



INNOVATIONS FOR SUCCESSFUL SOCIETIES

A CREDIBLE COMMITMENT: REDUCING DEFORESTATION IN THE BRAZILIAN AMAZON, 2003–2012

SYNOPSIS

In the early 2000s, deforestation increased sharply in the Brazilian Amazon, jeopardizing the tropical rain forest's critical role in mitigating global climate change. In 2003, under the administration of President Luiz Inácio Lula da Silva and his minister of the environment, Marina Silva, the federal government decided to address the problem. More than a dozen ministries worked together to draft the Action Plan for Prevention and Control of Deforestation in the Legal Amazon. Implementation, which began the following year under coordination by the Office of the Chief of Staff of the President, expanded Brazil's system of protected areas, improved remote monitoring of the Amazon, and increased enforcement of existing forestry laws. By 2007, the deforestation rate was less than half of 2004 levels. In response to an uptick in deforestation in late 2007 and early 2008, however, the Ministry of the Environment shifted tactics. Silva and her team at the ministry published a list of municipalities that bore the greatest responsibility for deforestation. The blacklisted municipalities were targets of increased enforcement operations and sanctions. The federal government also restricted landholders' access to credit by requiring environmental compliance to qualify for government-subsidized agricultural credit. Brazil's decade-long effort reduced the deforestation rate in the Amazon region by nearly 75% from the 1996–2005 average annual rate.

Rachel Jackson drafted this case study based on interviews conducted in Brazil, in September and October 2014. This case was funded by the Norwegian Agency for Development Cooperation in collaboration with the Science, Technology, and Environmental Policy program at the Woodrow Wilson School of Public and International Affairs. Case published January 2015.

INTRODUCTION

In January 2003, Brazil's newly elected president, Workers' Party candidate Luiz Inácio Lula da Silva (popularly known as "Lula"), appointed Marina Silva to head the Ministry of the Environment. Silva's appointment represented a victory for environmental interests. As a child, she had worked alongside her parents as a rubber tapper in the Amazon rain forest. In her twenties,

she marched alongside environmental activist Chico Mendes, leading protests against Amazon deforestation. Elected to the national senate as representative of the Amazonian state of Acre in 1994, Silva continued her fight to protect the Amazon region and built a reputation as a dedicated environmentalist.

During her first few months as environment minister, Silva had to set goals for the ministry to

achieve during Lula's four-year presidential term. Silva and her new team, drawn largely from civil society, wanted the ministry's top priority to be reducing the rate of deforestation in the Amazon region. However, many veteran members of ministry staff worried that achieving the objective would require unprecedented cooperation from other federal ministries as well as state and municipal governments and that the Ministry of the Environment would take the blame if it failed. "Half the ministry, especially the people who had been there before we took office, were against setting it as our goal for the next four years," recalled Tasso Azevedo, who served as director of the National Forest Program under Silva. "They asked, 'How could we assume a goal like that, which depended on things outside our control?'"

Silva and her team eventually persuaded doubters that the ministry should commit to tackling Amazon deforestation, even though the task was daunting. Azevedo said the team successfully argued that "if we performed very well in all other areas but deforestation in the Amazon was not controlled, our work would be seen as useless. But if we actually controlled deforestation, even if other things went wrong, the perception of progress would be there."

Silva's dedication to protecting the Amazon rain forest was important not just for Brazil but also for the world. The Amazon River basin was home to the largest tropical rain forest on the globe, and 60% of it lay within Brazil's borders. Occasionally referred to as "the lungs of the world," the biome helped regulate global climate, ejecting more than 20 billion tons of water vapor into the atmosphere each day. The Amazon basin was also the source of 20% of the world's fresh water and stored an estimated 90 billion to 140 billion metric tons of carbon.

Preserving the forest presented immense challenges. Brazil's Legal Amazon region comprised more than half of the country's total territory, covering more than 5 million square

kilometers (larger than the combined area of the European Union countries), though by 2003, only 3.5 million square kilometers of forest cover remained. Much of the region was inaccessible by road. When Silva came into office, Brazil's deforestation rate had risen during the previous six years. Past policies to reduce cutting of trees had failed to make any long-term reduction in forest clearance rates. At the 1992 United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil's second-largest city, Brazil's government had come under strong domestic and international pressure to develop a sustainable development strategy and slow the loss of trees. However, the government had failed to implement any concrete policy framework for achieving that goal.

In the decade that followed the Rio conference, logging, cattle ranching, and agriculture (mostly soy cultivation) accounted for most Amazon forest clearing. Those industries often worked in sequence over a period of several years. After loggers opened roads to remove trees from a tract of land for timber, ranchers would finish clearing the land to graze their livestock. In some areas, farmers would then move in to cultivate soy and other crops. Mining, government-funded hydroelectric dams (which required flooding certain parts of the forest during construction), urban expansion, and road construction—including the creation of federal highways—contributed to the problem.

Only a small percentage of the accelerating deforestation was legal. For example, in 1999, licensed tree removal accounted for just 14.2% of the total hectares logged that year. In 2000, federal licenses covered only 8.7% of the area actually cut.¹

Nearly three-quarters (70%) of Amazon deforestation took place in an arc of deforestation that stretched across seven of the nine Brazilian Amazon region states and spread northwest into the heart of the Amazon rain forest.²

Silva had no trouble persuading Lula and the rest of the cabinet that reduction of Amazon deforestation should be a formal priority for the Ministry of the Environment. It became one of the stated goals of Lula's term, along with other ministries' targets. "It was more controversial inside the Ministry" of the Environment than in the administration, Azevedo said. "It was an old fight of the Workers' Party. In the same way that we wanted to fight poverty, we wanted to fight deforestation. It was part of the package of doing something different."

The promise of change was a hallmark of Lula's new administration, Brazil's first left-wing government since the end of military dictatorship and return to democracy in the 1980s. "Because the Workers' Party for the past 20 years had been fighting to take over and assume the presidency, [when they won] there was this climate for change, and that allowed for innovation," said Mauro Oliveira Pires, director of deforestation policy at the Ministry of the Environment.

Political support for preserving the Amazon had gradually strengthened. The 2002 presidential race was the first time all of the major candidates agreed on the need to reduce deforestation in the Amazon region.³ In previous presidential elections, at least one prominent contender had supported increased deforestation in the name of regional economic development.

Still, Azevedo said, it remained unclear whether Brazil's politicians or the nation's citizenry fully appreciated Silva's vision for transforming environmental governance. "I don't think people really understood the meaning and the commitment," Azevedo said of the early cabinet meetings. "I think the people in the other ministries—or even society as a whole—looked at [reducing deforestation in the Amazon] as an intention and a good thing to say, but it was not taken seriously." That would soon change.

THE CHALLENGE

Forest preservation represented a complex challenge. To control deforestation, the federal government had to change the long-standing behaviors of loggers, farmers, and ranchers. Stopping destruction of the forest also required nimble coordination among ministries to (1) eliminate existing federal policy incentives for cutting trees, (2) monitor forest cover, (3) enforce penalties against violators, and (4) offer producers incentives to protect trees. President Lula and Environment Minister Silva had to work with nine state governments and hundreds of municipalities in order to achieve their goals.

The history of Amazonian land settlement made deforestation especially hard to address. In the 1970s, Brazil's military government had encouraged citizens to expand into the Amazon. Partly to alleviate land conflicts in more-densely-populated coastal areas, the federal government offered settlers acreage if they cleared at least 50% of the property. The land cleared under that policy officially belonged to the federal or state governments, which were supposed to issue official titles to settlers. However, many settlers never received land titles because of uneven policy implementation. The result was a patchwork of unspecified and overlapping claims that accumulated during the following decades.

Clearing land for timber or pasture just to assert ownership became common practice. Brazilians used the term *grileiros* to describe the people who grabbed land and submitted counterfeit titles or deeds to support their claims. The word *grileiro*, derived from the Portuguese word for *cricket*, referred to the practice of putting a forged document in a drawer full of the insects to artificially age and yellow the paper. The *grileiros* could then resell the land with falsified documents to third parties. By the time the federal or state governments investigated and took steps to prosecute, the *grileiros* typically had resold the land and moved on. Unraveling the tangle of falsified documents was a massive and

complex undertaking.

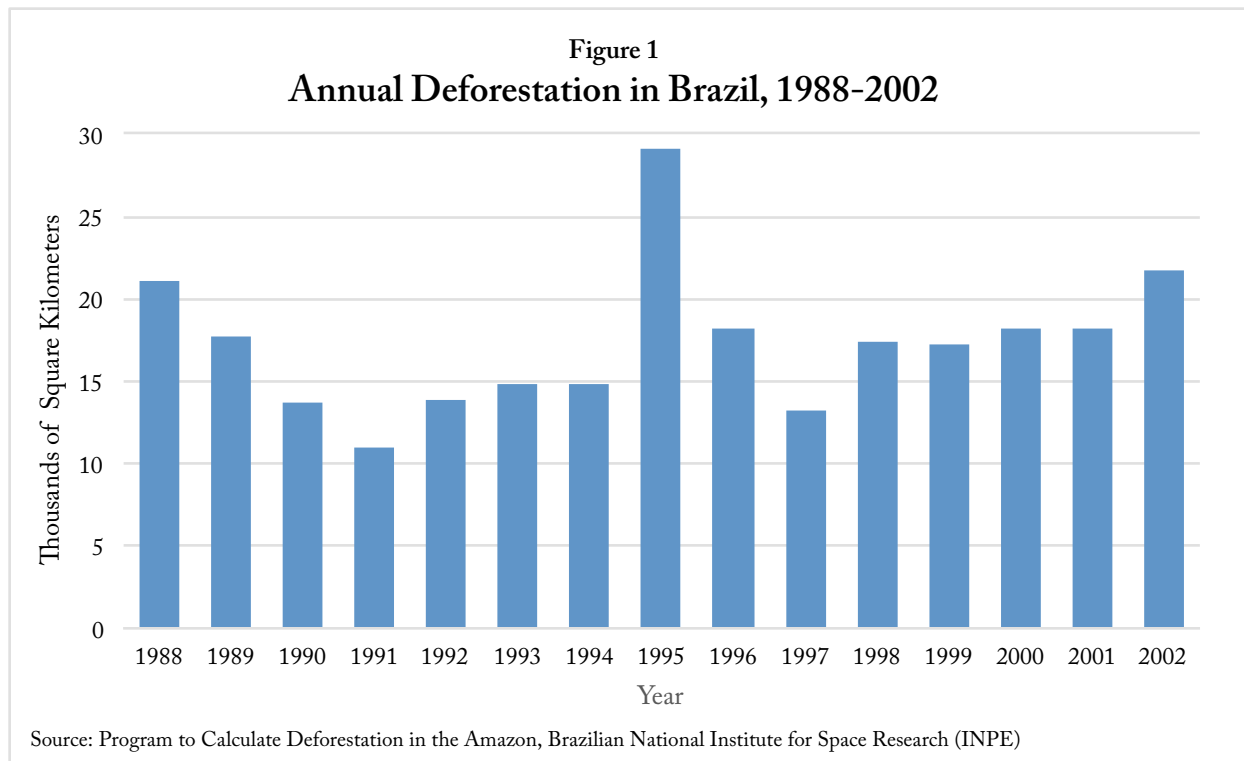
Even after the federal government committed to reducing deforestation and enacted new laws to protect the Amazon in the mid-1990s, federal subsidies continued to finance agricultural development in the Amazon region and fueled further land clearing. During the 2001–02 harvest year, the federal government granted R\$14.7 billion (US\$5.8 billion⁴) of rural agricultural credit to ranchers and farmers throughout the country under guidelines set by the Ministry of Agriculture.⁵ Such subsidies more than doubled during the following year, to about R\$31 billion (US\$9.4 billion).⁶ The Ministry of Agriculture estimated that rural agricultural credit covered about 30% of producers’ total annual costs.⁷ Much of the credit financed agricultural expansion on illegally cleared land.

The forest laws sharply restricted deforestation even on privately held land. From 1991 to 1997, the federal government passed a series of changes to its Forest Code that contained some of the strongest forest protections in the

world—at least on paper. Private landholders in the Amazon with properties larger than 100 hectares (1 square kilometer) had to preserve 80% of their land in legal reserves. The landholders also had to set aside land within 50 to 300 meters of springs and rivers, depending on the size of the body of water. The new laws carried steep fines for violations, and landowners who deforested their legal reserves could be forced to replant.

However, because of weak enforcement, the new restrictions had no measurable long-term impact on deforestation rates. From 1997 to 2002, deforestation rates continued to rise (figure 1).

Environmental protection was largely the domain of the Brazilian Institute of Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, or IBAMA), the enforcement arm of the federal Ministry of the Environment, and the state environmental ministries. Those entities struggled to monitor illegal activity. Because much of the expansive region was inaccessible by road, physical



inspection was challenging. Weak monitoring capacity made it difficult to identify and penalize lawbreakers.

Since 1988, the National Institute for Space Research had used satellite imagery to track deforestation in the Amazon. However, the satellite system had two significant weaknesses: it produced deforestation data only once a year, and the imagery was not precise enough to identify individual offenders.

In addition to lack of access to timely and accurate information, IBAMA suffered from serious institutional challenges. The agency had few enforcement officers, and many were poorly trained. Corruption was another problem, because some officers accepted bribes in exchange for lower fines or permits to clear protected federal forest. And the problem extended to state-level environmental ministries, which shared some of the enforcement responsibilities.

Ranchers and farmers, known collectively as producers, had powerful incentives to undermine enforcement of the strict environmental laws governing private property. Landowners who had deforested beyond their allowed limits could be fined and ordered to replant trees on acreage they used to graze cattle or grow crops. The ranching and farming industries—together with rural landowners—wielded major clout in Brazil's economy and legislature, where they were known as the *ruralistas*.

FRAMING A RESPONSE

In June 2003, Silva convened a meeting of scientists and civil society representatives to examine deforestation in the Amazon, including the policy landscape and the factors driving land clearance. “This understanding was very important because the majority of people in government used to say agriculture didn't have anything to do with deforestation because [those people in government] recognized only logging as the activity destroying the forest,” said Adriana

Ramos of the Instituto Socioambiental, or Socioenvironmental Institute, a Brazilian nongovernmental organization focused on Amazon preservation and indigenous rights. Under Silva, the Ministry of the Environment understood that “it was not the case of choosing one driver and focusing on that driver but, rather, on the dynamic between different economic sectors.”

That same month, preliminary data from the Brazilian space agency indicated that deforestation rates were rising rapidly in the Amazon. “Marina brought [that number] to the president, saying, ‘Look, we have to announce this number together. We said fighting deforestation was a priority of the government, so now the announcement needs to come from the government, not just from the Ministry of the Environment,’” recalled Azevedo, Silva's former chief of staff. Silva announced the growing problem alongside the minister of agriculture and the president's chief of staff.

In July, Lula threw his political will behind the effort by issuing a presidential decree that created a permanent interministerial working group for the development of a coordinated plan to combat deforestation in the Amazon. The insistence on coordination among ministries was a break from previous federal government deforestation policies, which had been the sole responsibility of the Ministry of the Environment.

In his decree, Lula laid out six policy instruments the group should focus on: (1) land planning in the municipalities that made up the arc of deforestation, (2) tax and credit incentives aimed at increasing the economic efficiency and sustainability of already deforested areas, (3) procedures for implementing works of environmentally sustainable infrastructure, (4) generation of employment and income in the restoration of degraded areas, (5) incorporation of open and abandoned areas into the production process and management of forest areas, and (6) integration of operations of the federal agencies

responsible for the monitoring and surveillance of illegal activities in the arc of deforestation.

Many of the proposals had been inspired by Silva and her team's recent experience in tackling the illegal mahogany trade, as well as their decades of experience in civil society organizations. In late 2002, signatory nations had increased the levels of protection of the mahogany tree under the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Implementing the new requirements was one of Silva's first tasks as minister. As a party to the treaty, Brazil would export mahogany only if the federal government could certify that the wood had been harvested legally and sustainably. Previously, environmental enforcement agents had seized illegally harvested wood but did not necessarily stop the export of unsustainably harvested mahogany.

"The strategy we used in the mahogany cases was based on the idea that if we can cut the links in the market of the money flows, that could be an answer to actually stop the illegal trade of mahogany," Azevedo said. "The whole business of mahogany was actually paid for up front by the buyers, who gave monetary advances to the people operating the logging business in Brazil." The team realized that if the federal government made enough large seizures quickly, the mahogany exporters would be unable to repay their advances and continue funding the illegal logging. "The mahogany business suddenly was virtually eliminated," Azevedo said.

After Lula issued his July 2003 decree, the Office of the Chief of Staff of the President, or Casa Civil, convened 12 ministries⁸ to produce a coordinated plan that would reduce deforestation based on the six policy instruments.

The creation of the interministerial committee marked the first time that so many different government ministries had come together on the issue of deforestation. "The context was highly favorable to the cause, because

at that time we had one of the highest rates of deforestation in history, so there was this need for action or we would reach the highest deforestation rates since 1994," said Johannes Eck, assistant deputy chief of staff for analysis and monitoring of government policies at the Casa Civil, who helped coordinate the meetings.

The committee included both ministers and a separate technical committee composed of subject experts from each ministry. They divided into subgroups in four priority areas: (1) territorial planning and land tenure, which focused on land policy covering conservation areas and sustainable local development; (2) monitoring and enforcement, which worked on instruments to monitor, license, and audit legal and illegal deforestation; (3) fostering of sustainable production activities, which examined rural credit and fiscal incentives, technical assistance, and scientific research; and (4) infrastructure, which looked into the transportation and energy sectors.⁹

The subgroups divided their proposed policy responses into different time frames. "The most important thing about the committee was that it presented short-, medium-, and long-term solutions to the problem of deforestation," said Juliana Simoes, a project manager at the Department of Deforestation Policy in the Ministry of the Environment who served on the technical committee. Based on those projections, the committee developed an implementation schedule.

In March 2004, the interministerial committee unveiled the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (Plano de Ação para Prevenção e Controle do Desmatamento na Amazônia Legal). In the short term, the plan emphasized expansion of the number of protected areas and command-and-control policies that aimed to improve monitoring and enforcement. In the medium term, it focused on tightening cooperation between federal agencies and state and local

governments and on dealing with existing economic incentives that encouraged deforestation, such as the rural credit system for the producers. For the long term, the action plan included efforts to build more-sustainable development and production chains and to encourage agricultural intensification rather than expansion, although the mechanisms to achieve those goals remained undetermined.

Even though the action plan set forth more than a hundred separate actions and goals among the participating ministries and agencies, the document lacked clear metrics for determining overall success.

The immediate focus on illegal logging made the plan more politically palatable in the short term. “The argument was very simple: we just wanted to combat illegality,” Azevedo said. “It was very easy to sell that at that moment, because all the actions we were doing were tied to that. At that point, in 2003–05, I don’t think people really realized what the impact of those actions would be. I don’t think they really believed we would be able to do the things in the second phase.”

The Casa Civil continued to play a coordinating role during implementation of the plan by meeting regularly to review ministry reports on progress in each target area. “The most successful element of this strategy was that the strategy was coordinated by the highest government institution in the country,” Simoes said. “Deforestation was no longer a problem attributed only to the Ministry of the Environment. It was a problem for the federal government. Every area of the government had to take deforestation into account in its policies.”

GETTING DOWN TO WORK

The 2004 action plan had a multistage timeline. The first phase, from 2004 to 2008, took aim at the short-term goals of monitoring deforestation and enforcing existing laws. The second, 2009 to 2011, focused on economic

incentives and working with state and local governments. The third, 2012–15, dealt with longer-term problems of sustainable economic development.

Regulating land and building a green wall

One of the first strategic objectives of the action plan involved better territorial management and land-use planning for public land in the Amazon region. The committee divided that objective into two parts: creating more protected areas and clarifying land tenure. Silva and her team at the Ministry of the Environment took responsibility for coordinating a massive expansion of the national system of protected areas, which were classified into indigenous territories (land reserved for exclusive occupation and use by the indigenous population) and conservation units (parks, biological and wildlife reserves, and areas designated for sustainable use).

Early on, Silva, Azevedo, and the rest of the team realized that management of the conservation units designated for sustainable use would require a better legal framework. The team also needed stronger laws to regulate public forests outside the conservation units. In 2004, Azevedo began working with the National Commission of Forests alongside congressional representatives, business, civil society, scientists, and indigenous community representatives to draft the Law on the Management of Public Forests for Sustainable Use (*Lei de gestão das florestas públicas para a produção sustentável*). After a period of public consultation, the commission sent the bill to Congress in February 2005, where the bill passed in January 2006. The law created the Brazilian Forest Service, which would have responsibility for (1) managing sustainable production within public forests, (2) the Registry of Forests, (3) plans for community forest management, and (4) the national system of forest concessions. The law tightened the rules governing the bidding process for forest concessions across public lands and, in a

break from previous bidding processes, allowed the Brazilian Forest Service to take into account the potential environmental impact of bids and those bids' social impacts in addition to the usual financial considerations.¹⁰

“We wanted to run people out of the illegal logging business and the utilization of logs that came from illegal deforestation—in favor of sustainable management plans,” Azevedo said. “And to have sustainable management plans, we needed to have rules on how to operate on public lands. So, this whole process led to the law for using the public lands, which implemented the concessions program and the plan to promote sustainable management of community lands.”

From 2003 to 2010, the ministry designated more than 500,000 square kilometers of conservation units on previously undesignated federal and state land—split between areas under full conservation (such as national parks and wildlife refuges) and those that allowed sustainable, licensed extraction (such as national forests and sustainable development reserves). The office of the presidency also designated 100,000 square kilometers of indigenous territory for protection during the same period.

Establishing new protected areas was a slow process. “Creating these areas required several months of debate between the federal government, the state government, the local government, and the population,” recalled Pires, Silva’s director of deforestation policy. “Brazilian law requires that we consult with the population when we create new protected areas, and some of the municipalities we had to consult with were very remote.” To reach populations spread throughout the Amazon region, ministry officials developed a trickle-down process. They would first explain the proposed policy to a small group of local representatives, who would then spread out across the municipality and hold their own consultation sessions.

Silva’s team built on work started at the ministry under former president Fernando Henrique Cardoso and used an existing World Bank project to help fund the expansion. The project, which had begun in August 2002, committed US\$81.5 million over a five-year period, with the aim of increasing by 10% the amount of protected land in the region.

During the first phase of the action plan, the National Institute for Colonization and Agrarian Reform (Instituto Nacional de Colonização e Reforma Agrária), issued an administrative rule that required holders of properties larger than 100 hectares (1 square kilometer) to reregister their properties within 120 days. Landholders who failed to submit the proper documentation by the deadline had their property registrations frozen until they did so, meaning that they were not permitted to sell the land or access rural credit for the property. During the first few years of the program, the federal government froze more than 70,000 rural property registrations.¹¹

Most of the protected areas were within the arc of deforestation and were meant to build a green-wall buffer zone against any northward expansion of the arc into the better-preserved areas of the Amazon. Designating an area of land as a conservation unit or an indigenous territory helped simplify the legal process of dealing with illegal occupation of public land by placing a higher burden of proof on occupiers claiming tenure. Law enforcement also prioritized protected areas—ahead of other land.

Linking monitoring to enforcement

Protecting thousands of square kilometers of forest required new tools. “One of the first gaps we identified as a priority was monitoring of the forest,” Simoes said. “We wanted to go beyond producing an annual rate of deforestation. We needed a type of monitoring that would give us information more quickly so the police and the government could take faster action.”

In May 2004, just two months after completion of the action plan, the federal space agency debuted a new satellite monitoring system that enabled the government to identify Amazon forest clearing far more quickly. The Real-Time System for Detection of Deforestation (Detecção de Desmatamento em Tempo Real, or DETER) provided deforestation updates every 15 days rather than the yearly data produced by the agency's previous satellite imagery operation. The timeliness of the information more than made up for the new system's less-precise imagery. (It could sense deforestation only in areas greater than 25 hectares, compared with 6.25 hectares in the old system.)

The DETER system went live in time to detect the second-highest recorded annual level of deforestation—27,000 square kilometers in 2004—which underscored the need to respond quickly to the problem.

To manage the flow of new satellite information, IBAMA established a monitoring center where analysts received alerts from the new system, evaluated the urgency of each instance of apparent deforestation, and referred cases to IBAMA offices in the affected areas.

The new system, which used satellite data from the US National Aeronautics and Space Administration's multinational Earth Observing System, represented a crucial early step in the implementation of the action plan. IBAMA and other law enforcement agencies no longer had to rely on potentially unreliable human reporting. They could respond to deforestation in progress in even the remotest areas of the Amazon region.

The ability to catch violators in the act made for stronger legal cases under Brazil's Forest Code. To react quickly to the new intelligence and deal with physical opposition from land grabbers and illegal loggers, IBAMA had to build greater enforcement capacity. "The resistance was enormous," Simoes recalled. "The local people armed themselves against the government, they

set fire to IBAMA offices, they would close down roads, and they would block bridges so the IBAMA teams couldn't reach certain areas. It wasn't easy."

Those developments underscored the need to upgrade the skills and training of enforcement officers. Luciano Meneses Evaristo, director of environmental protection at IBAMA, recalled that "many of the IBAMA officers were semi-illiterate. They were not physically conditioned to face the war zones we had in the rural areas, and they did not have the skills to collect evidence to build a report that we could file to fine the offender."

In addition to deficiencies in training, IBAMA and other federal and state environmental protection agencies had to confront the long-standing corruption problem. "At that time in these institutions, there was no system to fight corruption," Evaristo said. "Without technology, [agents] could do anything they wanted. With a paper system, they could give the offenders fines that were very high and then negotiate the high fines down to get bribes."

Silva had recognized the scope of the problem early on. "In 2003, when we got to the ministry, there were a lot of letters and calls saying there was corruption in the process," Azevedo said. Concerned that an internal investigation would lack independence, "Marina decided that anything we received related to an accusation of corruption or wrongdoing, we would send directly to the federal police," he said. For two years, Silva's team continued to forward the reports to the federal police, and nothing happened. "We were wondering what they were doing with it, because we didn't hear about anything," Azevedo said.

Then, in 2005, the federal police and prosecutors launched a sweep to clean up environmental enforcement, with the cooperation of the Ministry of the Environment and IBAMA's comptroller. The operation, called

Curupira after a mythological creature of Brazilian folklore, targeted a corruption ring within IBAMA's offices in the state of Mato Grosso and the state's environmental secretariat. The ring had sold timber-transport permits on the black market, facilitating the sale of illegally harvested timber.

Among those arrested were the head of the office and the state's secretary of the environment, as well as numerous businesspeople who had allegedly paid the bribes. "It was the largest environmental operation ever done by the federal police," Azevedo said. "They explained to us, 'That's why you didn't hear from us for two years. We were preparing that case.' But if we hadn't decided two years earlier that we needed that independence to check for corruption, it never would have happened."

Similar anticorruption operations followed. From 2004 to 2008, the federal government arrested more than 600 civil servants who had committed environmental crimes.¹² "We started this new cycle to fight corruption and those who were corrupting these people," said Evaristo, who dealt with internal affairs for IBAMA during that period. "After Mato Grosso, we went to Rondônia, Pará, and other states. We were able to minimize that rotten part of the institution."

Transparency and technology helped alleviate some opportunities for corruption. In 2003, during the drafting of the action plan, the government for the first time had released to the public satellite images of deforestation. Beginning in December 2004, the federal space agency began to release data monthly from its new system, and IBAMA, too, began to release reports of completed enforcement operations. The publication of that kind of information enabled other parts of the federal government, civil society, and other interested parties to monitor the effectiveness of responses to developing problems and to question any failure to do so.

The involvement of the federal police and the Ministry of Justice in the enforcement process allowed for easier coordination with IBAMA. In the short term, due in part to capacity restraints and in part to anticipated violent resistance, IBAMA relied heavily on the federal police, the federal highway police, and the army to help shut down the largest illegal logging operations.

The IBAMA enforcement team identified the nine worst hot spots in the arc of deforestation and set up bases of operation in those areas. "We used to come into an area for 21 days, and the illegal deforesters would hide their equipment and wait for us to leave," Evaristo said. "But this time, they eventually realized we wouldn't leave anymore."

These steps had an immediate impact on the effectiveness of enforcement actions. From 2000 to 2003, IBAMA issued an average of approximately R\$500 million (US\$206 million) a year in fines for illegal deforestation; in 2004, it issued approximately R\$750 million (US\$257 million) in fines; and in 2005, the total was about R\$1.75 billion (US\$722 million).

IBAMA began to hire more environmental enforcement agents to staff the nine hot spots its leadership had identified. Recruits had to pass the federal government's civil service exam before they could qualify for training. As the agency required agents to learn higher-level technology and more-rigorous law enforcement techniques, many less-qualified veteran officers decided to retire rather than go through the additional training needed to raise their skill levels. "With the arrival of new environmental analysts, the inspection process was improved and the space for the semi-illiterate and those with low levels of education was dramatically reduced," Evaristo said. "Law enforcement was based on the new technology available through satellite imaging, and those officers with low levels of education were not able to use this technology."

Tackling the supply chain

In the early years of implementing the action plan, Lula's administration focused more on creating additional protected areas and tackling illegal logging than on addressing deforestation problems related to cattle ranching, soy cultivation, and the economic chain behind the pressure to clear land. Civil society environmental movements, however, had other ideas. In April 2006, Greenpeace released a report called *Eating Up the Amazon*, which linked deforestation in the Amazon caused by the Brazilian soy industry to Cargill, a US-based agribusiness giant, and McDonald's, the US fast-food chain, and called for them to end purchases of Brazilian soy.

"We went to McDonald's, which was the final consumer in the supply chain before individual people, and we said two things," said Marcio Astrini, Greenpeace's campaigner for the Amazon. "First, 'Your money is financing deforestation in the Amazon,' and second, 'There is a way to produce soy in the Amazon without deforestation. If you help us make Cargill follow this new model, we'll have an agreement. Otherwise, you are an accomplice to this problem, and we will share that with your consumers.'" Both companies pledged to stop buying soy from the Amazon region unless they could be certain it was not linked to illegal deforestation.

Soy industry trade associations quickly reached out to the Ministry of the Environment and Greenpeace to work out a solution. In July 2006, the Brazilian Association of Vegetable Oil Industries and the National Association of Cereal Exporters agreed that they would not buy soy from farmers who deforested in the Amazon region after that date. The two trade associations also worked out a separate agreement with the Ministry of the Environment and a number of civil society groups that stipulated they would work with local producers' unions to help soy producers comply with the Forest Code. In turn, the civil society groups would provide technical

advice. The Ministry of the Environment, for its part, would help state environmental agencies implement a state rural environmental registry (Cadastro Ambiental Rural, or CAR), the tool that helped soy exporters determine whether their suppliers met the requirements. CAR required producers to submit documentation to state environmental agencies showing the boundaries of their properties, the legal reserves they had maintained, and restoration plans for any areas that had been deforested illegally.

"Even though soy was not as big a driver as cattle ranching, the potential was there to cause deforestation," Astrini said. "We decided to start with the soy area, because it was the preparation for our becoming able to deal with cattle ranching later on."

Three years later, Greenpeace applied the tactic to the cattle industry. In 2009, the group published a report called *Slaughtering the Amazon* and with a consortium of other nongovernmental organizations demanded a similar moratorium by slaughterhouses and beef exporters on cattle raised on illegally deforested pasture. "If you go to a slaughterhouse, you won't find a single chain saw there, but they buy from a thousand farms in the Amazon," Astrini said. "The decision to work with the slaughterhouses was strategic, and we tried to use economic power there to influence those who deforest the areas. We put pressure on the slaughterhouses to make it difficult for them to sell products that come from deforested areas."

Unlike the soy industry, the cattle industry faced legal as well as social pressure to reach a solution. That same year, federal prosecutors and IBAMA agents in the state of Pará filed charges against slaughterhouses that they alleged had bought cattle from suppliers that had deforested illegally after 2008. They also reached out to the slaughterhouses' customers, advising them to avoid the slaughterhouses' products or risk charges themselves. The slaughterhouses, federal prosecutors, and the Pará state government began

negotiations. Brazil's four largest slaughterhouses agreed to a moratorium on cattle raised on illegally deforested land and to implementation of a tracking system that would enable them to determine the origins of their suppliers' cattle. Greenpeace would monitor the implementation of the moratorium and tracking system. The slaughterhouses agreed to buy cattle only from properties that had completed CAR documentation. The state government agreed to computerize those registries and take other measures to speed implementation.

Shifting strategy

By 2007, deforestation rates had dropped 59% from 2004 levels due in large part to the new protected areas and the stronger monitoring and enforcement of illegal deforestation in those areas. That year, however, the National Institute for Space Research issued a warning that its monitoring system had detected an increase in the rate of deforestation, coinciding with rising prices for beef and soy. The 2004 action plan was scheduled to enter its second phase in 2009, so in early 2008, Silva and her team at the Ministry of the Environment began to assess their progress and plan for the following phase.

Silva and her team realized that the nature of deforestation was changing. "In the beginning, when we started the plan, 80% of the deforestation was happening in large areas, concentrated in a certain number of municipalities," Azevedo said. "By 2007, the share of small-scale deforestation—less than 100 to 200 hectares—was growing, and we were starting to see this spreading out to more municipalities."

In December 2007, Lula signed a decree that authorized Silva and her team to publish a list of municipalities that were the worst offenders with regard to deforestation. Those municipalities would receive priority attention from IBAMA and other law enforcement agencies. They could not receive permits for legal logging, and the National

Institute for Colonization and Agrarian Reform would not allow any reregistration of rural properties while a municipality remained on the list. In each municipality, properties with illegal deforestation were placed under an embargo that cut off the owners from agricultural subsidies and outlawed the sale of those properties or products produced there. For instance, federal prosecutors warned that enforcement officers had the authority to confiscate cattle that slaughterhouses bought from such landowners.

In January 2008, Silva published a list of 36 municipalities that were responsible for more than 50% of total deforestation, though they accounted for only 6% of private land in the Amazon region.¹³ Silva and her team targeted municipalities based on those municipalities' total areas of cleared forest, the amounts of forest they had cleared in the previous three years, and whether their rates of deforestation had increased in at least three of the previous five years. To get removed from the list by 2009, for example, a municipality had to register 80% of its privately held land under the CAR system, bring its deforestation rate in 2008 to 40 square kilometers or less, and reduce average deforestation in 2007–08 to less than 60% of the average deforestation during 2005–06. "We made the municipal governments part of the deforestation policy because they were closer to areas [of illegal deforestation]," Pires said. "They knew the lay of the land and the farmers best."

After publication of the blacklist, IBAMA agents made those municipalities priority targets for law enforcement efforts, effectively ending any large-scale illegal timber operations in those areas.

The following month, Brazil's central bank tightened access to rural agricultural credit by requiring landholders in the Amazon region to complete CAR documentation and submit it to their state environmental secretariats in order to qualify for government-subsidized rural agricultural credit from banks or credit unions.

The measure cut off a major source of funding for both legal and illegal agriculture- and ranching-linked deforestation across the region, at least temporarily, as landholders worked to complete registrations.

The central bank resolution also helped federal and state environmental agencies build a database that linked deforested land to individuals based on the declarations required by the CAR process. In a country where many landholders lacked official documentation of land tenure, tying responsibility for deforestation to individuals was difficult. To receive CAR registration, property holders had to submit an account of existing deforestation on their properties, including whether they had maintained their legal reserves. If they had not maintained those reserves, they had to submit plans to reforest.

Focusing on CAR enabled the Ministry of the Environment to sidestep the problem of ambiguous landownership in many parts of the Amazon region. Azevedo said, “If you were using the land, you could assume environmental responsibility over the land to be able to manage it—without any guarantee that because you are assuming environmental responsibility, you will get the land title . . . We had tons of people declaring they were responsible for land. If there was an overlap, they had to sort it out among themselves.”

In 2008, it also became clear that issuing more fines would not serve as a long-term solution to Amazon deforestation. Those caught clearing land could appeal the fines through a process that could take years, and during that time, the offenders often continued to cut down trees. In some areas—particularly the state of Pará—enforcement agents met violent resistance when they attempted to shut down illegal timber operations.

IBAMA’s leadership continued to upgrade the skills of field agents by tightening job requirements and providing more-rigorous

training on law enforcement tactics and intelligence techniques. In addition, a presidential decree in July 2008 handed IBAMA agents a number of new tools. The decree sped up IBAMA’s authority to penalize deforesters by clarifying administrative procedures, and it allowed the agency to (1) publicly identify the owners of properties that had been deforested illegally and (2) disclose their names to the federal agencies that controlled access to credit.

The same decree reaffirmed the right of enforcement agents to seize, disable, or destroy tractors, chain saws, and other equipment found in use for illegal deforestation. Disabling or destroying the equipment avoided the complex legal hurdles required for the seizure of property.

Enlisting state and local governments

In May 2008, Silva resigned from the Ministry of the Environment, and Lula appointed a well-known environmentalist, Carlos Minc, to succeed her. A founding member of the Green Party, Minc was a senator representing Rio de Janeiro.

Minc became minister as the action plan transitioned to its second phase in late 2008 and early 2009. The new phase called for Minc and his team at the Ministry of the Environment to bring state and municipal governments into the fight against deforestation. That task was not easy. Though the original federal action plan called for state governments to develop their own plans, as of early 2008 no state in the Amazon region had done so. Some Amazon region states resisted because their economies rested on industries that relied on deforestation. In Mato Grosso, for example, Governor Blairo Maggi was nicknamed “King of Soy” because his family owned Brazil’s largest soy production company. After he came to office in 2003, Maggi encouraged land clearing across the state as a way to expand the state’s agricultural economy. At the municipal level, many local mayors were involved in the timber

industry or politically connected to those who were.

Even in municipalities where government leaders did not have direct economic ties to businesses that relied on deforestation, cooperating with the requirements of the federal action plan was often politically difficult. “In the beginning, we didn’t expect resistance from the state and local governments, which we thought were our partners,” Leiza Dubugras of the Casa Civil said. However, she added, “when we shut down the timber businesses, we would have a lot of people who were unemployed, and those people would go to the city halls and complain. The municipal governments didn’t have money to deal with this issue, so they would go to the state, and the state couldn’t deal with it either, so they’d go to the federal government. The impact of this was that the people we thought were our partners—the local governments and the state governments—were not in fact partners 100%—because of these issues.”

The federal government was able to offset some of the negative side effects. During his two terms in office, Lula massively expanded social welfare and antipoverty programs to provide some relief for the unemployed. The federal government also created short-term jobs on infrastructure projects and in other public works.

To make the final push to reduce illegal deforestation, Minc and his team had to bring state governments on board. “We encouraged the state governments to create their own plans to fight deforestation,” Pires said. “We had to invest even more in this coordination effort to deal with the conflicts and to deal with the politics.”

Over time, the Casa Civil pressured state governments to implement their own antideforestation plans, Dubugras said. Restrictions on the sale of soy and cattle linked to illegal deforestation provided economic motivation. In Pará, the agreement the federal prosecutors mediated between slaughterhouses

and the state government following the Greenpeace report included the state’s commitment to support the federal government’s action plan and to develop its own plan.

Some help came in 2009 through Brazil’s new national plan on climate change. As part of a broader commitment to reduce greenhouse gas emissions by at least 36% by 2020, Brazil formally pledged to reduce its yearly deforestation rate by 80% to 3,920 square kilometers—down from the average of 19,600 square kilometers from 1996 to 2005. “This event was a major landmark for us because we started setting targets in our work for the first time,” said the Casa Civil’s Eck. At a 2009 international climate conference in Denmark, the Brazilian government made that commitment on the international stage as part of the Copenhagen Accord. At the time of the pledge, Brazil was already more than halfway to achieving its goal.

In exchange for that commitment and other emissions reduction targets, the government of Norway agreed to conditionally grant Brazil US\$1 billion to implement related projects. The money was to go to the Brazilian National Development Bank’s Amazon Fund, but only if Brazil’s deforestation rate continued to decline. The fund, first designed in 2007 and established in August 2008, provided financial support for federal, state, and municipal governments; civil society; and private companies for projects to prevent, monitor, and combat deforestation.

The Amazon Fund, boosted by Norway’s cash infusion, provided a powerful incentive for state governments to set up their own plans. “One of the rules of the fund was that every institution could present projects to get funds from the Amazon Fund, but the state governments could present projects themselves only if they had a state plan to combat deforestation,” Azevedo said. “[States] also have a seat on the board of the fund, but they can vote only if they have a plan to combat deforestation. So in a matter of nine months, all the states presented their state plans.”

OVERCOMING OBSTACLES

As minister of the environment, Silva had ignited a firestorm when she shifted strategy—with the support of President Lula’s decree and the central bank resolution—to restrict credit and target landowners in municipalities responsible for most of Brazil’s deforestation. Opposition from cattle ranching, agricultural interests, and landowners in the Amazon had been growing behind the scenes, but Silva’s new strategy brought her opponents into the open.

The resolution was controversial—particularly with the Ministry of Agriculture, where officials worried that the credit restrictions were unfair to producers in blacklisted municipalities that had obeyed the law. Ministry officials were also concerned that the resolution could expand beyond the Amazon to the country as a whole. “The Ministry of Finance helped on this because, they said, we should do this for all of Brazil and because we should not accept that illegal operations receive money from us,” Azevedo recalled. “When the Ministry of Finance started to say that it made sense for the whole country, the Ministry of Agriculture accepted that we could do it just for the Amazon.”

Although the central bank resolution went through, political opposition to the strategy continued to build. “We had very strong opposition from the governor of Mato Grosso [Blairo Maggi] and the Minister of Agriculture at that point,” Azevedo said. “They were pushing the president to step back on the decree.”

The president was more susceptible to that pressure than he had been in the past. The 2006 election had left Lula on shakier political footing in his second term, because congressional losses by his Workers’ Party forced him to build broader coalitions. “In the 2006 elections, the Congress changed immensely in its composition, and the ruralistas got a lot of seats in Congress; so, in 2007, in the first year of the second term, they

were very strong and they were building momentum,” Azevedo said. Led by Senator Kátia Abreu, head of the Brazilian Confederation of Agriculture and Livestock, the ruralistas raised concerns among environmentalists by proposing revisions to the Forest Code.

“Marina had started to receive signs that the president might actually step back on some of his decisions for political reasons,” Azevedo said. The possibility that the president could reverse his decree creating the credit restrictions put Silva in a difficult position. According to Azevedo, Silva was concerned that if Lula reversed the decree while she was in office, her presence would legitimize the move. But she strategized that if she left office, he would have to take sole responsibility for weakening environmental protection. “If [Lula] stepped back, people would say the commitment to ending deforestation was there only because Marina was there, not because the president made a commitment,” Azevedo said. “If he reversed the decree with Marina outside the government, then all the credit for the deforestation plan would go to Marina.”

In May 2008, Silva resigned as minister of the environment, surprising many both within and outside the government. Her announcement raised widespread concern about Brazil’s political will to continue the war against deforestation.

In her resignation letter, Silva outlined her team’s achievements and noted increased opposition to her efforts but did not identify those she considered opponents. “The measures we adopted show a clear and irreversible path to make the social and environmental policy and the economy into one single agenda,” she wrote. She cited “growing resistance to our team in important sectors of government and society” and announced her intention to return to the legislature so she could seek “crucial political support to consolidate all that we have achieved and to advance the implementation of the environmental policy.”¹⁴

Lula helped defuse some of the public's concerns by appointing Minc to succeed Silva. As a founder of the Green Party, Minc had the legitimacy to carry on Silva's work. "When Marina resigned, the president had to put in someone who was also significant in the environmental movement," Azevedo said. "Marina was an icon."

Minc's appointment also underscored the president's commitment to implementing the action plan. "Minc actually put as a condition to assume the position as minister that the president maintain the decree," Azevedo said. "He would not accept that on the first day he's minister, the president would step back on the most important tools he would have to fight deforestation."

Minc quickly demonstrated his commitment to fighting deforestation. He accelerated plans for Operation Boi Pirata (Pirate Ox). Federal agents followed through on earlier threats and seized cattle raised on illegally deforested land. In June 2008, the month after Silva's departure, IBAMA agents seized 3,500 head of cattle in Pará and promised more seizures across the region.

The Forest Code under fire

Silva's resignation reinforced political commitment to the action plan through the end of Lula's second term in 2010 but did not guarantee that that commitment would remain in place through a new administration. At the end of 2010, Brazilians elected Lula's chief of staff, Dilma Rousseff, the Workers' Party candidate, as president of Brazil. Rousseff's governing coalition included many ruralistas, who won a majority in the Congress.

Minc had left the Ministry of the Environment during the campaign period to run again for state office in Rio de Janeiro, and the ministry's executive secretary, Izabella Teixeira, took his place as minister. In her new position, Teixeira had the task of leading the Ministry of the Environment's implementation of the final

phase of the action plan from 2012 to 2015. In contrast to Silva and Minc, who had built political careers on environmental issues, Teixeira was a technocrat who had worked her way up through IBAMA and the Ministry of the Environment.

In a move that raised concerns among environmentalists, Rousseff took coordination of the action plan out of the domain of the Casa Civil, assigning the responsibility to the Ministry of the Environment. Because the environment ministry had little formal control over other ministries, Rousseff's decision led to worries that Teixeira would lose buy-in from those ministries and endanger the implementation process.

Teixeira's challenge broadened and deepened quickly as the ruralista majority in Congress sought to revise the Forest Code. In earlier years, landowners in the Amazon region and their ruralista representatives in Congress had pushed for revisions to the Forest Code but failed to garner sufficient support. Following the 2010 election, that changed. "There was pressure to review the decisions that made many of the agricultural producers illegal," Teixeira said. "There was an effort to try to end the Forest Code in Brazil, forgive everyone, and eliminate instruments such as the permanent protection areas and the legal reserves."

In April 2012, both houses of Congress passed Forest Code revisions that environmentalists said would cripple forest protections and usher in a new era of deforestation in Brazil. Abreu, the senator who headed one of the country's largest agricultural lobbying organizations, argued that the revisions would end "environmental dictatorship."¹⁵

Though the revisions left intact the requirement for an 80% legal reserve, they provided amnesty from fines for any illegal deforestation prior to July 2008 and allowed continued cultivation on land deforested prior to that date. The revisions also called for less land to be set aside for permanent preservation around

riverbanks and other erosion-vulnerable areas, thereby reducing buffers from 100 meters to 15 in some cases.

On the positive side, the revisions also proposed mandatory CAR registration for all rural properties throughout the country. Once completed, the database of CAR registrations would lead to more-efficient monitoring and clearer liability for deforestation and therefore pave the way for a better national system of forest management.

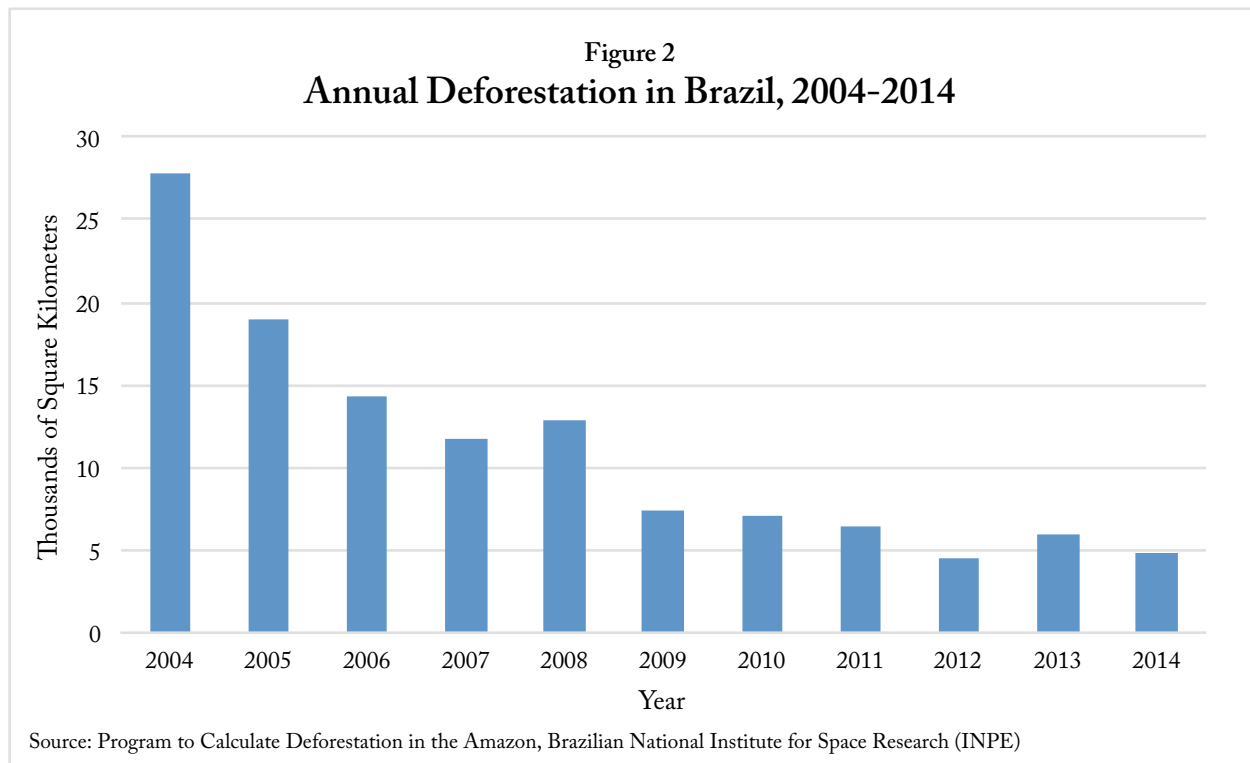
As environmental organizations staged protests and called for Rousseff to immediately veto the bill, the president and Teixeira went to the negotiating table with Congress. Rousseff’s administration would need the ruralistas’ support for other areas of its agenda, making a compromise vital. “We took on the negotiations in very unfavorable conditions compared with 10 years ago,” Teixeira said.

Rousseff ultimately vetoed portions of the changes but allowed others to go through. She struck language that granted amnesty from fines

to those who had illegally deforested prior to July 2008, but for smaller farms, she approved exemptions from the stricter obligations of larger landowners to recover land illegally deforested prior to that date. Those larger landholders who met their recovery obligations could also have their fines forgiven.

Opponents argued that the changes unfairly penalized landowners who had obeyed the law prior to 2008, because they would be required to maintain their full reserves, whereas those who had previously overcleared land could use a greater proportion of their properties. They also argued that the 2008 amnesty provision created expectations for landowners that future deforestation might be forgiven later on, which could lead to increased land clearing.

“You had a politically weak government with a very strong ruralista sector in the Congress, and that was a moment,” Azevedo said. “They found the momentum where they could push for a Forest Code that in other circumstances they would never have received. We lost that one—and



we lost badly.”

ASSESSING RESULTS

At its most fundamental level, Brazil’s 2004 action plan succeeded in reducing deforestation in the Amazon. In 2004, the nation saw its second-highest deforestation rate since it began collecting data in 1988. From 2004 to 2014, the federal government reduced annual deforestation by 75% from the yearly average of 19,600 square kilometers from 1996 to 2005 (figure 2). To reach the 80% target reduction set by the national climate change plan and in the Copenhagen Accord, the country needed to bring annual deforestation down to 3,920 square kilometers by 2020.

Scholars attribute most of Brazil’s reduction in Amazon deforestation directly to the action plan that began in 2004. Some observers argued that the shifting prices for commodities such as beef and soy may have contributed to much of the improvement in deforestation rates from 2004 to 2009.

In an empirical analysis that controlled for the prices of agricultural outputs, however, Juliano Assunção of the Climate Policy Initiative and his team found that under the action plan, conservation policies—rather than fluctuations in commodity prices—were responsible for the bulk of the reduction in deforestation.¹⁶

In a related analysis, the Climate Policy Initiative team analyzed whether the restriction of rural credit affected deforestation rates from 2009 to 2011. The researchers estimated that without the restriction, more than 2,700 square kilometers of additional forest would have been cleared during that period.¹⁷

From 2004 to 2011, the Brazilian government nearly doubled the area of protected land, increasing the total by 250,000 square kilometers to cover 520,000 square kilometers, with the goal of reaching 600,000 square kilometers by 2018. During the same period,

state-protected areas expanded by 250,000 square kilometers.¹⁸

The federal government also awarded concessions for legal logging on approximately 490 square kilometers of public forest under the Sustainable Forest Management program.¹⁹ Under Rousseff’s administration, however, some of those protected areas became redesignated, drawing criticism from environmental groups. “Recently, we’ve had some setbacks because of pressure from other sectors and the view of the current government that protection should be more balanced with development initiatives,” said the Instituto Socioambiental’s Ramos. “We’re living in a very challenging moment.”

On the enforcement side, from 2004 to 2011, IBAMA carried out 649 operations that resulted in fines of R\$7.2 billion (US\$3.6 billion), and seized 864,000 cubic meters of timber. IBAMA officers had arrested more than 600 individuals who committed environmental and “public-order” crimes, including some of their own.²⁰

Another quantitative analysis by the Climate Policy Initiative team concluded that law enforcement prioritization of blacklisted municipalities had a far greater impact on reducing deforestation in those municipalities than did either the CAR requirements or restrictions on the sale of products from illegally cleared land.²¹

As the IBAMA agents adapted, however, so did the deforesters: loggers and land grabbers realized that the DETER satellite-monitoring system would quickly uncover clear-cutting, so they began to cut down trees on smaller, disparate pieces of land, leaving the tallest trees to shield themselves from overhead view. IBAMA and the National Institute for Space Research began using higher-definition images to identify that type of multipoint deforestation.

Not all facets of the CAR program could be marked as successful. As of late 2014, it was too early to tell whether CAR-mandated reforestation

plans would lead to the massive forest recovery the action plan called for. Under the national system, landholders had 20 years to meet the requirements. In 2009, before the new Forest Code created the nationwide CAR system, the federal space agency found that at least 20% of deforested land in the Amazon was regrowing. The space agency was unable to determine, however, what portion of that land was deliberately under reforestation and what portion had been cleared for timber and then simply abandoned. Some observers predicted that many of the landholders who were required to reforest under their individual CARs would wait to see whether the federal government would enforce penalties in the future. The 2012 changes to the Forest Code contributed to the problem by absolving some landowners of reforestation responsibilities for land deforested prior to 2008. “Some people are saying, ‘We didn’t have to pay before, so we can go on and do it again because there will be new legislation in five years,’” Ramos said.

Full supply-chain monitoring also was incomplete. Though Brazil’s largest meat and soy processors implemented the agreed-upon tracking systems, some smaller companies had not done so. IBAMA’s system for tracking legally harvested timber also had serious flaws, opening the door for covert sales of illegal timber.

Struggling for a model of sustainable development

As of late 2014, in the third phase of the action plan, the Ministry of the Environment was still in the early stages of implementing policies to promote more-sustainable agricultural and other economic activities—despite a 2015 deadline. In the long term, maintaining low deforestation rates meant the federal government had to provide viable alternatives to the economic activities that had fueled the problem in the first place. The Ministry of Agriculture was just beginning to implement a program of credit specifically for

low-carbon agriculture, and results were not yet available.

Also by late 2014, the federal government had not yet succeeded in resolving the problem of uncertain land tenure in the Amazon region. Under the action plan, the Ministry of Agriculture and the National Institute for Colonization and Agrarian Reform had mapped 25,618 rural properties for registration—well short of the goal of 300,000. Nor had the National Institute for Colonization and Agrarian Reform met the action plan’s goal of promoting more-sustainable ranching and agricultural activities across the region.

REFLECTIONS

During the decade after the Action Plan for Prevention and Control of Deforestation in the Legal Amazon was first implemented, the Brazilian government successfully reduced deforestation in the Amazon rain forest. Those involved in the project attributed their success to political commitment from President Luiz Inácio Lula da Silva and his cabinet and to the leadership of Minister of the Environment Marina Silva. “Marina’s charisma and the respect she commanded contributed to the creation of this environment [for change] and allowed the policies to come to fruition, even after she left the ministry” said Mauro Oliveira Pires, former director of deforestation policy at the Ministry of the Environment under Silva, Carlos Minc, and Izabella Teixeira. He added that continuity under subsequent ministers also was important. “Minc maintained the policy and expanded it to other biomes.”

Of the action plan’s myriad changes to Brazil’s framework for environmental governance, the key contributions to reduced deforestation were (1) expansion of protected areas, (2) a nearly real-time monitoring system, (3) more-effective environmental law enforcement, and (4) elimination of federal agricultural subsidies for

production on illegally deforested land. Transparency of the data on the places deforestation was occurring also reduced opportunities for corruption and raised public awareness about the seriousness of the problem.

Silva and her staff at the Ministry of the Environment played a key role in both designing and implementing the action plan, but the interministerial nature of the plan enabled the federal government to tackle the problem of Amazon deforestation in a more comprehensive and coordinated way than it could in previous efforts.

After Silva resigned from the Ministry of the Environment in 2008, government leaders sustained political will and momentum by reaffirming in the 2009 Copenhagen Accord Brazil's commitment to curb deforestation as part of a national climate policy and on the world stage.

Though the action plan had nearly achieved the national target for reduction in the rate of Amazon deforestation, implementers still faced challenges in 2014. The federal government had largely failed to address the insecurity of land tenure that had fueled illegal land grabbing and land clearing in federal and state forests outside the protected areas. In addition, antideforestation efforts had failed to develop either (1) systematic strategies to encourage agricultural intensification on legally cleared land or (2) other sustainable

economic alternatives for rural communities that had previously relied on logging for income. The failure to provide alternative sources of income threatened the long-term sustainability of Brazil's lowered rate of deforestation.

"We were able to prove that it is possible to grow economically and reduce deforestation at the same time," said Johannes Eck, deputy chief of staff at the Casa Civil, which coordinated implementation of the action plan. In the short term, Eck noted, the federal government offset the loss of jobs in illegal industries through infrastructure projects in the Amazon region. But he added, "Now that the economy is stagnant, we are concerned that the lack of growth is going to stimulate illegal economic activities again, and we're going to increase deforestation because we're not going to have as many legal jobs."

Teixeira said that most of the new land clearance was coming from illegal logging, which she linked to broader economic issues in the region. Designing a more sustainable economic model for the Amazon region was her main concern for the future. "We have to protect the environment, but we cannot forget that to achieve that result, we must be engaged in social and economic policy in such a way that we can provoke a new economic base for regional development," Teixeira said. "We cannot look at the forest and forget that we have around 22 million people that live in that region."

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