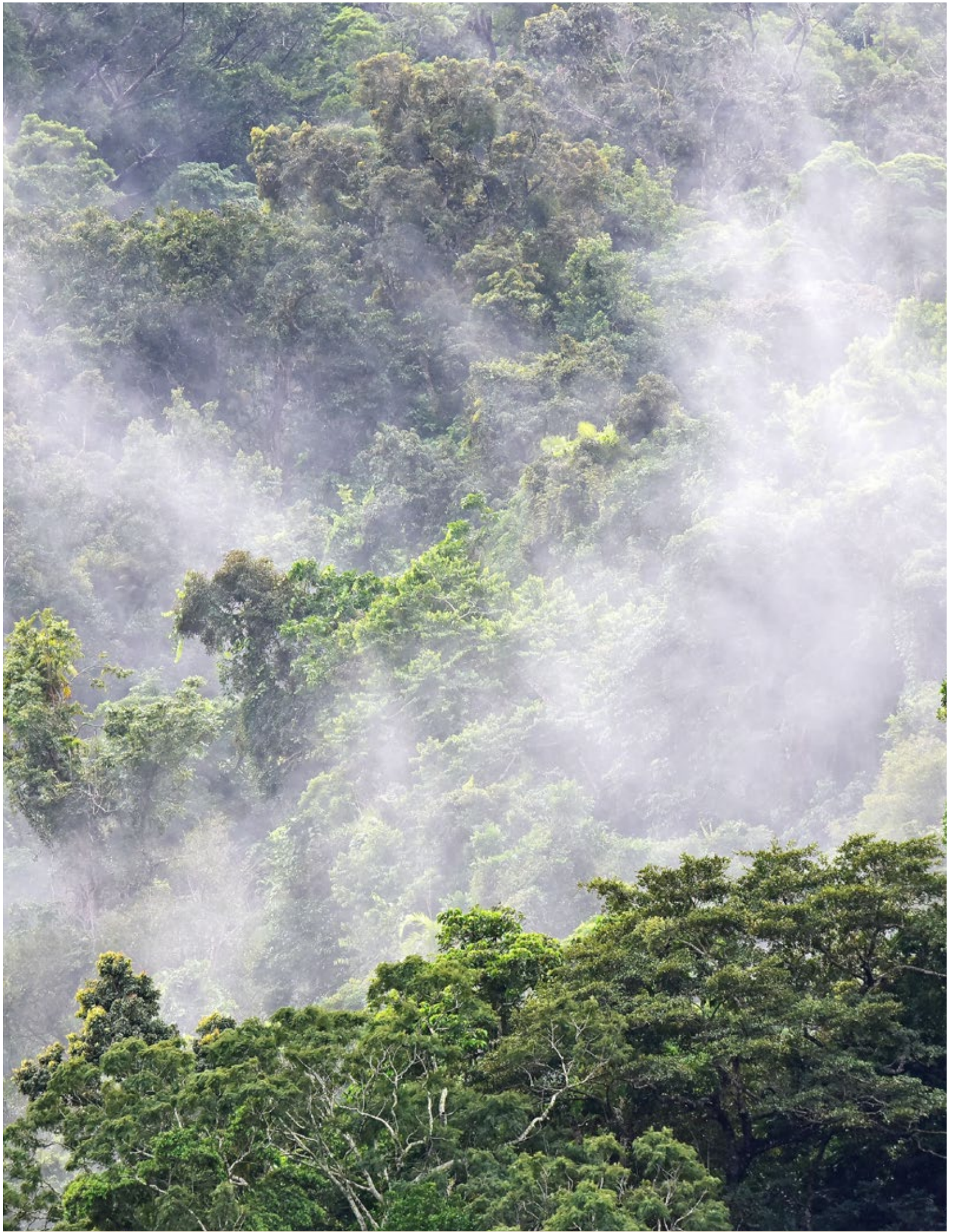
*Domestic Policies and Programs*

*Market Transformation*

*Results-Based Payments*

**54 Conclusion**

**55 References**

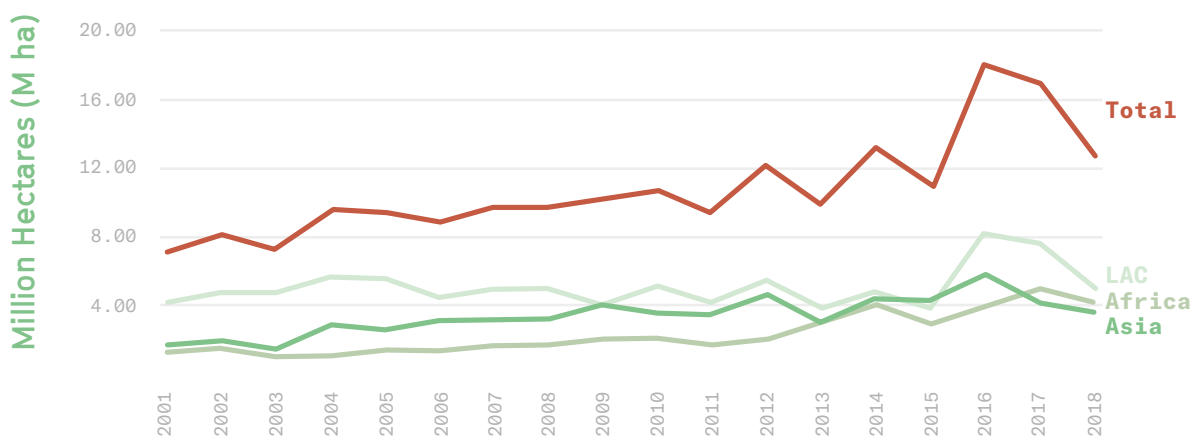


# Innovations in Approaches to Forest Conservation and Recovery

Never before has so much funding or attention been devoted to tropical forests. Norway alone is investing approximately US \$500 million to unlock the potential of tropical forests as part of a global solution to climate change. Approximately 190 entities, including governments, companies, and nongovernmental organizations, signed the New York Declaration on Forests in 2014, committing to help reduce tropical deforestation 50 percent by 2020 and completely by 2030. At the 2019 Climate Summit in New York City, a third of the events focused on nature-based solutions to climate change, all of which involve forests.

The reason for this elevated interest in tropical forests is the urgency of addressing climate change. Slowing the loss and speeding the recovery of tropical forests could account for a fourth or more of the emissions reductions that will be needed in 2030 to avoid catastrophic climate change (Griscom et al. 2017; Stickler et al. 2018).

Progress has been slow, however. The two years with the highest tree cover loss since 2000 are 2016 and 2017 (Figure 1; WRI 2019). In Latin America and the Caribbean (LAC), this trend is even more troublesome, with a higher recent uptick in deforestation. Exceptions to this trend include the nearly 80 percent decline in deforestation rates in the Brazilian Amazon region from 2004 to 2012, described below. But in general, it appears that a course correction is needed.



**Figure 1.** Forest Loss, 2001–2018

Tree cover loss for tropical countries of Latin America and the Caribbean (LAC), Africa, Asia, and all of the tropics (total), derived from Global Forest Watch using a canopy cover threshold of 30 percent. *Source:* WRI (2019).

Any course correction in strategies to slow the loss and speed the recovery of tropical forests should build on what is working and strive to fix what is not. This chapter distills some of the lessons from application of three major approaches and regional experiments to slow deforestation in LAC. We present case studies of some leading efforts to address the forest challenge, undertaken by Brazil, Costa Rica, Ecuador and Peru.

Our main findings are as follows. Command-and-control strategies have demonstrated massive short-term effects on deforestation, as we describe for the Amazon region of Brazil, but appear to be unsustainable over the long term in the absence of significant positive incentives for maintaining and expanding forests. Catching and prosecuting lawbreakers across a vast tropical forest landscape is expensive and can be maintained only with a high level of political commitment—something now flagging in Brazil.

Approaches based on positive incentives for conserving forests, such as Costa Rica's forest program and the Socio Bosque program of Ecuador, have delivered more sustainable gains in forest conservation, although the long-term source of domestic funding for these initiatives is uncertain. In Peru, a multistakeholder coalition for forest-friendly development in the Amazon region holds great promise.

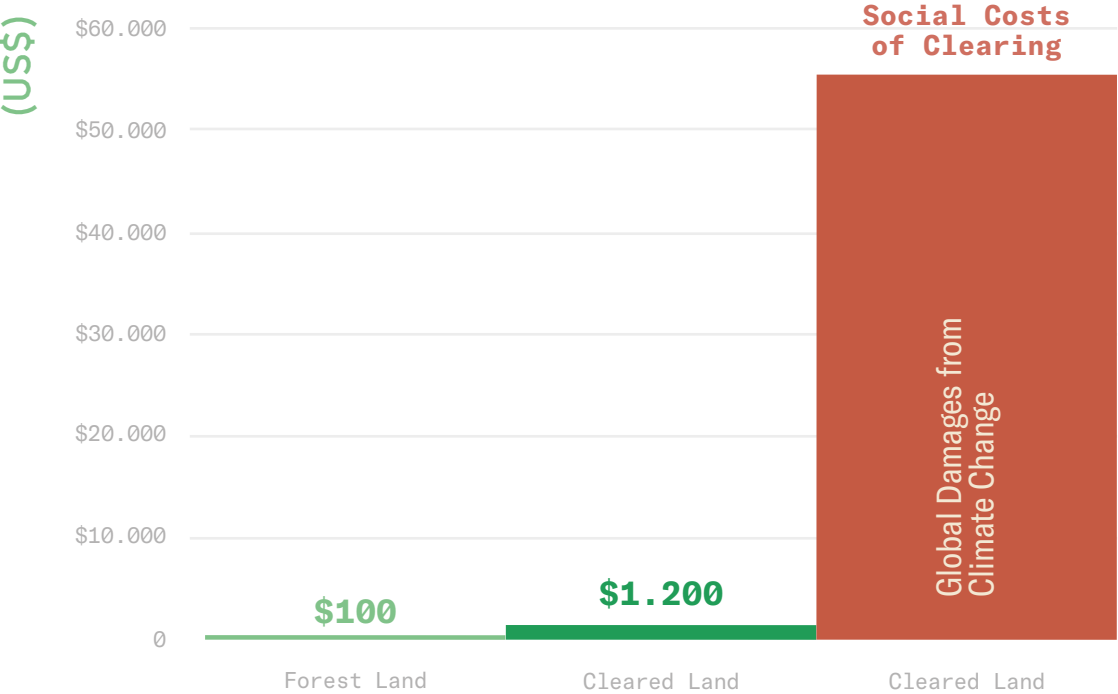
The growing polarization between the farm sector and environmental groups in Brazil provides an important cautionary note. It has pushed important allies—forest-conserving farmers—away from the forest agenda. This polarization was aggravated by the opportunities missed by the Soy Moratorium and other market-exclusion mechanisms to recognize and reward farmers who are in compliance with the Forest Code. The code requires that at least 80 percent of Amazon farms be maintained under natural forest cover.

Results-based payments for jurisdictional programs appear to achieve large benefits for a fairly small amount of money when the contracts are developed directly with subnational governments and the benefits to a range of land-holding stakeholders are clear. There are only two such contracts that have these characteristics, both in Brazil.

Finally, when forest conservation is clearly and positively linked to economic development—as is the case in Costa Rica via the tourism industry—it is possible to maintain strong political will for the budget allocations and regulatory frameworks that are necessary to slow the loss and speed the recovery of tropical forests. In most LAC countries, however, this basic condition has not been met.

# Causes of Deforestation

Despite several decades of public policies, environmental advocacy campaigns, and international strategizing and financing, the basic driver of forest clearing in Latin America and elsewhere in the tropics has not changed: the market value of forested land is less than that of cleared land. These land values are in sharp contrast to the value of the forest to the global economy. Using the US Environmental Protection Agency’s estimate for the social cost of carbon—about \$100 per ton of carbon dioxide (CO<sub>2</sub>) emitted (IWGSCC 2010)—the value of a hectare of moist tropical forest in Latin America in avoided damages to the global economy, assuming 150 tons of biomass carbon per hectare, is approximately \$55,000. That is roughly 50 times greater than the market value of a hectare of cleared land in the Brazilian Amazon, which is roughly 10 times higher than the market value of a hectare of forested land (Figure 2).



**Figure 2.** Land Value per Hectare in Amazon Basin (US\$)

Typical price of land in the land market of the Brazilian Amazon (left two columns) and the value of a hectare of forest for the global economy associated with avoided damages associated with climate change. Each ton of carbon dioxide is estimated to cause approximately US \$100 in damages to the global economy (EPA 2010). The biomass of a hectare of Amazon forest is approximately 150 tons of carbon, which becomes 550 tons of carbon dioxide when it is oxidized.

Perhaps the single most important determinant of the location and scale of forest conversion is transportation infrastructure (Soares-Filho et al. 2006; Nepstad et al. 2001). ... In the Brazilian Amazon region today, more than 75 percent of forest clearing has taken place within 50 kilometers of an all-weather highway (Soares-Filho et al. 2006).



The drivers of deforestation can be divided into primary and secondary categories (Geist and Lambin 2002). Primary drivers are directly involved with the clearing of forests and include cattle pasture expansion, land speculation, forest conversion for subsistence and semisubsistence production of manioc, beans, rice, bananas and other staple crops, forest conversion for soybean production, oil palm plantations, and other commodities, and forest clearing for wildcat mining (De Sy et al. 2015).

It is often said that cattle pasture is the main primary driver of forest conversion in the LAC region,<sup>1</sup> but land-use activity on a tract of cleared land should be distinguished from the motivation for establishing that land-use activity. In the Brazilian Amazon, for example, land grabbers (*grileiros*) often clear forest and establish cattle pasture to demonstrate “productive use” of the land, enhancing the likelihood that they will eventually be granted ownership.

Secondary drivers are the actions and investments that make primary drivers feasible: investments in transportation infrastructure, rural electrification, agrarian reform that provides forestland to landless farmers, subsidies for agricultural expansion in forest regions, and others. Perhaps the single most important determinant of the location and scale of forest conversion is transportation infrastructure (Soares-Filho et al. 2006; Nepstad et al. 2001). At the time of European colonization, farming was largely restricted to the margins of rivers and streams that could be navigated by canoe. Occupation of forested regions expanded most rapidly where larger vessels could navigate. As roads were cut across the interfluvial forests, colonization and forest expansion followed. In the Brazilian Amazon region today, more than 75 percent of forest clearing has taken place within 50 kilometers of an all-weather highway (Soares-Filho et al. 2006).

<sup>1</sup> <https://globalforestatlas.yale.edu/amazon/land-use/cattle-ranching>.

# Three Approaches to Forest Conservation

Of the great diversity of strategies and approaches to tropical forest conservation, we examine the approaches that fall into three general categories: domestic policies and programs, market transformation, and results-based payments.

The first approach to tropical forest conservation refers to the public policies and programs of national and subnational governments in tropical forest regions. Governments have the power to establish and implement fiscal policies, land-use regulations, energy and transportation infrastructure, import-export policies, and many other actions and instruments that influence the fate of forests, the ease of doing business, and the flows of finance to the land sector. They are also charged with defending the public good by exercising these responsibilities effectively. The potential of governments to influence tropical deforestation is exemplified by Brazil's Amazon strategy, launched in 2004.

The market transformation approach to tropical forest conservation is premised on the idea that if a large enough share of the market rejects commodities produced in ways that cause deforestation and are otherwise unsustainable, then a large-scale shift to sustainable production systems results. This approach has been implemented both through international sustainability standards for certifying commodities as sustainably produced, such as the Forest Stewardship Council, the Roundtable for Sustainable Palm Oil (RSPO), and the Roundtable for Responsible Soy, and through corporate and governmental commitments to zero or "zero net" deforestation commodity sourcing, such as those registered in 2014 in the New York Declaration on Forests (New York Declaration on Forests 2019). In practice, corporate zero deforestation commitments are generally implemented via certified compliance with international standards. The Brazilian Soy Moratorium, a sector-wide zero-deforestation agreement (Nepstad and Shimada 2018), reviewed below, is widely held to be one of the most successful examples of a market-based strategy for addressing deforestation.

Finally, the results-based payments approach to tropical deforestation assumes that financial compensation to governments and landholders for the ecosystem services provided by tropical forests will lead to the

conservation of these ecosystems. This approach fits within the broader set of strategies that are often called payments for ecosystem services (PES; Daily 1997). The most prominent example for tropical forests is REDD+, the acronym for “reducing emissions from deforestation and forest degradation,” with the plus sign referring to forest carbon enhancement (Agrawal et al. 2011). REDD+ programs and projects vary greatly in complexity and scale and include Norway’s performance-based commitment to the Brazilian Amazon Fund, REDD for Early Movers programs (Germany and the United Kingdom), and the Green Climate Fund. The disbursement of funds is tied to low or declining emissions from deforestation. Large-scale “jurisdictional” REDD+ programs measure results across entire political geographies, such as states and nations, and are more strongly linked to domestic policies and programs than the REDD+ initiatives developed by carbon project developers and financed by companies and investors seeking to voluntarily offset their carbon emissions. A second major type of results-based payment schemes focuses on the role of forests in regulating water flow and quality from watersheds.



# Case Studies

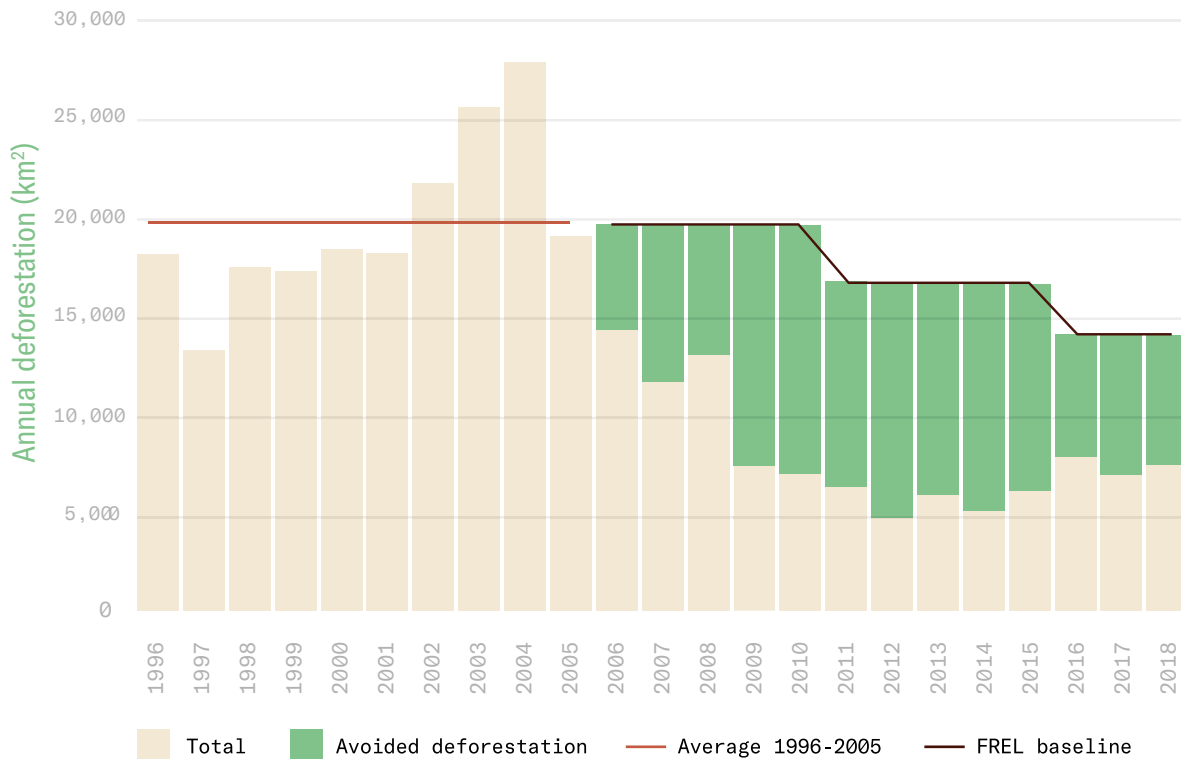
We examine how the three approaches have been applied to the challenge of stemming tree cover loss in four LAC nations: Brazil, Costa Rica, Ecuador, and Peru (Figure 3).



**Figure 3. Tree cover loss in Brazil, Costa Rica, Ecuador, and Peru, 2000–2017**  
Sources: (a.) PRODES, (b.) Mongabay, Hansen, (c.) SUIA, (d.) Programa Nacional de Conservación de Bosques

# Brazil

Beginning in 2005, deforestation in the Amazon region of Brazil slowed dramatically (Figure 4). From a 10-year average of 19,500 square kilometers of primary forest loss from 1996 through 2005, the annual area of forest clearing declined 77 percent to less than 4,570 square kilometers in 2012 (INPE-PRODES). It has been rising steadily since then but is still well below the historical average, even with the sharp uptick that occurred in 2019 under President Bolsonaro. Seventeen percent of the Amazon forest has been cleared. This reduction in deforestation is one of the world's largest contributions to climate change.



**Figure 4.** Deforestation in Brazilian Amazon Region, 1996-2018

Brazil's forest conservation policies slowed deforestation rates to 77 percent below the 10-year average ending in 2005, with rates climbing slowly since then. Preliminary, MODIS-based estimates of deforestation in 2019 are at approximately 12,000 km<sup>2</sup>. More than 6 billion tons of carbon dioxide emissions have been avoided in the Brazilian Amazon. FREL = UN-approved reference level against which emissions reductions are estimated. *Source:* INPE/PRODES.

Based on the forest reference level, which has been approved by the United Nations Framework Convention on Climate Change, Brazil has kept more than 6 billion tons of carbon dioxide out of the atmosphere—and in Amazon trees—through its successful efforts. Thus far, only 3 percent of these emissions reductions have been compensated through results-based payments (Nepstad 2019).

Further slowing of Amazon Basin deforestation and speeding of forest recovery and restoration are important features of Brazil's nationally determined contribution to the Paris Climate Accord, through which Brazil has committed to achieve net zero emissions from Amazonian forests by 2030.

## Domestic Policies and Programs

Brazil's remarkable conservation achievement was possible in large part because of its audacious Programa de Prevenção e Controle de Desmatamento na Amazonia (Program for the Prevention and Control of Deforestation in the Amazon), orchestrated across 13 national government agencies and between national and state governments (reviewed in Nepstad et al. 2014) under President Luiz Inácio Lula da Silva. The initiative increased law enforcement efforts, including sting operations against organized crime. Through it and the Amazon Region Protected Area program, Brazil expanded the area of forest under some form of formal protection by 68 percent, including the creation of protected areas and extractive reserves, and formal recognition of indigenous territories close to the advancing deforestation frontier. More than half of the remaining forests of the Brazilian Amazon today are under some form of protection. Brazil also launched a jurisdictional strategy in 2008, through which farmers in high-deforestation *municípios* (counties) lost their access to public lines of farm credit.

Those efforts at taking control of the vast Amazon frontier were facilitated by advances in monitoring. Using data from MODIS satellites, the DETER system, O Sistema de Detecção de Desmatamento em Tempo Real (System for Detection of Deforestation in Real Time), allowed deforestation events to be spotted within days of forest clearing, increasing the effectiveness of law enforcement efforts (Assunção et al. 2013).

Another important feature of Brazil's arsenal for combating deforestation in the Amazon region was the Forest Code. Established in 1965, the Forest Code set minimum percentages of private land that must remain in a legal reserve of native vegetation. In the Amazon region, this percentage was 50 percent. After the record-high deforestation rate in 1995, President Fernando Henrique signed a temporary measure increasing this percentage to 80 percent, which was renewed each year until it was made permanent in 2000. When the government of Mato Grosso insisted that the state's "transition forest," where much of the conversion to soy has taken place, was still at 50 percent legal reserve, the federal government reversed that designation in 2005 (Stickler et al. 2013).

Finally, subnational strategies have also been prominent in Brazil's policies to address Amazon deforestation. Each state was required to develop its own program to prevent and control deforestation. All states of the Brazilian

Amazon are members of the Governors' Climate and Forests Task Force and have signed the Rio Branco Declaration, committing to reduce deforestation 80 percent by 2020 if sufficient finance is available and collaborations with companies are established (Stickler et al., in review).

The state of Acre, for example, launched the Sistema de Incentivos para Servicos Ambientais (System for Incentives for Environmental Services) law and program in 2009, which has now received its second results-based payment contract with the German government (de los Rios et al. 2018).

Mato Grosso initiated the Produce, Conserve, Include strategy in 2015, which establishes targets for slowing the loss and speeding the recovery of forests and Cerrado woodland, for increasing soybean production and the productivity of cattle operations, and for improving technical support and market access of the state's agrarian reform settlement farmers. Mato Grosso's strategy also establishes a minimum area of native cover—60 percent in both the Amazon and the Cerrado biomes, just below current coverage. A strategy for indigenous lands is also under development. If successful, Mato Grosso's policies would result in emissions reductions of 6 gigatonnes of carbon dioxide equivalent by 2030 (EII, 2015).

In Pará, the Municipios Verdes program was designed to help remove *municipios* from the federal blacklist that suspended access to farm credit. A similar Municipios Sustentaveis program was established in Mato Grosso.

## Market Transformation

Brazil's Program for the Prevention and Control of Deforestation in the Amazon was reinforced by voluntary market agreements to establish deforestation cutoff dates for soybeans and beef. Products grown on land cleared after these cutoff dates would be rejected by participating companies, which included the buyers of roughly 90 percent of the soy grown in the Amazon region and a third of its beef (Nepstad and Shimada 2018; Shimada and Nepstad 2018). The Soy Moratorium and the Cattle Agreement were responses to "name and shame" campaigns led by Greenpeace (Nepstad and Shimada 2018). The Cattle Agreement featured a strong role of the Ministerio Publico, the public prosecuting ministry of Brazil, that had taken actions against some of the major beef-processing companies, such as JBS, because of their purchase of cattle from farms that were in violation of the Forest Code or had encroached on protected areas or indigenous territories (Shimada and Nepstad 2018).

## Results-Based Payments

The above measures created restrictions on deforestation; a few important actions were also taken to reward reductions in deforestation. The Brazilian Amazon Fund was created in 2008 as a pay-for-performance mechanism. So far it has received approximately US \$1.3 billion and disbursed more than half of that amount to state governments in the Amazon region and NGOs. As long as Amazon deforestation continues to decline or does not increase, money is released to the fund from its chief contributors, Norway and Germany. In 2010, a similar agreement was established between the German development bank, KfW, and Acre through the REDD for Early Movers program, with a second contract signed in 2017. Mato Grosso also made a results-based payment agreement with Germany and the United Kingdom in 2017. In 2019, a new contract for a \$96 million results-based payment contract between Brazil and the Green Climate Fund was finalized.

## Discussion

The Brazilian Amazon experience shows that in general, a largely command-and-control approach to deforestation, apparently reinforced by market exclusion of beef and soy associated with deforestation, worked for several years. Its effectiveness diminished, however, in part because of a lack of positive incentives—a shortage of carrots. The polarization that has occurred between environmental groups and the farm sector in Brazil is a cautionary tale about the limits of market exclusion strategies and the potential of the zero-deforestation movement to trigger backlashes that undermine important public policies.

Observations about four aspects of Brazil's forest conservation efforts explain why some strategies failed and other succeeded.

### *1. The Forest Code meets the Soy Moratorium*

Have market exclusion strategies helped turn conservation-minded farmers into enemies? The polarization is best understood in the context of the Forest Code and its interactions with supply chain interventions. Brazil's farm sector organized a campaign to revise the Forest Code in 2010 that was motivated, at least partially, by Brazil's increased law enforcement. Years of inadequate enforcement and slow or no implementation of "flexibility" measures, such as the legal reserve trading scheme among farmers, had made compliance with the code, which itself was changing, extremely difficult (Stickler et al. 2013). Many environmental groups said that compliance



was low because farmers broke the law. From the perspective of farmers, noncompliance was high because the responsible agencies never implemented it properly. Farmers felt demonized.<sup>2</sup>

The Forest Code was changed, but the most important restrictions on forest clearing—including the legal reserve percentages in each biome and most of the areas of permanent preservation—remained intact. Significantly, Article 41 was included in the New Forest Code, providing a legal framework for developing mechanisms for delivering benefits to compliant farmers. This article has yet to be implemented. Amnesty was given to all landholders who had cleared forest illegally prior to June 2008. Although much criticized by environmental groups because of this amnesty, the New Forest Code, approved by the Brazilian Parliament in 2012, was accepted by farmers and their organizations. They hoped and assumed that it was the new definition of success in addressing the forest issue, and that it would facilitate their access to global markets. They pointed out, accurately, that Brazil required more native forest on private farms than any other nation.

Farmers' support was evident during negotiations over Mato Grosso's Produce, Conserve, Include strategy in 2015. Representatives of Aprosoja, the powerful soy farmers' organization, supported the target of zero illegal deforestation by 2020.<sup>3</sup> They also supported a mechanism that would compensate farmers for forgoing their legal right to clear forests on their land in excess of the New Forest Code's legal reserve requirement—unchanged from the previous requirements. They stated, however, that participation in such a mechanism should be voluntary.

During these and many other meetings, farm leaders described their opposition to the Soy Moratorium, which did not recognize legal compliance with the New Forest Code. According to the terms of the Soy Moratorium, farmers with forest in excess of the legal reserve requirement on their farms were expected to forgo the legal right to clear this forest. Aprosoja decided not to fight the Soy Moratorium, given that the number of soy farms that had forest in excess of the legal requirement was quite small.

When the Cerrado Manifesto (Belmaker 2018) was launched, signaling a new global effort to conserve the Cerrado woodland savanna of Brazil, farmers grew deeply concerned. Although the soy sector of the Amazon region produced only a 10th of the nation's crop and very few farmers there retained forest that could be legally cleared, the Cerrado accounted for 60 percent of the national crop, with large areas of Cerrado vegetation on farms that could be legally cleared. The farm sector was preparing for battle. And one champion of their cause was gaining support in the presidential campaign—Jair Bolsonaro.

<sup>2</sup> D. Nepstad, interviews with 15 farmers.

<sup>3</sup> D. Nepstad, interviews with Aprosoja leaders.

Bolsonaro campaigned on an agenda of, among other things, removing restrictions on farmers and businesses more generally. He won more than 50 percent of the vote and appears to have won a particularly high level of support from soy farmers (Figure 5).

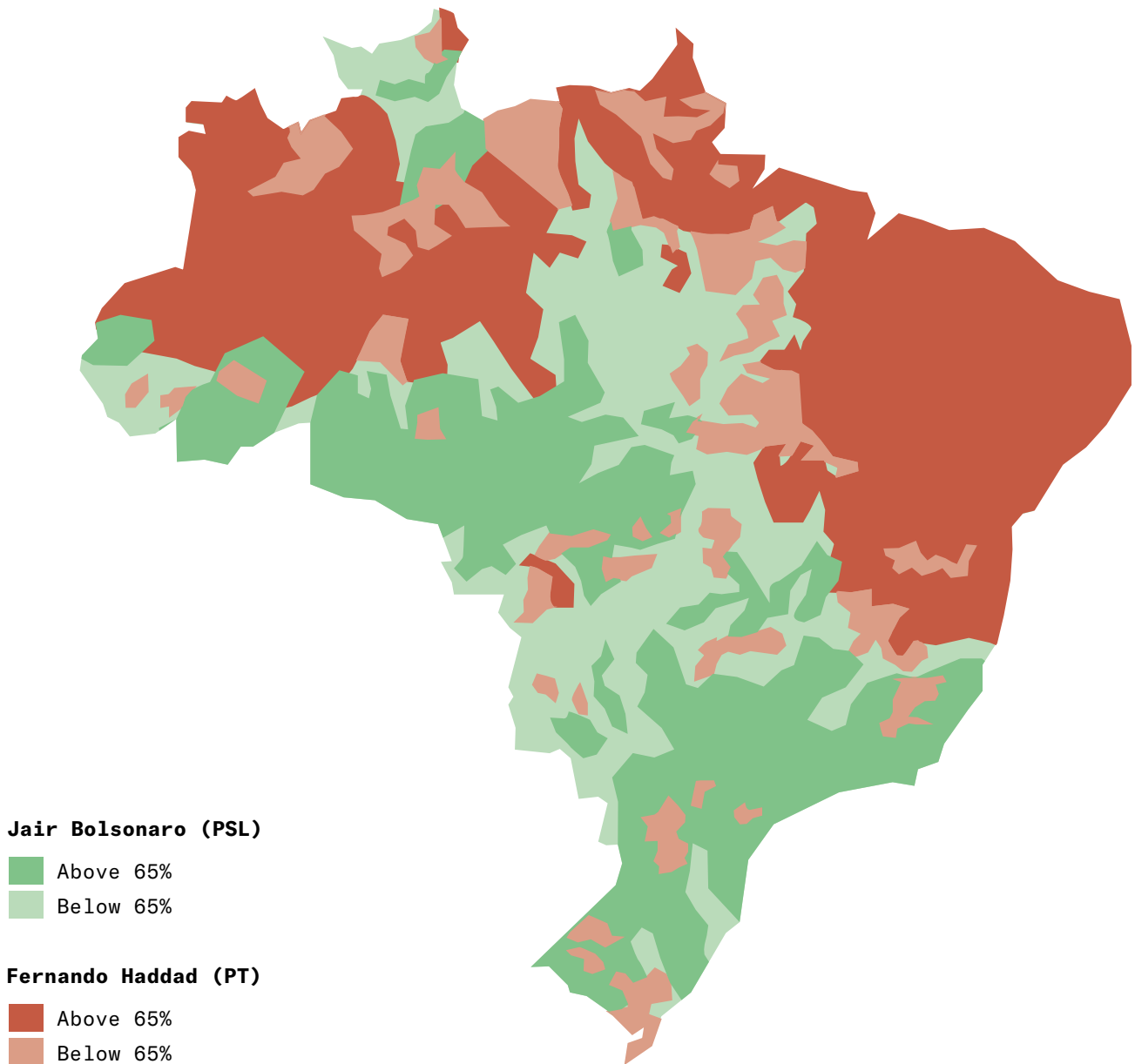
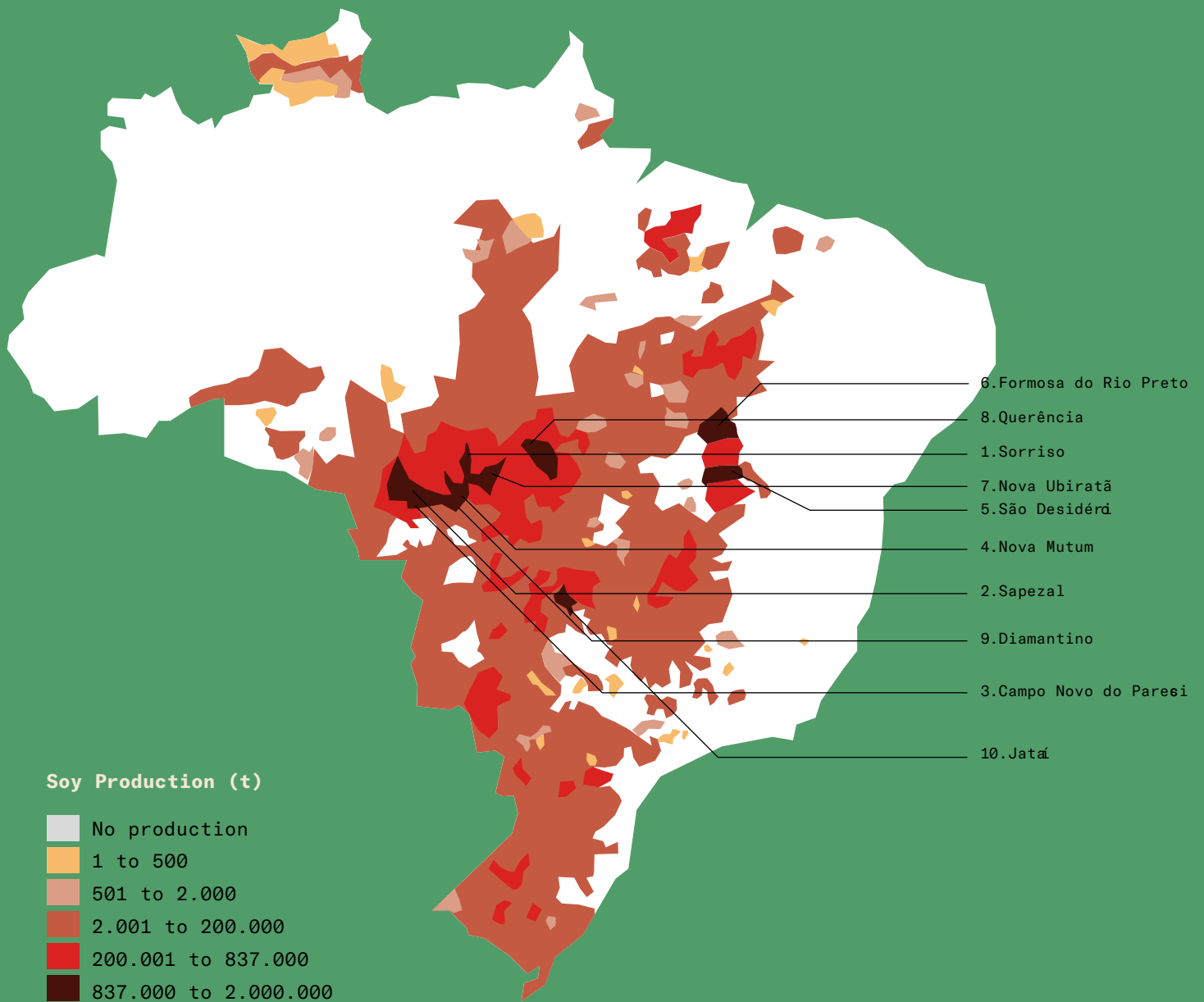


Figure 5a. Brazil's electoral map 2018



**Figure 5b.** Soy Farmers' Support for Bolsonaro

*Municípios* (counties) that voted at least 65 percent in favor of presidential candidate Jair Bolsonaro (dark green, Figure 5a) generally coincide with *municípios* that have significant soybean production (dark red, Figure 5b)

Sources: <https://infograficos.oglobo.globo.com/brasil/mapa-eleicao-2018-presidente-2-turno.html> (Figure 5a)  
<https://twitter.com/ibgecomunica/status/779305992857260038/photo/1> (Figure 5b)

## 2. Law enforcement and farm credit suspension

Many of the measures put in place by Brazil to slow deforestation are either difficult to maintain over the long term or diffuse in their implementation—that is, the connection between the intervention and the desired behavioral change (less forest clearing) is not direct enough.

An example of the first situation is the suspension of access to public farm credit in high-deforestation *municípios* through the *Municípios Críticos* program, initiated in 2008 (Nepstad et al. 2014). Suspension of bank credit in high-deforestation areas is hard to maintain in part because banks need to make loans—it is the core of their revenue model. In a 2014 interview, Justiniano Neto, director of the Programa Municípios Verdes, said that loans were flowing once again even in *municípios* that still had high deforestation rates.

Law enforcement itself is a very expensive undertaking when the government is trying to catch infractions spread across a vast forest frontier with precarious or nonexistent infrastructure. DETER made it much easier to catch perpetrators in the act, and the Cadastro Ambiental Rural (Rural Environmental Registry) will eventually allow infractions to be associated with landholders and their tax numbers. Nevertheless, the areas in question still must be visited by well-armed teams, sometimes by helicopter.

The budget decisions that determine whether to maintain a law enforcement program in a place like the Amazon Basin are hotly contested; budget allocation to environmental law enforcement loses out during periods of economic recession or when the local benefits of declining rates of deforestation appear meager compared with the advantages.

## 3. Sustainability certification

The Brazilian soy farmers' response to the certification agenda (through the Roundtable for Responsible Soy, RTRS, standard), strongly influenced by the Forest Code, had the added difficulty of legal compliance. Only Brazil and Paraguay have a mandatory farm-level forest requirement (Chomitz 2007). Representatives from Aprosoja made it clear through the discussions of the RTRS principles and criteria that their participation in the standard would depend on the creation of a mechanism for covering the costs of legal compliance. In 2009, as the principles and criteria were approved at the general assembly, that mechanism had not been created, and Aprosoja left the RTRS.

One of the core challenges faced by international certification standards is that farms already using most of the sustainability practices embodied in the RTRS standard have the lowest costs to comply. The farms that are using unsustainable practices—clearing forests, causing soil erosion, ignoring legal requirements, and abusing their laborers—have very high compliance costs and tend to forgo certification. This is one reason RTRS certified less than 2 percent of global production during its first 10 years.

A second limitation of certification is the demand and associated low price premium. Demand for RTRS-certified soybeans is lower than production, and the price is usually a dollar or two above conventional soy—a premium that is meaningless to farmers. Little evidence supports the notion that sustainability certification is driven by the demand from consumers. It appears to be much more a reflection of corporate fear of being attacked by Greenpeace or other vocal environmental groups.

#### *4. The Amazon Fund and REDD for Early Movers*

The Brazilian government created the Amazon Fund as a results-based payment mechanism, managed by the Brazilian National Development Bank. The fund was not designed, however, to highlight the connection between funding and emissions from deforestation. It does not require grantees to quantify the effect of their projects on carbon emissions; even though the recipients are mostly state governments and nongovernmental organizations, it is the government of Brazil that bears the onus of demonstrating to contributors the fund's positive effect on deforestation.

The results-based payment contracts established directly with Acre and, more recently, Mato Grosso—which, incidentally, appear to be the only subnational jurisdictions to establish such contracts throughout the tropics (Stickler et al. 2018)—may have had greater benefits. The process of developing these contracts involves dialogues with a range of public and private sectors to develop the programs that will translate the finance into emissions reductions (Fishbein et al. 2015), even though the amount of funding represents a tiny fraction of the emissions reductions that a subnational jurisdiction retains.

# Costa Rica

Costa Rica is a tiny nation compared with the other three studied here (5 million hectares versus 350 million hectares for the Brazilian Amazon region), but it has an outsize importance in the field of forest conservation and development. Costa Rica's relatively early evolution from low forest cover, because of agricultural expansion, to steady forest regrowth and rising incomes made it a case that provided evidence for the forest transition hypothesis (Mather 1992).

Costa Rica's deforestation history can be divided into two major eras: pre-1980, during which the national economy relied heavily on cattle and agricultural exports, and forestland was converted to cropland and pasture; and post-1980, which saw unprecedented forest regrowth after the domestic beef industry collapsed, the development of the tourism industry, an overall transition to higher urbanization, and new forest protection legislation (Stan and Sanchez-Azofeifa 2018; Navarro and Thiel 2007; Jadin et al. 2016).

Expansion of agriculture began in the 1950s, largely driven by increases in international beef prices combined with penalties associated with uncultivated lands, and peaked in the 1960s, when pasture area nationwide expanded by more than 60 percent (Stan and Sanchez-Azofeifa 2018). Costa Rica's highest deforestation levels occurred between 1973 and 1989, with an average rate of deforestation of 31,800 hectares per year. By 1985, forest cover had reached an all-time low, at only 24 percent of the country's original forest area (Sader and Joyce 1988; but see Sanchez-Azofeifa 2015).

Forest policy began with the first forest law in 1969 and the National Forest Development Plan in 1979; however, the incentives (tax exemptions) offered through these laws excluded small and medium farmers, who were not taxpayers. These early laws were effective, however, in creating a system of protected areas. Today, 26 percent of the country is set aside in national parks and other protected areas. The laws also introduced incentives for forest conservation but still allowed forest conversion to a significant extent (Navarro and Thiel 2007; González-Maya et al. 2015).

The majority of deforestation was concentrated in Cartago, Guanacaste, and Puntarenas provinces (70 percent, collectively), with Guanacaste as the main cattle-producing region (with more than 40 percent of national production) (Stan and Sanchez-Azofeifa 2018). Guanacaste is also particularly drought-prone, in part because of historical deforestation in the region (Stan and Sanchez-Azofeifa 2018; Castro et al. 2018).

Following the pre-1980 peak, deforestation declined and eventually reached net zero by 1998 as a result of effective policies and landowners' responses. External economic factors also played a role, including the beef price

collapse (Wallbott et al. 2019; Stan and Sanchez-Azofeifa 2018). In 2015, forest cover in Costa Rica was 52 percent, representing a sizable increase from the 26 percent cover in 1983 (Oviedo et al. 2015). Although forest regrowth has been substantial and continuous, recent studies in some parts of the country indicate that these regrowing forests are recleared on average within 20 years (Reid et al. 2018), that clearing of more mature forests continues (Zahawi et al. 2015), and that these dynamics have led to substantial forest and habitat fragmentation (Zahawi et al. 2015; Algeet-Abarquero et al. 2015).

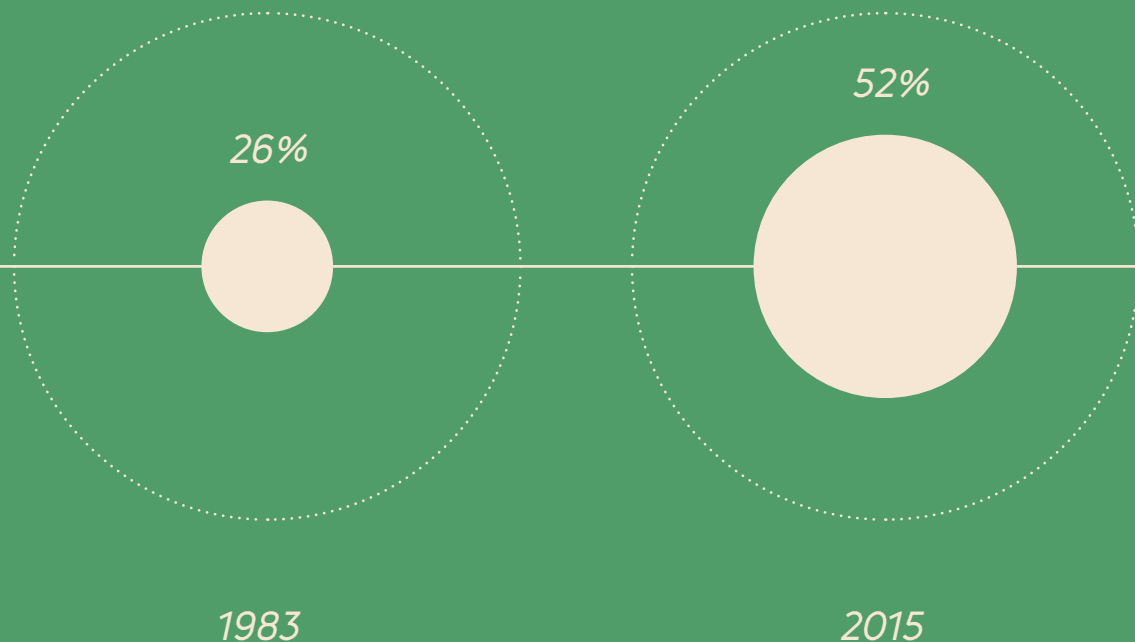
## *Domestic Policies and Programs*

Costa Rica's most significant domestic policy implemented since deforestation peaked is the 1996 Forest Law (Law 7575), which established payments for environmental services to compensate landowners for forest conservation and banned clearing of mature forests. Deforestation subsequently declined, but the law's long-term effectiveness remains to be thoroughly assessed (Fagan et al. 2013).

Other relevant policies and programs include the National Climate Change Strategy (2008), 2021 carbon neutrality goal (2008), National Carbon Market (2011), REDD+ Strategy (2010–2014), National Development Plan (2011–2014), and National Decarbonization Plan (2018–2050) (Wallbott et al. 2019; Government of Costa Rica 2018). Costa Rica's new Política Agroambiental (Agro-Environmental Policy) could act as an overarching framework, integrating otherwise siloed processes like REDD+, agricultural policies, nationally determined contributions for the Paris Climate Accord, and other policies and programs (Wallbott et al. 2019).

In 2001, Costa Rica implemented an integrated fuel tax as part of the Law of Tax Simplification and Efficiency (Law 8114), with 66 percent of revenues distributed to the Ministry of Finance, 29 percent to the National Road Council, 3.5 percent to the National Forestry Finance Fund (FONAFIFO), 1 percent to the University of Costa Rica, and 0.1 percent to the Ministry of Agriculture (Blackman and Woodward 2010). FONAFIFO is a semi-autonomous body that manages Costa Rica's PES program (described below). Conclusive results on the effect of the tax on emissions are not available.

In 2015, forest cover in Costa Rica was 52 percent, representing a sizable increase from the 26 percent cover in 1983.





## Market Transformation

The livestock industry accounts for 30 percent of Costa Rica's emissions and 35.5 percent of national land use (Martin 2017). Consequently, the sustainability of the livestock industry represents an important aspect of Costa Rica's overall environmental strategy. The National Low Carbon Livestock/Cattle Strategy targets this sector through priority themes—silvopastoral systems, improved pastures, climate change adaptation, and others. The National Commission for Forestry Certification, established by the 1996 Forest Law, sets standards and procedures for sustainable forest management and certification of natural forests and plantations based on sustainability principles, criteria, and indicators (Navarro and Thiel 2007). The National Decarbonization Plan acknowledges that its success is closely tied to agricultural systems and export industries. It aims to, among other goals, “use the most advanced technology according to standards of sustainability, competitiveness, low emissions and resilience to the effects of climate change” in agricultural industries by 2050 (Gobierno de Costa Rica 2018).

## Results-Based Payments

The 1996 Forest Law provides the foundation for Costa Rica's PES system and covers four categories of environmental services:

- **mitigation of greenhouse gas emissions through emissions reduction and carbon fixation, capture, storage, or absorption;**
- **protection of water for urban, rural, or hydroelectric use;**
- **biodiversity conservation for conservation, sustainable use, scientific investigation, or genetic enhancement;**
- **protection of ecosystems or scenic natural beauty for tourism or science (Pagiola 2008).**

Landowners receive payment for providing these services through their conservation.

The program is financed by tax funding and is managed by FONAFIFO, which was set up by the law to work with private landowners and NGOs to disburse funds (Wallbott et al. 2019; Johns 2012). Its success may be attributable to behavioral aspects—landowners' efforts to comply and their understanding of the public benefit.

## Discussion

Costa Rica's PES program has been lauded internationally; however, closer analyses reveal the differential effectiveness of PES across geographic areas and land-use types. Daniels et al. (2010) discuss the poorly understood role of PES at the national level, finding that PES drives different outcomes based on the starting conditions of each forest area and that PES effects may not be additional to conservation that would have occurred on PES sites without payments. Additionally, Reid et al. (2018) find that despite significant reforestation, it is unclear whether regenerated forests will persist. They question the extent to which governments can count natural regeneration as contributions toward reforestation goals, given that in Costa Rica—a supposed model of successful regeneration—the new forests may not persist more than about 20 years before being recleared.

Despite the country's small size, the Costa Rica case study provides lessons in the context of forest transitions. To evaluate national-level forest transitions and the influence of land-use policies on those transitions, subnational-level analyses are important for understanding the dynamics at play, including how land-use redistribution may influence overall regeneration processes (Jadin et al. 2016).

Subnational analyses can also help determine whether forest regeneration related to the national PES system was in fact additional (Daniels et al. 2010). Spikes in deforestation in recent years occurred primarily in northern Costa Rica, where export-oriented banana and pineapple industries are based (Fagan et al. 2013).

# Ecuador

For the past decade, Ecuador has shown a strong commitment to understanding and curbing deforestation. Because of its institutions and programs, net annual deforestation in Ecuador fell from 92,742 hectares in 1990–2000 to 47,497 hectares in 2008–2014. The annual figure rose, however, to 61,112 hectares in 2014–2016. Environmental programs based on subsidies to forest-conserving landholders benefited and then suffered from the oil price boom and bust, accounting for the strong decline in deforestation up to 2014 and the less positive results in slowing deforestation after 2015.

About 25 percent of the country is home to indigenous communities (Blackman and Veit 2018) and 30 percent consists of protected areas (Government of Ecuador, Ministry of the Environment 2016).

The land-use and forestry sectors are responsible for 36 percent of the country's greenhouse gas emissions (Blackman and Veit 2018). The main driver of deforestation over the past decade has been the expansion of the agricultural frontier and extensive cattle ranching, which have contributed to forest loss in Ecuador's main ecosystems—coastal dry forest, mangroves, paramos, and tropical Amazon forest. Conservation policies are currently focused on improving agricultural practices, halting the expansion of the agricultural frontier, reforestation, and restoring agricultural production in open areas. The future of Ecuador forests is uncertain because domestic funds are limited, international funds are only beginning to flow, and recently drafted national development policies require coordinated implementation across the forestry, agriculture, and energy sectors.

## Domestic Policies and Programs

Ecuador's 2008 constitution recognizes that nature in all its life forms has the right to exist, persist, and maintain and regenerate its life cycle.<sup>4</sup> In the years following its adoption, several environmental and agricultural programs were enacted to encourage the transition to sustainable land-use practices and the conservation of natural forests. However, many initiatives to address deforestation are still in the early stages of implementation, and their future is threatened by recent economic shocks and inadequate oversight and enforcement. Better coordination among the Ministry of Environment, Ministry of Energy, and Ministry of Agriculture, Cattle, Aquaculture, and Fisheries (henceforth, Ministry of Agriculture) is also needed.

<sup>4</sup>National Constitution of Ecuador, Art. 71-74, 2008; Environmental Code, Official Registry 983, April 12, 2017.

Part of the institutional and technical progress of Ecuador over the past decade is attributed to the Programa Socio Bosque, a nationwide payment-for-conservation program. The program was launched and funded by the national government during the oil price boom (2007–2014), which had significant benefits in Ecuador (Rosa da Conceição et al. 2015). Then, as oil prices fell and the financial crisis hit Ecuador, funding for Socio Bosques declined along with other government subsidy programs. In recent years, the program has stopped adding new beneficiaries. A revenue model that provides long-term funds for Socio Bosque is urgently needed.

Socio Bosques is Ecuador's flagship program to address deforestation and alleviate poverty. Furthermore, the program was essential for the implementation of a readiness phase and for inspiring conservation policies that extended to the agricultural sector. Since its inception, the program has provided more than US \$65 million in payments for the conservation of 1.6 million hectares of primary forest and native vegetation to more than 175,000 beneficiaries in private lands and indigenous communal areas (Government of Ecuador 2015a). The beneficiaries of the program commit to stopping deforestation for 20 years and in return receive a fixed yearly payment, its amount depending on the area. Recent evaluations indicate that the program has directly contributed to a 1.08–1.5 percent decline in deforestation rates after 2007 in the target areas (Cuenca et al. 2018).

Additionally, in recent years Ecuador implemented initiatives led by the Ministry of Agriculture, with some support from the Ministry of Environment, to support the transition of agricultural production systems to sustainability. These initiatives feature the Amazon Productive Transformation Agenda (Government of Ecuador 2015b) and the Forest Incentives Program (Government of Ecuador 2013). ATPA is poised to contribute directly to forest conservation efforts in Ecuador by slowing deforestation in the Amazon provinces through diversified and environmentally sustainable agriculture. ATPA supports the conversion of degraded areas of pasture or monocultures to sustainable production systems while also raising the income of local producers. Through the ATPA program, farmers commit to protecting forest remnants on their farms and receive technical assistance and basic agricultural resources to facilitate the transformation. By June 2019, ATPA had enrolled 145,863 hectares.

Water funds are Ecuador's innovative approach to preserving the water supply of large cities and agricultural areas by protecting native forests and *paramos* andean vegetation in critical watersheds. Although reducing deforestation and mitigating climate change are not the stated intent, these funds are ideal mechanisms to implement many of the measures and actions defined in the REDD+ Action Plan. The funds have focused on roughly 900,000 forested hectares and resulted in sequestering a large volume of carbon in biomass, particularly in *paramo* soils. Of the three major water

funds (FONAG, FONAPA, and FORAGUA), FONAG took the lead in 2000, seeking to conserve water resources for the 2.5 million inhabitants of Quito. The funds operate as a trust system managed by independent financial institutions. The assets are invested and distributed among land managers so that they can improve their production and conservation practices. Each fund has a steering committee, responsible for vision and planning, and a technical secretariat that oversees implementation of the committee's decisions (Kauffman 2014). These water funds have been an economically viable conservation instrument.

The Forest Incentive Program, implemented by Ministry of Agriculture, is designed to cover up to 100 percent of the costs associated with establishing commercial forest plantations for the first four years, with the goal of achieving 1 million reforested hectares on private and communal land by 2027. This program has not expanded as planned, however, because it has been underfunded by the national government in recent years.

## Market Transformation

As of 2018, Ecuador had 6,800 palm oil producers (89 percent of them considered smallholders) distributed in 13 provinces of the country, with a total planted area of about 257,000 hectares. The country is the second-largest producer of palm oil in Latin America, with 540,000 tons in 2018 and a projected 480,000 tons for 2019, according to Ecuador's palm oil producers association.

Ecuador is hoping to become the first nation certified by the Roundtable on Sustainable Palm Oil as part of the certifier's pilot program for a jurisdictional approach. In 2018, Ministries of Environment and Agriculture partnered to support implementation of Ecuador's RSPO jurisdictional certification initiative, creating an interagency committee for monitoring sustainable palm oil production, known as CISPS. The committee has met multiple times to discuss the competitiveness and sustainability of palm oil in Ecuador and to advance the necessary actions to obtain certification, which will require conducting studies of conservation values, land-use change, and regulations for the environmental licensing of oil palm trees. This is an important initiative, given evidence that an increase in oil palm cultivation has stimulated new deforestation (Vijay et al. 2016 and 2018)

## Results-Based Payments

Since 2008, Ecuador has been committed to the development of a national REDD+ strategy that has made the country among the first to receive international climate finance for forest conservation. During the readiness phase, Ecuador developed its REDD+ Action Plan, a forest monitoring system with observation of land-cover changes, a national reference level for deforestation activities, and a REDD+ safeguards system (Guedez and Guay 2018).

Ecuador's REDD+ Action Plan, approved in 2016, aims to reduce gross emissions from deforestation by 20 percent or more by 2025 from the 2000–2008 reference level. The plan has four strategic components: institutional policies and management for REDD+, transition to sustainable productive systems, sustainable forest management, and conservation and restoration.

The REDD+ Action Plan has catalyzed efforts to address deforestation in Ecuador. It had so far secured funding from the Green Climate Fund (US \$41.2 million) and the Global Environmental Facility (US \$12.5 million) for its implementation (Guedez and Guay 2018). The REDD+ Action Plan is expected to secure payments for performance; most likely the first one will come from the German REDD for Early Movers program.

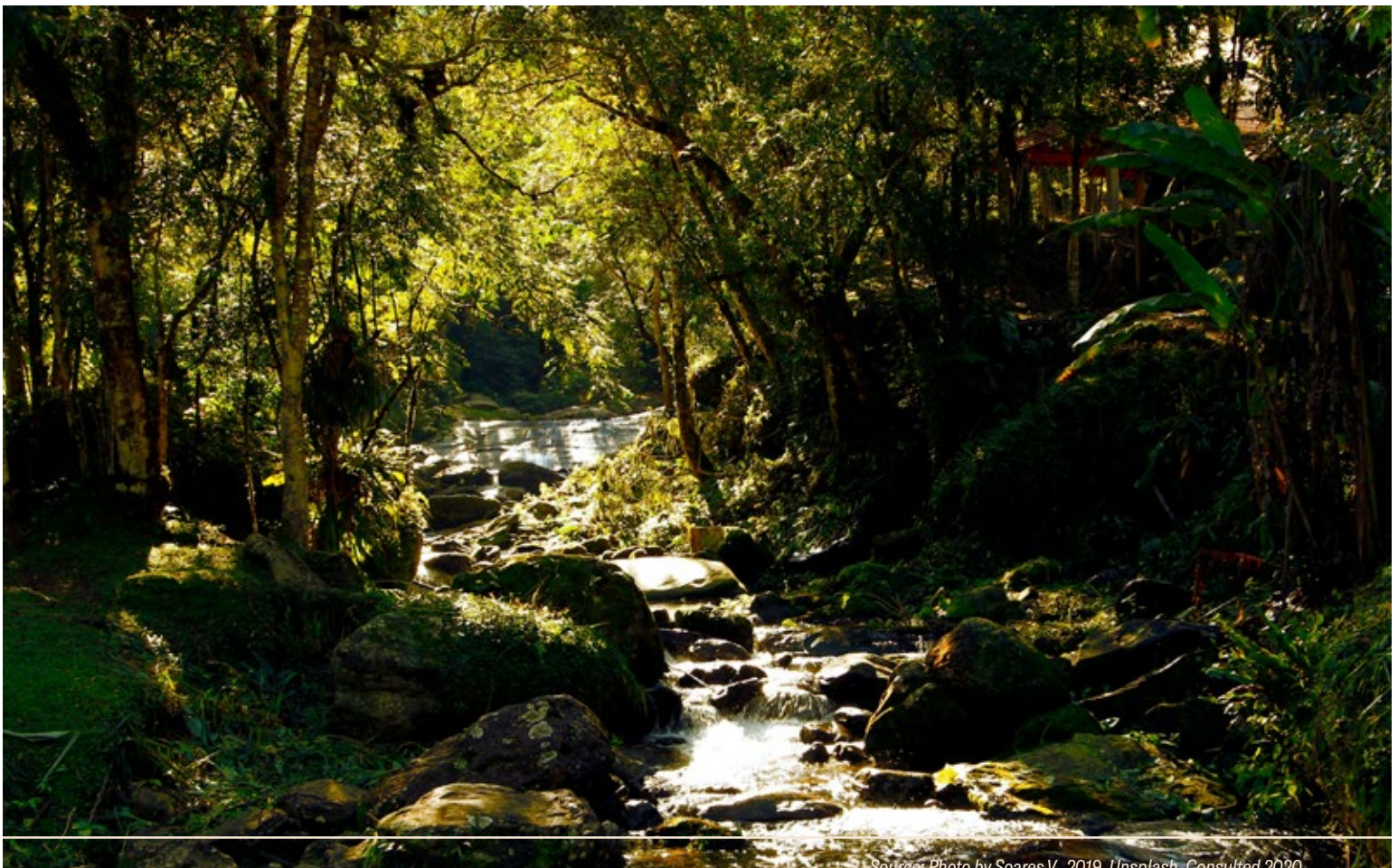
## Discussion

Ecuador has a progressive constitution that recognizes the rights of nature and is undertaking innovative programs such as Socio Bosques and the RSPO jurisdictional certification pilot. It has secured substantial funding from the Global Environment Facility and the Green Climate Fund to support implementation of its REDD+ Action Plan and more recently has obtained loans from the International Monetary Fund to support its development agenda. Deforestation has decreased but still occurs, and illegal logging and forest clearance for agricultural expansion remain risks. The initiatives that have been promoted to address deforestation are troubled by management and financial challenges. To ensure long-term success and encourage sustainable production and enterprises, future initiatives could involve public-private partnerships.

For example, the Ecuador 2030 Productive and Sustainable initiative, promoted by the Ecuadorian Business Chamber to foster the implementation of development goals, calls for private sector engagement and could make a strong case for attracting it. Likewise, the water funds, which stand out among conservation programs because they have sustainable administrative structures and financial resources, could be ideal programs for donors seeking long-term strategies and mechanisms to expand thematically and geographically.

Currently, 25 percent of the natural area of Ecuador is covered under the Programa Socio Bosque, ATPA, and water funds. Since most programs and policies to address deforestation in Ecuador are in their early stages, it is hard to quantify their real effects on deforestation rates. Recent evaluations of Socio Bosque demonstrated that there is room for achieving greater benefits by adjusting the geographic focus and strategic prioritization of the intervention areas (Ardila et al. forthcoming). Other programs are at the point where early lessons can inform adaptation to maximize their potential. For example, further alignment and engagement of the Ministry of Agriculture and the private sector could strengthen the REDD+ Action Plan. The ministry could be more involved in revising and implementing this plan since it often targets the same lands and land managers.

Further efforts at coordination between the Ministries of Environment and Agriculture could lead to success in developing shared goals. It has been difficult to reconcile the “do not touch your forest” message of the Socio Bosque program with the “maximize production” challenge of the agriculture sector. The RSPO pilot certification is a potential space for fostering collaboration and finding common ground among the different actors.



# Peru

With more than 68 million hectares of Amazon rainforest in 2018, Peru is the fourth-largest tropical forest nation in the world and recognized as a globally significant hotspot of biodiversity (MINAM 2016). Natural forests cover about 72 million hectares, with 82 percent of all forest in the Amazon regions of Loreto, Ucayali, Madre de Dios, San Martín, and Amazonas (MINAM 2016).

The Amazon rainforest ecosystem is increasingly threatened by deforestation and degradation. Total forest loss in the Peruvian Amazon was 2.3 million hectares over the years 2001–2018, and increased over this period (MINAM 2019). Official deforestation data indicate a 5.2 percent increase in 2016 with respect to 2015, totaling 164,662 hectares, followed by a slight decline to 155,914 hectares in 2017 (MINAM 2019). Emissions from deforestation and land-use change accounted for 45 percent of Peru’s national greenhouse gas emissions in 2014, with more than 75.3 million tons of CO<sub>2</sub>e attributed to gross deforestation (MINAM 2019b).

Deforestation in the Peruvian Amazon is driven primarily by the expansion of small- and medium-scale agriculture and cash crops such as coffee, cacao, palm oil, cassava, maize, and other fruits and vegetables. Illegal mining is also causing deforestation, most notably in the Madre de Dios region. Indirect drivers of deforestation are related to institutional challenges including incomplete land zoning, insufficient allocation of land use and landownership rights, lack of alignment among public policies, and inadequate capacity for law enforcement. Social causes of deforestation include rural migration to agricultural frontiers, weak governance, land tenure challenges, and limited access to technology and finance needed to sustain soil fertility and farm productivity (MINAM 2016).

## Domestic Policies and Programs

Peru’s commitment to the Paris Climate Accord (nationally determined contribution) is to reduce greenhouse gas emissions 20 percent below a business-as-usual reference level, with an additional 10 percent reduction contingent on international investment (Government of Peru 2015). As part of the strategy, the Peruvian government formally committed to net zero deforestation by 2021 and developed the National Forests and Climate Change Strategy as a roadmap to reach this goal. In addition, Peru has committed 3.2 million hectares to forest landscape restoration and conservation to support the Bonn Challenge (MINAM 2017).



Recognizing the need for increased private sector investment and multistakeholder cooperation to achieve the interrelated goals of increasing sustainable land use and forest conservation, a new program, Peru launched the Public-Private Coalition for Low-Emissions Rural Development at the 2017 ExpoAmazonica in the region of San Martin (CIAM & GCF 2017). Supported by the Amazon Interregional Council and the Governors' Climate and Forests Task Force, the coalition invites the private sector, producer organizations, and civil society organizations. The coalition's action plan has three main objectives: to guarantee forest and land-use rights without entailing new deforestation; to optimize the sustainable use of forest landscapes, recognizing high-elevation Andean forests and lowland rainforests and wetlands; and to build the enabling conditions and transformational changes required for low-emissions rural development, including technological, financial, and business model innovations. The coalition received the endorsement of more than 45 public institutions, companies, producer organizations, and civil society organizations.

## Market Transformation

Peru is advancing sustainability goals in the agriculture sector across major commodities—coffee, cacao, and palm oil—through national action plans produced by trade federations and the Ministry of Agriculture and Irrigation. For coffee and cacao destined for export, trade organizations rely heavily on specialty markets focused on high-quality, sustainably produced products. Among the development projects focused on sustainable production are the Peru Cocoa Alliance, a public-private partnership supported by USAID (Peru Cocoa Alliance 2016). At the farm level, many initiatives pursue international certification through the Rainforest Alliance, Fairtrade, UTZ, or USDA Organic.

Perhaps the most significant progress in advancing sustainability goals has been made in the palm oil sector. From 2007 to 2013, oil palm accounted for 11 percent of agricultural deforestation while occupying less than 4 percent of Peru's total agricultural area (Vijay et al. 2018). Although Peruvian palm oil accounts for less than 1 percent of global production, the sector is rapidly expanding. Palm oil production increased from 140,088 tonnes in 2000 to 921,001 tonnes in 2018, and there are currently 66,171 harvested hectares (FAO 2017). Palm oil production provides about 7,200 former coca producers with a legal livelihood alternative and directly employs 37,000 rural farmers, primarily in the Amazon regions of Loreto, Huánuco, San Martin, and Ucayali (Junpalma Peru 2016).

The rapid expansion of oil palm, along with its notoriety as a major cause of deforestation in Southeast Asia, has given rise to concern within government, NGO, and civil society institution in Peru. In 2015, when the Environmental Investigation Agency and a coalition of NGOs exposed the planned deforestation of 23,000 hectares of primary forest by Grupo Palmas, Peru's largest palm oil producer and the resulting public pressure along with legal issues prevented the project from materializing (EIA 2015; Finer et al. 2017). Grupo Palmas is now implementing No Deforestation, No Peat, No Exploitation (NDPE) policies to remove deforestation from its palm oil and cacao supply chains, and it is pursuing Roundtable on Sustainable Palm Oil certification.

The RSPO certification standard provides a market mechanism to prevent deforestation of high-conservation-value and high-carbon-stock forests for oil palm plantations. The framework provides economic incentives to palm oil producers, who may command a premium for certified sustainable palm oil in international markets, often from buyers with NDPE policies. In 2015, a the Santa Clara de Uchunya indigenous community filed a complaint against the Plantations Pucallpa oil palm company for violating the RSPO code of conduct (Finer et al. 2017). While the investigation was ongoing, the company withdrew from RSPO and divested its plantations. It was later confirmed that the company had illegally cleared 5,725 hectares of primary forest. No further deforestation has been detected.

To maximize the economic potential of the growing oil palm sector while addressing deforestation and sustainability concerns, the Peruvian Palm Oil Growers Association (JUNPALMA) was formed in 2015. In 2019, the association committed to deforestation-free palm oil production by all members by 2021, in partnership with the Ministry of Agriculture and Irrigation. This commitment promised to secure Peru as a leading source of sustainable, deforestation-free palm oil in the future.

## Results-Based Payments

The considerable potential for forest conservation in Peru has attracted many bilateral and multilateral cooperation agencies and international initiatives. Ongoing programs, totaling roughly US \$100 million to \$120 million, are supported by the Forest Carbon Partnership Facility, UN-REDD+, Forest Investment Program (Inter-American Development Bank, IADB), Global Environment Facility, Norway (phases 1 and 2 of the Joint Declaration of Intent through the UN Development Programme and the IADB; see below), Germany, USAID, and Japan.

In 2014, Peru, Germany, and Norway signed a declaration of intent on cooperation in reducing greenhouse gas emissions from deforestation and forest degradation and support for sustainable development in Peru (Joint

Declaration of Intent 2014). This REDD+ program aims to protect Peru's rainforest by reducing net deforestation to zero by 2021. The partnership requires Peru to “take immediate and decisive action to reduce its forest-related emissions toward making the forest and agriculture sector carbon neutral in 2021 and to recognize millions of hectares of indigenous peoples' land claims.” Norway committed to pay for verified results up to US \$300 million until 2020, and Germany committed to continue current levels of support on climate and forest issues and to consider further contributions based on the results.

In 2010, Peru's Ministry of the Environment created the Programa Nacional de Bosques para la Mitigación del Cambio Climático (National Forest Conservation Program for Climate Change Mitigation) to support the National Forests and Climate Change Strategy (MINAM 2020). The program, which aims to conserve 54 million hectares of tropical forests to avoid emissions from deforestation, has three primary objectives: to identify and map areas for forest conservation; to promote the development of forest-based sustainable production systems to generate income for impoverished local communities; and to strengthen the capacity of regional and local governments, rural communities, and indigenous peoples to conserve forests. The program has provided incentives for forest conservation by supporting alternative livelihoods—in timber and nontimber forest products, ecotourism, coffee and cacao agroforestry systems, and aquaculture—for more than 200 indigenous communities. It has also established the GEOBOSQUES platform, a satellite-based monitoring system to track deforestation in the Peruvian Amazon.

The Tambopata-Bahuaja REDD+ and Agroforestry project aims to conserve 570,000 hectares of primary forest in and around the Tambopata National Reserve and Bahuaja-Sonene National Park in Madre de Dios region (Althelia Climate Fund 2020). The US \$12 million project includes a \$7 million investment from Althelia Funds and an additional \$2 million from the US-Peru debt swap fund, Fondos de las Américas. The project is a public-private-civil society collaboration between Peru's National Service for Natural Protected Areas, Althelia Funds, and a local nonprofit, Asociación para la Investigación y Desarrollo Integral. The voluntary carbon offset project follows a payment-for-performance model: more than 400 smallholder farmers living in the buffer zones around the park receive technical support and financing to establish improved agroforestry systems of high-quality cacao in exchange for ensuring that no deforestation occurs in the protected areas. A minimum quantity of certified deforestation-free, organic and Fairtrade cacao is produced every year, with a portion of the sales going to investors. This project was expected to avoid emissions of 4 million tonnes of CO<sub>2</sub>e by 2020. The carbon credits, which are verified by Verra's Verified Carbon Standard and the Community and Biodiversity Gold standard, function as collateral for the \$7 million loan. A Peruvian insurance company has purchased the offsets credits generated by the project.

## Discussion

A common long-term vision for a productive, sustainable Peruvian Amazon is emerging across public and private sectors, supported by national-level processes such as the National Strategy on Climate Change, National Strategy on Forests and Climate Change, and national action plans for agriculture, including coffee, cacao, and oil palm trade federations. Regional governments in the Peruvian Amazon are active in the Amazon Interregional Council and the Governors' Climate and Forests Task Force and have made broad commitments to advancing low-emissions development based on production-protection-inclusion approaches, including reducing deforestation 80 percent by 2020, with international investors as signatories of the Rio Branco Declaration (GCF 2014). Through the Public-Private Coalition for Low-Emissions Development, regional governments are committed to partnering with the private sector to reduce deforestation through sustainable economic development, yet these partnerships have been slow to develop. Of the total area deforested over the 2001–2016 period (1,974,209 hectares), 82.7 percent is in Amazon regions represented on the Amazon Interregional Council and the Governors' Climate and Forests Task Force, which underscores the need for effective interventions and strong engagement with those regions to reduce deforestation.

Many of the elements critical to rapid reduction of deforestation in the Peruvian Amazon are in place, but implementation at scale and development of sustainable systems will require further support from international donors and private investors. The regional governments of the Peruvian Amazon are developing low-emissions development strategies, finance, and action plans; they need additional help in establishing partnerships with the private sector and financial institutions for implementation.

Despite the many international donor-led programs in Peru that already focus on rural development and the forestry sector, there remain opportunities for synergies and coordination among programs at national and regional levels. Two immediate opportunities:

- **implementation of the GEOBOSQUES forest monitoring system at regional levels so that the system can systematically evaluate progress toward national and regional performance targets; and**
- **harmonization of the regional low-emissions development plans being developed by Peru's Amazonian regional governments for a basin-wide approach to forest conservation and economic development.**

The Andean Amazon Alliance of governors is committed to forest and land management goals across the region, and the Amazon Interregional Council's Manucomunidad may provide a platform for basin-wide collaboration on forest conservation initiatives and investment.



# Conclusion

The effectiveness of the three approaches to forest conservation—domestic policies and programs, market transformation, and results-based payments—can be evaluated with the help of recent assessments by Stickler et al. (2018), Angelsen et al. (2018), and Seymour and Busch (2016). The potential effectiveness of the policy approach is very high because governments control the major levers that shape the decisions of land managers across vast territories. In practice, however, this potential is constrained by the often limited capacity of governmental institutions to carry out public policies and programs and by the will of political leaders to exercise governmental power to address tropical deforestation—often against the interests and advocacy of powerful vested interests (Brockhaus et al. 2017). Strong political will and effective public policies are best viewed as the end game for slowing the loss and speeding the recovery of tropical forests at scale, with the other two approaches best viewed as supporting strategies.

Market-based approaches arose in the early 1990s largely in response to the perceived lack of capacity and political will of many governments to address tropical deforestation. Their potential effectiveness is high because of the efficiency, reach, and independence from political processes that characterize market actors. Ironically, this same independence—the lack of a deliberate connection to public policies and programs—can also alienate the farm sectors and governments of tropical forest regions, triggering a backlash against efforts to slow deforestation. The success of market-based approaches has thus far been limited largely because the companies and producers that take on commitments and become certified tend to be those that are already performing at a high level. Market-based approaches are also constrained by the focus on individual commodities and by the lack of clear positive incentives for the producers and firm that achieve certification.

In fact, market-based strategies have been far more successful in creating risks to companies and governments that acquire commodities from, or invest in, tropical forest regions where deforestation is taking place than in defining secure pathways for companies to do business in tropical forest regions (Vogel 2005). The driving force behind the corporate adoption of sustainable sourcing commitments and policies is not consumer demand so much as fear of the reputational risk that can be incurred through the name-and-shame campaigns of advocacy NGOs, such as Greenpeace, Rainforest Action Network, and MightyEarth.<sup>5</sup> One of the main metrics of success adopted in recent years—zero-deforestation supply chains—can mean, in practice, that the companies and investors that are concerned

<sup>5</sup> Companies can face additional costs, shareholder concern, and in some cases, reduced demand for their products because of campaigns and associated publicity that link them with deforestation, labor abuses, illegality, or land conflict. These risks motivate them to change their procurement policies as part of a larger corporate strategy of risk management, with the goal of minimizing risks and associated hits on profits.

about reputational risks shift away from the forest frontier regions where deforestation is taking place, only to be replaced by companies and investors that are less vulnerable to reputation risk (Nepstad et al. 2016).

The strength of pay-for-performance systems is that they can establish a positive incentive—a payment that rewards progress. This approach is limited, however, by the small scale of the financing available to tropical forest region governments that are making progress and by the mechanisms through which it comes into tropical forest countries (Angelsen et al. 2018, Ch. 4).

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