

# BUILDING A SUSTAINABLE FUTURE IN BRAZIL

Environment, Development, and Climate Change



Edited by Anya Prusa and Amy Erica Smith  
Brazil Institute | Wilson Center

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## Editors' Note

by Anya Prusa and Amy Erica Smith

Famous for the Amazon Rainforest, Brazil is home to what was once another vast forest: the coastal Mata Atlântica. The slow removal of the Mata Atlântica in the service of economic development goes back more than five centuries, to the arrival of the Portuguese on Brazil's northeast coast in 1500. Plantations, ranching, logging, and eventually urbanization all hacked away at the trees, with deforestation accelerating as cities expanded in the twentieth century.

Today, just 12 percent of the forests that once covered a million square kilometers along the coast of Brazil remain in good condition, and the region is now home to 72 percent of the Brazilian population.<sup>1</sup> What is left of the Mata Atlântica exists in patches. Dense urban sprawl is punctuated by islands of green; untamed vegetation and tall palm trees pop up on empty plots of land left to their own devices for a few years. Little black capuchin monkeys scamper up and down isolated trees in urban parks and small forest preserves.

These remnants of the Mata Atlântica still form one of the most biodiverse forests in the world: more than 52 percent of its tree species are found nowhere else in the world. Many initiatives are underway to restore the forest, including the innovative Atlantic Forest Restoration Pact, created in 2009. The Pact's more than 270 members—

research organizations, private companies, NGOs, and government institutions—are developing new techniques and models to aid forest restoration, including using data to predict where the forest is most likely to regrow quickly.<sup>2</sup> Their goal is to restore 15 million hectares (150,000 square kilometers) over the next 30 years.<sup>3</sup>

Yet the scale of the effort required to restore even part of the Mata Atlântica serves also as a cautionary tale for the fate of the Amazon. It is far easier to conserve a standing forest than to regrow one, and the Amazon has already lost about 18 percent of its total tree cover. The need to prevent forest loss in the Amazon is particularly acute because the world's largest rainforest creates its own weather. Deforested areas become dryer and hotter; and studies indicate that, at least in the short-term, regrown forest is less effective at carbon capture, more dominated by dry tree species, and more prone to future fires. Scientists Thomas Lovejoy and Carlos Nobre, both contributors to this report, warn of a looming tipping point near 20-23 percent deforestation, after which the forest will no longer be able to sustain its current hydrological cycles, and will instead transition instead towards drier savannah and scrub—drastically diminishing rainfall and driving a spike in warming across South America—with profound implications for the global climate.<sup>4</sup>

<sup>1</sup> *Atlas da Mata Atlântica*, 2018-2019, SOS Mata Atlântica, <https://www.sosma.org.br/sobre/relatorios-e-balancos>

<sup>2</sup> Karen D. Holl. "Restoring Tropical Forests from the Bottom Up," *Science* 355, no. 6324 (February 2017): 455-6, <https://doi.org/10.1126/science.aam5432>.

<sup>3</sup> Pacto pela Restauração da Mata Atlântica, <https://www.pactomataatlantica.org.br/o-pacto>.

<sup>4</sup> Thomas E. Lovejoy and Carlos Nobre, "Amazon Tipping Point: Last Change for Action," *Science Advances* 5, no. 12, eaba2949, <https://advances.sciencemag.org/content/5/12/eaba2949>.

The stakes are clear. Nonetheless, addressing deforestation—and environmental conservation more broadly—remains an ongoing challenge. D

returning to rural communities in the interior of the state of Amazonas—places where most ways to earn a living involve deforestation (see the interview with Denis Minev in Chapter 3).

However, deforestation is not inevitable. This report represents the outcome of a series of conversations we (as well as the Brazil Institute's recently retired director, Paulo Sotero) have been having over the past year—discussions with policy makers, scientists, civil society, the business community, and ordinary citizens.



leave the woods intact (see chapters by Christopher Schulz and Magaly Medeiros). However, as Christopher Schulz explains, REDD+ has proven surprisingly difficult to get right. Among other criticisms, payment arrangements that only protect certain sections of forest may simply stimulate logging, ranching, and mining to move from one area to another.

Instead, many of the most promising ideas coming out of this report would engage Amazon residents in sustainable, low carbon economic development. The Amazon is home to 30 million people who will find ways to provide for their families in their own local areas, regardless of legal and regulatory frameworks.

Traditional economic activities can be “greened.” R&D and capital investments in low carbon agriculture and ranching are increasing—indeed, companies are deploying cutting-edge technologies in Brazil, from artificial intelligence to precision agriculture—, while wind and solar power have begun to develop what Kathryn Hochstetler calls a “green spiral,” in which environmental and economic benefits begin to reinforce each other. And as Thomas Lovejoy points out, public works projects in the Amazon can be redesigned to rely on riverine transportation routes or to build elevated highways through forests, thus protecting biodiversity and maintaining intact ecosystems.

Most intriguing, though, are efforts to create what Carlos Nobre calls a “bio-economy” that “leaves the forest standing.” Nobre and business partners are now engaged in a series of entrepreneurial ventures called the Amazon Creat



mudslides, and its urban centers by droughts that increasingly threaten to leave millions without access to potable water. However, Brazil is also uniquely poised to respond to the threat of climate change, through its enormous capacity to reduce deforestation but also through leveraging new technologies and innovations to drive advances in sustainable agriculture, industry, and energy.

Brazil, like the Amazon Rainforest, stands at an inflection point. It is increasingly clear that Brazil's future lies not in the deforestation of its past, but in summoning

the political and societal will to build a twenty-first century economy that prioritizes human capital and sustainable, low-carbon growth. History shows that effective legal, regulatory, and enforcement frameworks can substantially reduce deforestation, which fell as low

*Thomas Lovejoy, an accomplished conservation and tropical biologist, serves as a Senior Fellow of the United Nations Foundation where he advises Foundation leaders on biodiversity and*

at the Instituto Evandro Chagas in Belem, and some of these micro-organisms could spill over into human populations.

The way to avoid the tipping point is through forest restoration and policies which keep 80 percent of the Amazon under forest cover, so there are enough trees and leaves generating the moisture needed to maintain the hydrological cycle. That is, however, insufficient to achieve a sustainable future.

What is needed is a new vision of Amazon development based on sustainability and the incredible biological richness of the region. Important steps were made in creating various conservation areas and in demarcating indigenous reserves, but those areas are under increasing pressure and suffer illegal incursions and deforestation.

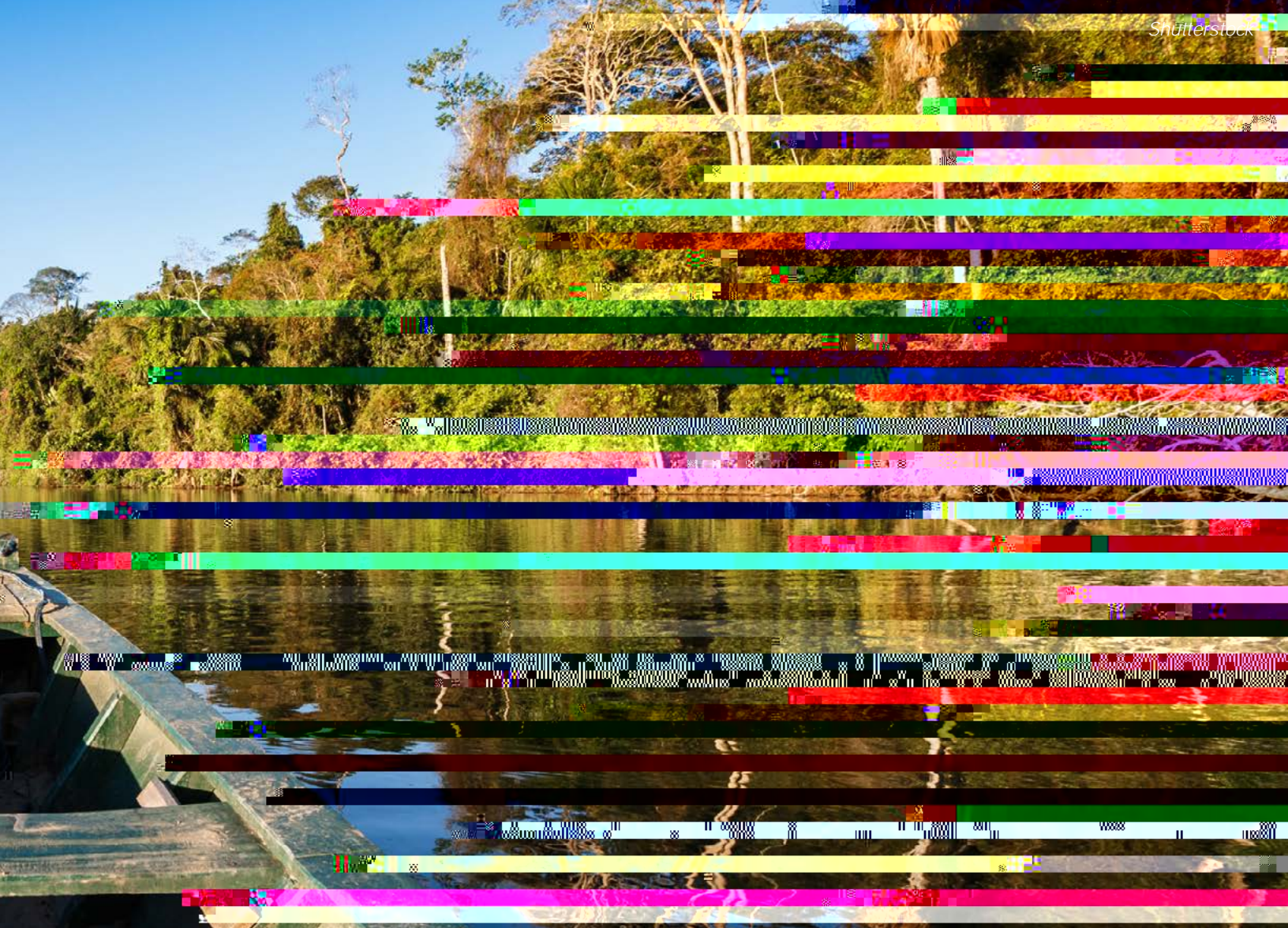
The Amazon has been plagued since the 1960s by poorly conceived and analyzed infrastructure projects, together with limited visions of development. Cambridge Prof. Partha Dasgupta and his team have produced an interim report at the behest of the U.K. Treasury on the economics of biodiversity. They find that decisionmakers only



Nor should dams interfere with the migratory catfish species so important as a food source. The life cycles of these amazing fish run from the headwaters to the estuaries and back. Run-of-river design would allow this important feature to continue.

One of the more immediate possibilities for economic growth is aquaculture of native fish species like the tambaqui and pirarucu.

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Peru and Ecuador have notable ecotourism industries. For whatever reason, with a couple notable exceptions, the Brazilian Amazon lags in ecotourism.

Interesting opportunities exist to explore sustainable cities, especially if they do not draw on vast amounts of forest resources.

The Amazon is teetering on a fulcrum as much socioeconomic as ecological. With proper vision and political will, this can tilt in the direction of sustainability for the people of the Amazon, as well as its amazing biological diversity.





Now, if we only had global warming without deforestation, you would also have a tipping point if the temperature increase in the Amazon exceeded 4 degrees Celsius. The hydrological changes associated with warming also make the dry season much lengthier. These are independent: a 4-degree increase from global warming, or 40 percent deforestation.

This is all modelling, so one might criticize it and say, "Well, how can you be sure?" Unfortunately, we have already seen these things happening. In Bolivia, and the Brazilian Amazonian states of Acre, Rondônia, northern Mato Grosso, and Pará—the southern, eastern part of the Amazon—observations are following exactly what we predicted.

Number one: the dry season is becoming lengthier. Over the last forty years, it has become three weeks longer, and in heavily deforested areas, it is four weeks longer. So, we are almost near the tipping point, which will really turn ecosystems into a dry savanna!

Number two: during the dry season, the temperature is between 2 and 3 degrees warmer. And this is not only global warming—global warming all over the Amazon is something like 1-1.5 degrees. This area is something like 3 degrees warmer. Part of the warming is related to less forest evapotranspiration during the dry season, that is, if you have less evaporation, the air heats up. That's bad news.

Also, in those areas, the Amazon is no longer a carbon sink. It's not removing carbon dioxide from the atmosphere. In fact, it's already carbon neutral and, in some areas, it's losing carbon. I'm not talking about the fires or chopping down the forest as a carbon

source. I'm talking about the forest itself, which is not functioning as a carbon absorber in some areas in the southern Amazon.

The most worrying fact is the combination of these factors. The mortality rate of wet forest tree species is much higher than the mortality rate of dry forest species. So, we are not far from the tipping point. From our calculations, [the tipping point is] something like 20 to 25 percent of total deforestation. In the whole Amazon, we have about 16-17 percent of total deforestation. So, we are somewhere between 15 and 30 years away given the current rates of deforestation.

**You've done a lot of work on sustainable development and creating a bio-economy in the**

**dry forest. The lengthening of the dry season, that is, the increase in the length of the dry season, is a major concern.**

**the world's most worrying 16.60 million hectares of forest are lost each year, that is, 0.536 billion trees are lost each year.**

and biomimetic aspects. There is so much hidden knowledge that we can decipher and study scientifically. We can merge indigenous knowledge with scientific knowledge of hundreds of thousands of species.

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So, why should we bring bio-industry to the Amazon? To uncover knowledge, profits, and products, and reach international markets—while returning a large fraction of the financial benefits to the people of the Amazon.

**At the Wilson Center in December 2008, you said there were five products from the Amazon and that we needed at least fifty export products that depend on the forest's existence to implement a bio-economy that leaves the forest standing. Where are we now, compared to a decade ago?**

The açai berry is really big, generating something like 1.1 billion dollars a year into the Amazon economy. This is more than timber (legal and illegal) and is only inferior to beef. In less than ten years, we developed this bio-economy from the standing forest. Even without industrialization, in ten years it is going to be equal or superior to the deforestation-based economies: meat and grain. Traditional agribusiness has tremendous political power, but they're getting a bit concerned. They're trying to find a way to sustain their model.

**When you present the idea of adding value to the Amazon to the Brazilian busi-**

**'o the 50 products from the Amazon to the Brazilian business community, you say that it's a good idea to add value to the Amazon in less than ten years.**

*Denis Minev is CEO of Lojas Bemol in Manaus, as well as Co-founder and Board Member of the Fundação Amazonas Sustentável. Mr. Minev served as Secretary for Planning and Economic Development for the state of Amazonas from 2007 to 2009, where he oversaw a decline in deforestation.*

**To begin, can you please describe briefly the intertwined challenges you see in Manaus and the Amazon region that are related to COVID-19 and deforestation? How do you think the two crises are influencing and will influence each other?**

COVID-19 is striking the Brazilian Amazon with incredible speed. Manaus had its peak in late April and by mid-May the virus had already killed more than 0.15 percent of its

**Can you tell us a bit about your career in state government, and about the organizations you founded?**

I worked at the State Government of Amazonas from 2007 to 2009 as Secretary for Planning and Economic Development, a period when Amazonas had a GDP growth rate above 10 percent per year and deforestation rates were falling by almost 50 percent. The year 2009 remains the best year on record for fires and deforestation in the state of Amazonas.

We implemented sensible policies that discouraged deforestation for cattle breeding and encouraged highly productive activities in deforested areas, such as fish farming. We also connected some forest products with industries in Manaus, the most notable example being a Michelin tire factory in Manaus using local rubber. We doubled investment in research and development in Amazonas in three years, despite a budget shortfall caused by the 2008 international crisis. We also initiated relations with California for what would eventually become the G

I like to recount a story from 2007. I was secretary for planning of Amazonas, and a city in the neighboring state of Pará called Tailândia (nothing to do with Thailand) was identified as the worst deforester in the Amazon. There was great international outrage (as there is from time to time) and the military was sent there to fix it (as it is from time to time). With the military in the streets, the people of the city initially revolted but then were pacified by force; when the military left (as it eventually has to) everything there went back to normal.

What really happened? It is a city of 30,000

Dirt road and deforestation near soybean plantations close to Sinop, Mato Grosso, Brazil (Shutterstock)











were very well received by the Fernando Henrique government. But also under the Fernando Henrique Cardoso government, deforestation peaked at 29 thousand square kilometers.

The second peak of deforestation comes under President Lula: 27,000 square kilometers per year in 2004. Lula attacked the problem on several fronts. Deforestation began to fall precipitously when the government developed a new plan, called the PPCDAm (Action Plan for Prevention and Control of Deforestation in the Legal Amazon), under the management of Minister Marina Silva. It is in this context that new instruments were developed, such as the so-called DETER (the system for Detection of Deforestation in Real Time), in order to guide federal inspection more effectively.

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with BASIC [Brazil, South Africa, India, and China], a very interesting group that was a strategic legacy of Copenhagen. Brazil demanded two things: that every country would have the obligation to reduce emissions, and that the framework of the climate convention would not be changed, but multilateralism would be protected.

Paris changed the game. Paris was another big problem. Brazil delivered a speech—I delivered a speech—saying that Brazil is on board with a new agreement. Carbon neutrality is a strategic part of Brazil's vision as an emerging economy, using the global issue to promote its development. Brazil still has fat to burn. Although Brazil was on a path of reducing emissions, it started to increase again.

We had presidential participation: President Fernando Henrique created the Brazilian Forum for Climate Change, negotiating with Clinton. President Lula spoke with Obama. Dilma spoke with Obama and Xi Jinping. These bilateral agreements were the support base of Paris. The Minister of the Environment had an important coordinating role, but this was a global issue, not a strictly environmental matter.

This no longer exists. On the contrary, you have a federal government that questions the very existence of climate phenomena. The political role of the Ministry of the Envi-

### **What do you see as the next steps in the near term for climate change policy in Brazil?**

The current government has fixed ideas about social participation, and many of its allies believe environmentalist NGOs play against national interest. This perception affects the government's ability to foster international dialogue, because environmentalist NGOs are well-recognized abroad. This perspective of a polarized Brazil—on one side you have environmentalists, on the other side you have the government—will not work.

You need to create a dialogue with the private sector and civil society. The only way forward I see is to explore new political stances, starting with economic reform, and build new constituencies.

Environmentalism is increasingly adopting an economic perspective. Now, our climate agenda does not focus solely on deforestation. For example, it also focuses on choosing a new energy matrix for Brazil, on business, and on technological innovation. Climate policy and carbon pricing now take into account agriculture, and they monitor market demand, production costs, and competitiveness. Brazil also needs technological investment to produce foods with low carbon agriculture.

Implementing Paris will require forest restoration. We need to understand the paths to finance the Brazilian forest sector. One of the delicate issues this century, I think, is that countries with forests will have political or geopolitical power. Brazil has already destroyed the Atlantic Forest (Mata Atlântica), which has more biodiversity than the Amazon, but Brazil has a second huge forest that science signals is at a tipping point.

Second generation cellulose biofuels are also a path. Brazil's biofuel sector—that is, ethanol—particularly benefited from the Paris Agreement.

The federal government's role is to have a separate vision of the country's development. However, the private sector is assuming a part of this role, especially in the area of economics. Increasingly, the Ministry of the Economy can coordinate these policies. You also have an emerging political space for the private sector, for the financial sector. You can construct the agenda with Brazil's economic sectors and offer it to the Minister of Economics to promote Brazil's economic, financial and commercial interests.

**Can you describe the state of conservation in Brazil?**

Brazil has a prominent place in maintaining global biodiversity and in mitigating climate change.

bers in the past, granting them amnesty over cutting down the forest. These perverse incentives facilitate illegal clearings and occupation of public lands that end up as pastures with a few heads of cattle. A recent study by IPAM found that of the 49.8 million hectares of forests under state and federal responsibility in the Amazon, but not yet designated for a specific purpose, 11.6 million hectares, or 23 percent, were illegally registered as 'private rural properties' using the Brazilian Environmental Rural Registry (CAR, in Portuguese). The area is equivalent to half of the United Kingdom.

If you look at the Cerrado, even though most of the land has ended up as soy plantations, cattle are driving a lot of the initial land conversion. Satellite data shows us that land cleared for cattle are being converted to soy farms in under three years, which is less than the time necessary to render cattle ranching profitable. This indicates a clear pattern of land speculation also taking place in the Cerrado.

**Could you explain the importance of the Cerrado from a conservation perspective?**





corporations push for deregulation and less bureaucracy when it comes to environmental issues, they could play a reversed role, and call for a competitive environment that also co-generates social and environmental returns. Private sector commitments or public statements favoring transparency will be insufficient. For society to prosper, we actually need companies to proactively deliver on social and environmental objectives.

Here's an example: in 2009, about 50 percent of slaughterhouses operating in the Amazon agreed not to buy cattle from recently deforested areas; they signed an agreement to exclude certain suppliers. However, slaughterhouses that did not sign the agreement continued to buy from suppliers that had illegally cleared their farms. Ultimately, after the agreement was signed, procurement of cattle from the Amazon didn't decline; on the contrary, it went up. Think about it: the math doesn't add up. If the commitment of slaughterhouses to exclude suppliers had been working, we would expect overall purchases from the Amazon to decline. But the volume of cattle sold from the Amazon increased, and at a rate unexplained by increased productivity. This shows us two things: first, commitments are not a push for decarbonation, worth the room

an end to deforestation  
and the elimination of illegal suppliers

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## e Role of Indigenous Peoples in the Conservation of the Amazon

by Magaly da F.S.T. Medeiros

*Magaly da F.S.T. Medeiros is a biologist, with 30 years of experience with local communities and indigenous peoples in the Brazilian Amazon region. She is a representative member for Brazil on the Global Committee for Indigenous Peoples and Local Populations in the Task Force of the Governors for Climate and Forests (FT-GCF). She served as President of the State of Acre Institute of Climate Change and Environmental Services Regulation (2014-2018), and while part of the State Secretariat for the Environment of Acre, she coordinated International Projects on environmental management and management of natural resources in tropical forests (1999-2013) and has a track record of leadership with public governmental entities and civil society actors environmentalists and indigenistas. She previously worked on research projects in areas of conservation units with involvement of local populations (1990-1998).*

The indigenous peoples that inhabit the best-preserved areas of the Amazon have historically contributed to the conservation of natural resources. The low rate of deforestation in indigenous lands is associated with the ways in which indigenous peoples occupy land, their customs and lifestyle, their spiritual relationship with and knowledge of the forest, as well as their adoption of policies to reduce deforestation and lower carbon emissions.

Acre is one of the states with the highest levels of conservation in the Brazilian Amazon. Situated in Brazil's far west, bordering Peru and Bolivia, Acre holds 16 million hectares, of which 87 percent is forest and 14.5 percent is demarcated as indigenous land.<sup>1</sup>

Sixteen tribes constituting approximately 20,000 people occupy indigenous lands, representing 2 percent of Acre's entire population of approximately 820,000 inhabitants.<sup>2</sup>

Over the past two decades, public policies relating to the conservation of forests, indigenous peoples, and the tackling of climate change have been implemented in Acre in an integrated and participatory way. At first, between 1999 and 2007, the priorities were territorial management and instruments such as Ecological-Economic Zoning (ZEE), Ethno-zoning, and Management Plans for Indigenous Lands, aiming to guide community actions based on assessments that supported the creation of territorial management plans. Subsequently, between

<sup>1</sup> Governo do Estado do Acre, *ACRE: Zoneamento Ecológico-Econômico do Estado do Acre: Fase II (Escala 1:250.000): Documento síntese*, 2nd ed. (Rio Branco: SEMA, 2010): 356, [http://www.amazonia.cnptia.embrapa.br/publicacoes\\_estados/Acre/Fase%202/Documento\\_Sintese.pdf](http://www.amazonia.cnptia.embrapa.br/publicacoes_estados/Acre/Fase%202/Documento_Sintese.pdf).

<sup>2</sup> Governo do Estado do Acre, *ACRE: Acre em números 2017* (Rio Branco: SEPLAN, 2017): 182.

2008 and 2018, Acre advanced a low carbon economy policy, which combined valuation of forest assets with a State System of Incentives for Environmental Services (SISA), expanding efforts to combat climate change and mitigate climate-related risks through forest conservation.

During the public consultations for the creation of SISA, several issues were debated, relating to historical recognition of indigenous peoples and their efforts to maintain the standing forest, to guaranteeing them

environmental and territorial management. The Chamber's decisions resulted in many priority actions, including a call for proposals that led to the approval of 17 projects; grants to 149 Indigenous Agroforestry Agents (Agentes Agroflorestais Indígenas, or AAFIs) and the training of 43 new AAFIs; and continuing education of leaders and communities on topics related to climate change, environmental services, SISA, and specific strategies for its implementation in indigenous lands.

Indigenous lands are the most conserved areas of Acre's territory. Agents' activities range from fieldwork and partnership with schools and families, to guarding territory.

In addition, the exchange of experiences in workshops enables leaders to learn how other indigenous lands are working out conflicts and overcoming challenges. Today,



What does the Brazilian public think about environmental problems? In developed countries, especially the United States, scholarship on public opinion related to climate change has focused on skepticism and denial regarding whether a problem even exists. But in Brazil, the climate skeptic movement has until recently been relatively weak, despite its prominence within the Bolsonaro administration. The movement's anemia might in part be due to the fact that climate change has already had a substantial impact on life in Brazil: personal experience of heat, drought, and flooding might limit skepticism. Yet my research also suggests a difference in the way Brazilian evangelical groups perceive climate change and their role as stewards of the envi-

change is a problem. Only age and news attention significantly affect climate change concern in the AmericasBarometer data. Among those who pay attention to news daily, 82 percent express the highest level of concern about climate change, compared to 66 percent of those who never pay attention to the news. The most concerned demographic is aged 26 to 45, about 83 percent of whom say climate change is a “very serious” problem. The least concerned are those over the age of 66, 70 percent of whom still say climate change is very serious (just 10 percent of this age group denies the problem). The results for age, however, partially contradict results from my qualitative interviews in Pernambuco, where I found that the oldest citizens were often best able to describe eloquently the changes they had personally witnessed over their own lifetimes.

### **Support for Environmental Action**

However, concern does not automatically lead to action. To what extent do Brazilians prioritize public efforts on this issue? Here, views are decidedly mixed. When the 2017 AmericasBarometer asked Brazilians whether “protecting the environment” or “promoting economic growth” should be a higher priority, 39 percent of citizens favored the environment, 41 percent chose the economy; and the remainder chose both equally. Even among citizens who said climate change is a “very serious problem,” 38 percent nonetheless thought the government should give higher priority to the economy. By contrast, 62 percent of those who said climate change was “not at all a problem” wanted to prioritize the economy.

These views could either reflect or influence elites’ views in public debates. In the 2018 election campaign, for instance, environmental issues appear to have received relatively little discussion from the candidates, compared to other issues such as the economy and sexuality politics.

Analysis of the AmericasBarometer data indicates that ideology (that is, identifying as a rightist or a leftist) predicts Brazilians’ priorities. More interestingly, age does as well. Among Brazilians between the ages of 16 and 25, 69 percent wanted the government to prioritize the environment as much as or more than the economy. By contrast, only 45 percent of those 55 or over thought the environment should be a priority.

### **Role of Religion in Perceptions of Climate Change**

How does religion factor into this discussion? Religion can influence citizens’ perceptions of the severity of climate change, as well as its causes and solutions. Religion shapes people’s understandings of the nature of material reality, physical and geological processes, and the likely future of the earth and humanity. Religious narratives about everything from the creation of the earth to its potential eventual apocalyptic destruction become a filter for understanding and accepting scientific narratives. In addition, religion affects people’s views about what kinds of action people can and should take to address collective problems.

Scholarship based primarily on the United States argues that religion tends to make citizens skeptical of climate change and

<sup>2</sup> Out of 76 citizens and eight clergy interviewed by the author, only three respondents expressed any degree of skepticism or denial; the remainder believed in and were concerned about climate change.

resistant to environmental action. This research dates to a 1967 article in the journal *Science*, in which the historian Lynn White asserted that the Christian narrative holding God gave humans “dominion” in the Garden of Eden encouraged exploitative behav-





may rise to close to a third of the population by the 2020 census.<sup>5</sup> Evangelical and Catholic congregations may well be the most important civil society groups in Brazil, in terms of their reach, frequency of contact with adherents, and potential for collective action. Moreover, evangelicals have become highly politically engaged, and often sponsor candidates for office; this group was critical to Jair Bolsonaro's 2018 presidential victory.<sup>6</sup> Although evangelical leaders have prioritized conservative social issues such as sexuality and gender in their political activism, Brazilian evangelicals' attitudes about the environment are potentially highly influential. Environmental issue framing that takes into

account evangelical ways of understanding the world could help the movement attract new grassroots allies and reshape environmental politics in Brazil.

The vast majority of Brazilians believe that climate change is a significant problem; the challenge has been turning concern into policy action. Deeper and more systematic partnerships with religious leaders could dramatically expand the reach of Brazil's environmental movement—and in the process, perhaps help to save Brazil's own lush Gardens.

<sup>5</sup> Amy Erica Smith, *Religion and Brazilian Democracy: Mobilizing the People of God* (New York: Cambridge University Press, 2019).

<sup>6</sup> *Ibid.*

## An Eternal Struggle: Civil Society Mobilization for Forest Conservation

by Solveig Aamodt

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Long before “climate change” became part of mainstream vocabulary, Brazilians were civically engaged to reduce deforestation and protect the peoples and biodiversity of the Amazon. Civil society campaigns convinced the Brazilian government to create the first indigenous territory in 1961, the Xingu Indigenous Park. In the 1970s, during the military dictatorship, pressure from environmental activists and growing international attention to environmental issues led to the creation of a national environmental agency in 1973, which was upgraded to an environmental ministry in 1985. However, the history of environmental mobilization in Brazil is not one of uninterrupted progress or of easy victories.

The efforts of Brazilian environmentalists first drew significant international notice

in 1988, following the murder in Acre of rubber tapper union leader Chico Mendes, who had fought for the preservation of the Amazon and the rights of poor and Indigenous people.<sup>1</sup> Brazil is the most dangerous country in the world for environmental activists—more than 600 activists have been killed in the last two decades alone<sup>2</sup>—but the murder of Chico Mendes shocked the international community into action. Brazilian environmental NGOs gained international supporters willing to fund the fight against deforestation. Saving the Amazon was placed high on international environmentalists’ agendas. Yet, during the same period, resource extraction and the expansion of agricultural land were central to Brazil’s ambitions of economic growth and prosperity. In 1995, deforestation rates

<sup>1</sup> For a thorough analysis of the history of Brazilian environmentalism, see Kathy Hochstetler and Margaret Keck, *Greening Brazil: Environmental Activism in State and Society* (Durham: Duke University Press, 2007).

<sup>2</sup> Nick Kilvert, “Environmental Activist Killings Double as Corruption Identified as Key Driver,” *ABC Science*, 5 August 2019, <https://www.abc.net.au/news/science/2019-08-06/defending-environment-deadly-risk/11373130>.

spiked, with almost 30,000 square kilometers deforested in one year.<sup>3</sup>

Around the turn of the millennium, scientists increased their focus on the effects of deforestation on carbon release to the atmosphere. Formerly a “soft” political question of Indigenous peoples’ rights and biodiversity, the Amazon became connected to one of the main current issues of global governance: climate change mitigation. A small group of researchers became personally engaged in the task of informing the public in Brazil and internationally about the importance of forest conservation. Cooperation among researchers, research NGOs, environmental groups, and activists in both Brazil and the Global North enabled targeted science communication, raising awareness of deforestation in Brazil and making it a salient political issue.<sup>4</sup> Brazilian environmental activists also organized lobbying events at the yearly United Nations (UN) climate negotiations (the COPs, or Conferences of Parties), and were active in discussions of the establishment of what is currently the international Reducing Emissions from Deforestation and Forest Degradation mechanism (REDD+; see Chapter 9).

In response, the Brazilian government started to prioritize deforestation. In 2003, environmental activist Marina Silva, a former colleague of Chico Mendes, became the

environmental minister in Luiz Inácio Lula da Silva’s first government (2003-2006), and brought in a team of activists and scientists to lead the ministry’s work against deforestation. In 2004, the government launched the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), an important breakthrough for the Brazilian environmental movement.<sup>5</sup> However, strong opposition to environmental protections continued. That same year deforestation again spiked to close to 30,000 square kilometers in one year, and, in February 2005, the American-Brazilian environmental activist Sister Dorothy Stang was killed by ranchers in the state of Pará. The murder of the 73-year-old nun again placed the lawless conditions in the Amazon on the international radar, increasing pressure on Lula’s government for action—not just talk—on reducing deforestation.<sup>6</sup> In close cooperation with civil society and local governments, the Lula government managed to implement the PPCDAm and reduce deforestation rates significantly. In 2009 Brazil adopted a Climate Law drafted by the environmental ministry. At the climate negotiations (COP15) in Copenhagen that same year, Brazil, for the first time, presented national climate change mitigation targets to the international community. By 2012, the deforestation rate fell below 5,000 square kilometers in one year, for the first time on record.

<sup>3</sup> The cutoff date for deforestation rates is July 31, so, for instance, the rate for 1995 is the deforestation from August 1994 to July 1995. For an overview of yearly deforestation rates, see Rachel Biderman and Ruth Noguera, “Brazilian Government Announces 29 Percent Rise in Deforestation,” World Resources Institute, 9 December 2016, <https://www.wri.org/blog/2016/12/brazilian-government-announces-29-percent-rise-deforestation-2016>.

<sup>4</sup> Solveig Aamodt, “The Ability to Influence: A Comparative Analysis of the Role of Advocacy Coalitions in Brazilian Climate Politics,” *Review of Policy Research* 35, no. 3 (2018): 372–397, <https://doi.org/10.1111/ropr.12282>.

<sup>5</sup> Fernanda Viana de Carvalho, “A posição brasileira nas negociações internacionais sobre florestas e clima (1997–2010): Do veto a proposição,” PhD diss., University of Brasília, 2011, <https://repositorio.unb.br/handle/10482/8449>.

<sup>6</sup> Hochstetler and Keck (2007).

The environmental movement's direct influence on policymaking was short-lived, however. Lula's successor, Dilma Rousseff (2011-2016), formally maintained structures for civil society engagement on forest conservation, but her government was less focused on cooperation with these groups and activists found fewer opportunities for interaction and policy advocacy. As the Rousseff administration came into office, Marina Silva's team inside the environmental ministry was replaced, and activists and researchers had to continue their work from less central positions in NGOs, universities, and governmental institutions. Rousseff was known for her need to control policy processes. An activist environmental ministry with close bonds to civil society was regarded as too unpredictable, and Rousseff selected a career civil servant as minister. The government continued implementing forest protection policies, but the Ministry of the Environment went from being an ambitious climate policy advocate to align-

azon. After just a few weeks in office, Salles communicated that cooperation between the Ministry of the Environment and NGOs would be put on hold.<sup>10</sup> In addition, the president is in open dispute with the National Institute for Space Research (INPE), which is responsible for collecting and presenting yearly data on deforestation, saying their deforestation reports are damaging Brazil's reputation. Most recently, leaked footage of a cabinet meeting showed Salles saying that media preoccupation with the ongoing COVID-19 crisis provided a good opportunity for environmental deregulation.<sup>11</sup>

Given frequent political changes, and high turnover in national and local government, civil society organizations have become the principal stewards of environmental regulations in Brazil. And these organizations depend on donations. International attention has channeled funding to Brazilian NGOs and researchers in order to document and reduce deforestation. In the process, deforestation has become the core issue of environmental mobilization in Brazil. Issues like nuclear power, wind power, water security, and environmental disasters such as the 2019 Brumadinho dam collapse mobilize

local protests and national attention; however, funding for mobilization on these issues is much smaller than deforestation-related funding. Other environmental issues thus risk falling into the shadow of the massive donations available to address deforestation. With a government that is consistently growth-focused and lenient on environmental protection, environmental activists need strategies for uniting with other societal actors across sectors to create strategies promoting both environmental protection and economic gain.

While the polarized debate over the environment and climate has created parallel echo chambers in social media, deforestation rates and violence against environmental activists have both increased dramatically in the last couple of years. The Brazilian environmental movement is currently politically marginalized and policymakers are ever more distant from activists. The fight is not over, but the current violence against Brazil's environment will cause irreparable damage to people, biodiversity, and the global climate if allowed to continue.

<sup>10</sup> Daniele Bragança and Sabrina Rodrigues, "Ricardo Salles suspende todos os contratos e parcerias com ONGs," *((o))eco*, 15 January 2019, <https://www.oeco.org.br/noticias/ricardo-salles-suspende-todos-os-contratos-e-parcerias-com-ongs/>.

<sup>11</sup> Emanuel Colombari and Patrick Mesquita, "Salles cita foco da imprensa na covid para 'passar boiada' e aprovar leis," *Notícias UOL*, 22 May 2020, <https://noticias.uol.com.br/politica/ultimas-noticias/2020/05/22/salles-cita-foco-da-imprensa-na-covid-para-passar-boiada-no-meio-ambiente.htm>.

## Carbon Markets and Forest Conservation in the Brazilian Amazon

by Christopher Schulz

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The world's largest contiguous area of tropical rainforest can be found in Brazil's Amazon region. This fact alone gives the country central importance in discussions about global forest conservation policy. Despite its remoteness and low population density, the Amazon basin and its forests have featured centrally in key global debates about the environment and development, illustrating the need to protect biodiversity, safeguard indigenous people's rights, and mitigate climate change.

While there is no doubt that Brazilian politics shapes the context for forest conservation in the Amazon, many of the main drivers of deforestation follow an economic logic. The growth of cattle ranching, the expansion of agricultural areas, road construction, mining, and other infrastructure

projects may all cause deforestation in the Amazon, alongside illegal logging.<sup>1</sup> Historically, many of Brazil's governments have incentivized such activities to "bring development" to the Amazon frontier and assert national sovereignty over a region with little state presence; but agriculture and cattle ranching could not be sustained over the longer term without also being economically attractive to investors.<sup>2</sup>

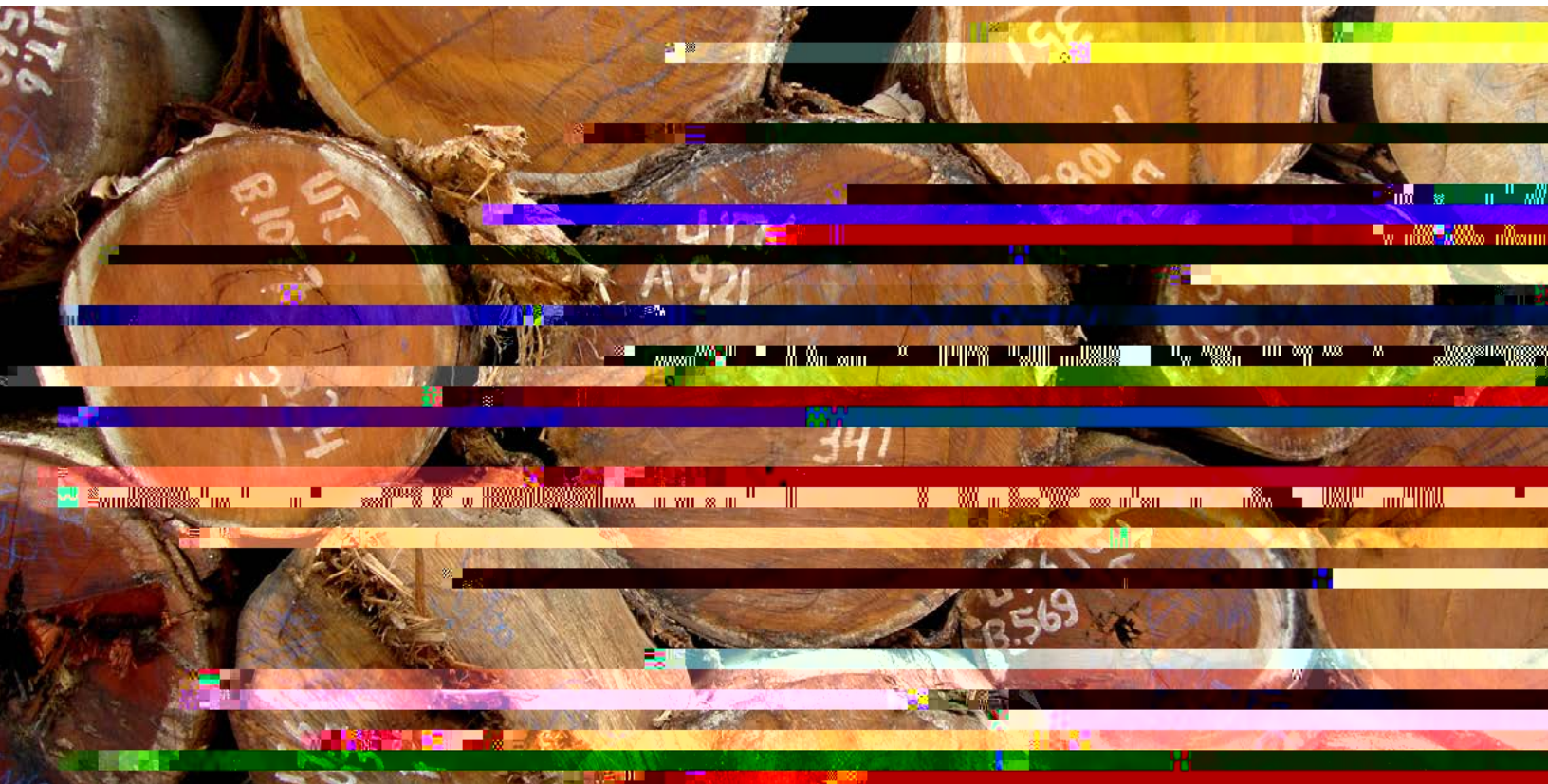
Thus, it is not surprising that the proposal to pay private entities to avoid deforestation in the Amazon via global carbon markets has attracted significant interest in Brazil.<sup>3</sup> The main mechanism to access these funds is called REDD+, which was developed by the parties to the United Nations Framework Convention on Climate Change (UNFCCC). REDD initially stood for "Reducing Emis-

<sup>1</sup> Philip Fearnside, "Deforestation in Brazilian Amazonia: History, Rates, and consequences," *Conservation Biology* 19, no. 3 (2005): 680-688, <https://doi.org/10.1111/j.1523-1739.2005.00697.x>.

<sup>2</sup> Sérgio Sauer, "Soy expansion Into the Agricultural Frontiers of The Brazilian Amazon: The Agribusiness Economy and Its Social and Environmental Conflicts," *Land Use Policy* 78 (2018): 326-338, <https://doi.org/10.1016/j.landusepol.2018.08.030>.

<sup>3</sup> Christopher Schulz, "Forest Conservation Through Markets? A Discourse Network Analysis of the Debate on Funding Mechanisms for REDD+ in Brazil," *Environmental Communication* 14, no.2 (2020): 202-218, <https://doi.org/10.1080/17524032.2019.1631869>.





*Legally harvested logs in the Amazon Basin (Shutterstock)*

its creation in 2008. Thus far, results have been mixed, due to the complexities of designing a novel institutional infrastructure from scratch.<sup>11</sup> The Norwegian and German governments suspended payments to the Amazon Fund in 2019, following disagreements about its governance structure with the new Bolsonaro government and a surge in deforestation, causing further setbacks for REDD+. Earlier that year, Brazil had received its first results-based payment for REDD+ from the UN's Green Climate Fund (GCF), but this was again unrelated to carbon markets.<sup>12</sup>

Financing forest conservation via carbon markets raises multiple questions, which have been intensely debated among Brazilian policy-makers, researchers, and stakeholders. First, it is surprisingly difficult to quantify avoided carbon emissions for market transactions. Few REDD+ projects are thus based on an accurate science of carbon, which would allow results-based payments. Second, REDD+ payments are not always sufficiently targeted, and may go towards areas without a serious risk of deforestation.<sup>13</sup> This runs counter to the goal of reducing deforestation, but could create

<sup>11</sup> Juliano Correa, Ricard van der Hoff, and Raoni Rajão, "Amazon Fund 10 Years Later: Lessons From the World's Largest REDD+ Program," *Forests* 10, no. 3 (2019): 272, <https://doi.org/10.3390/f10030272>.

<sup>12</sup> Sarah Sax, "Brazil to Receive First-Ever Results-Based REDD+ Payment, But Concerns Remain," *Mongabay Series: Global Forests*, 1 March 2019, <https://news.mongabay.com/2019/03/brazil-to-receive-first-ever-results-based-redd-payment-but-concerns-remain>.

<sup>13</sup> Peter H. May, Brent Millikan, and Maria F. Gebara, "The Context of REDD+ in Brazil: Drivers, Agents and Institutions," *Occasional Paper 55*, 2nd ed. (Bogor, Indonesia: CIFOR, 2011).



the false appearance of a conservation success story. Third, much of the deforestation in the Brazilian Amazon is already illegal anyway, so payments for avoiding it seem legally and morally questionable. Fourth, as long as REDD+ schemes cover only relatively small areas, REDD+ runs the risk of simply shifting deforestation to other, unprotected areas, resulting in no overall conservation gains.

Fifth, offsetting carbon emissions via REDD+ carries the risk that emission reductions are outsourced from industrialized countries, where they are most needed. As a result, funding forest conservation through carbon markets may slow down industrialized states' transition toward a low-carbon economy, potentially impeding needed technological innovations. Sixth, even where forests are successfully protected through market payments, there is no guarantee that this protection continues once a contract ends. Seventh, market funding for REDD+ raises significant challenges for equity, since the poorest residents of forested areas face the highest barriers towards successful participation.<sup>14</sup> If not managed carefully, such mechanisms may accelerate the concentra-

tion of land ownership in the Amazon and further social inequality. Eighth, making forest conservation conditional on financial incentives may crowd out alternative motivations for forest stewardship, including ones rooted in local culture and ethical systems.<sup>15</sup> Undermining existing moral foundations in this way could contradict the initial objective of conserving forests.

These are just some of the challenges that have been discussed in relation to carbon markets. While raising funds for forest conservation is clearly a positive objective, they do require serious consideration in the Brazilian Amazon and beyond. At COP25 in Madrid, Ricardo Salles, Brazil's current Minister of Environment, has expres[(mn0F004gcd emissiouh

## Political Economies of Energy Transition: Wind and Solar Power in Brazil

by Kathryn Hochstetler

*Kathryn Hochstetler is Professor of International Development at the London School of Economics and Political Science. She has published widely on Brazil's environmental politics. Her most recent book is Political Economies of Energy Transition, forthcoming in January 2021 from Cambridge University Press.*

Building renewable energy, such as wind and solar power, is one of the most promising ways to achieve sustainable development. In the last global economic crisis, governments around the world turned to renewable energy promotion as a strategy for rebuilding economies, and even opening up new pathways for innovation.<sup>1</sup> The fastest way to reduce greenhouse gas emissions is to electrify as much as possible, and then build low-carbon forms of electricity like wind and solar, according to the Intergovernmental Panel on Climate Change, which sifts through peer-reviewed research to offer recommendations for global climate negotiations.<sup>2</sup> A final endorsement came from President Jair Bolsonaro: a review of the pro-environmental positions of the 2018 presidential candidates in Brazil shows that promoting renewable energy was the only one he favored.<sup>3</sup>

Brazil has a long history of promoting renewable energies. Its primary source of electricity has always been hydropower, and it developed biofuels years before most other countries did. Yet its transition to wind and solar power has not been as smooth as leaders' praise for renewable energy might suggest. Figure 1 shows that wind power had an early start, but then stagnated before it took off, now comprising 10 percent of Brazil's electricity capacity. Solar power was severely delayed, although it is now also beginning to develop and is already nearly equal in scale to nuclear and coal-T, no

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What accounts for , nse slow starts and the eventual rise in both wind and solar?

My new book investigates , nse outcomes for wind and solar power in Brazil and South

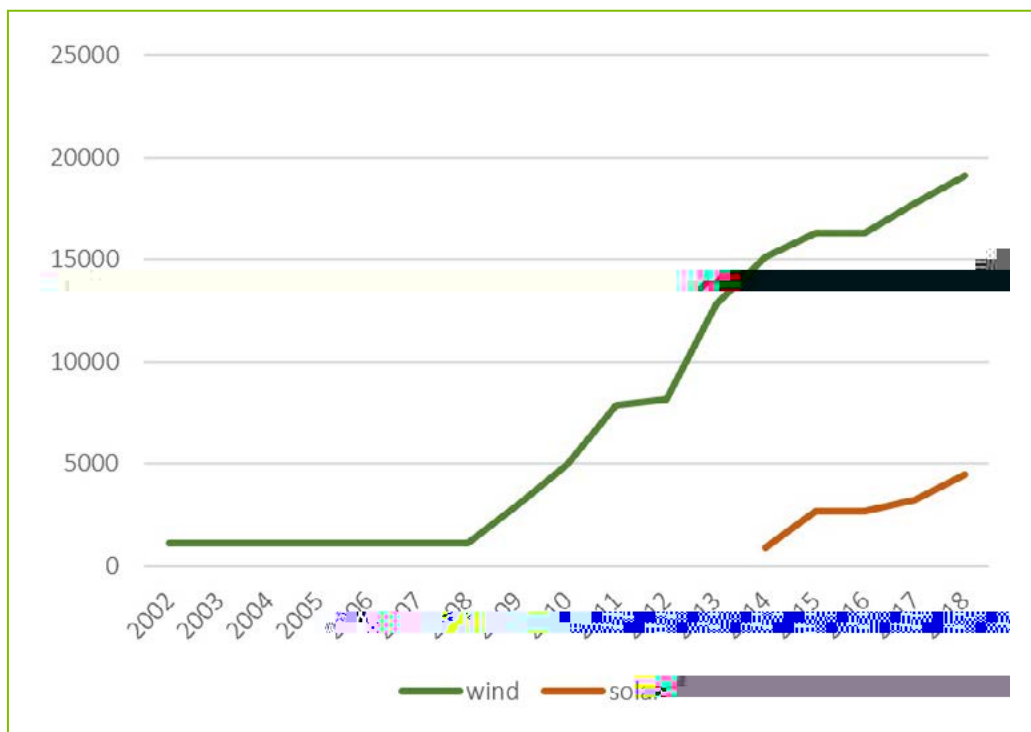
<sup>1</sup> S pavin and Arwal and Simon J. E

Africa.<sup>4</sup> I argue that investment in renewable energy involves the political economies of four different policy arenas: climate policy, industrial policy, electricity consumption, and siting policy. Each of these arenas has a different basic constellation of interests, and each convokes participants from a different set of government agencies, the private sector, and civil society. Renewable energy outcomes result from the intersection of these four political economies, which may reinforce or undermine each other. Thus, environmental ministries may work with environmental actors to promote wind and

solar power to address climate change, but they may be supported or blocked by simultaneous actions that economic ministries are taking with private firms and labor to develop industrial policies for the energy sector. Public utilities and consumers will follow a third set of considerations. Local communities, in the fourth policy arena, may accept or resist the environmental impact assessments that allow these infrastructure projects in their backyards.

In sketching the results, it becomes clear that debates around climate change have

**Figure 1.** Contracted capacity of wind and solar power in Brazil in cumulative installed megawatts (2002-2018)



Source: calculated from ANEEL documents at <http://www.aneel.gov.br/resultados-deleiloes> and PROINFA results.

<sup>4</sup> Kathryn Hochstetler, *Political Economies of Energy Transition: Wind and Solar Power in Brazil and South Africa* (Cambridge: Cambridge University Press, forthcoming).

done little to shape Brazil's outcomes for wind and solar power. After all, climate change considerations call for building as much of both as possible, not for building a great deal of wind power and little solar power, especially in a sunny, tropical country. Brazil has had heated climate change debates, but they have focused on deforestation, historically Brazil's largest contribution to climate emissions. Wind and solar power have been fairly peripheral to this debate.

Similarly, the siting of projects also explains little of the outcomes. Wind power installations have been quite contentious in Northeast Brazil, where about one-quarter of host communities have mobilized against their impact on dunes and coastal areas, birdlife, rights to access land, and cultural communities like the *quilombola* communities.<sup>5</sup> Conversely, there have been no mobilizations yet against solar power. As such, this political economy cannot account for the pattern of building a great deal of wind and not much solar power.

Industrial policy considerations and consumer costs, however, do play a role in accounting for outcomes. The first program to promote wind power came under President Fernando Henrique Cardoso, in the aftermath of the droughts and hydropower crisis of 2001. The team in the Ministry of Energy calculated that wind power could be built quickly and, while very expensive at the time, could have its costs compensated by building a domestic industry in wind power manufacturing alongside the installations. Solar power was set aside because it was

costlier and showed much less potential for building a domestic industry. Following the 2002 elections, President Lula da Silva's incoming administration adopted Cardoso's plan and implemented it.

Requirements stipulating a minimum percentage of domestic content in manufacturing slowed early wind development, as it took years to even begin establishing an industry. Lula's government eventually chose competitive auctions where public and private actors could bid to provide wind power to the national grid. -  
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The Paris Agreement set a goal of a global average temperature increase below 2° C and closer to 1.5° C. In the Agreement, each country voluntarily committed to a nationally determined contribution (NDC), or planned reduction in emissions. Under a business-as-usual model, based on Brazil's GDP and its growth rate of carbon emissions from 1990 to 2014, Barcena et al. project that Brazil would have emission outputs of 1,320.1 tons of CO<sub>2</sub> equivalent by 2030. If Brazil fulfills its NDC, it would reduce emissions to 1,165.1 tons by 2030—a 12 percent reduction. However, this is above the output that the authors calculate would be needed to contribute to the overall global temperature objectives of the Agreement. To get to a global 1.5° C goal, Brazil's emissions would need to drop to 816.1 tons of CO<sub>2</sub> equivalent by 2030—a 38 percent reduction. A 2° C objective would require Brazil's emissions to drop to 1,112.9 tons, or a 16 percent reduction.

What policies can help Brazil achieve emissions reductions? The authors argue that countries must distribute and enforce responsibilities across various sectors and markets, reducing overall compliance costs.

This report identifies three potential initiatives: low-carbon ranching, environmental taxes, and climate financing.

The low-carbon livestock sector focuses on carbon sequestration, the extraction of carbon from the atmosphere in order to be stored in other forms, the integration of livestock into the bioeconomy by using animal byproducts, and grassland reclamation. All of these work to increase sustainability and productivity over time. A 2018 study of various beef cattle production systems in Brazil found that processes using grassland reclamation technologies and integrated procedures, where animal waste is utilized through biotechnology in various economic sectors, had much higher rates of carbon sequestration. Through utilizing animal products in different steps of the production process, Brazil was able to employ 53,943 people in 2014. Brazil has already taken steps towards implementing these systems by creating a line of credit for farmers to reform production me a Lroniss, Brazil w5ctualTextREFF0054

cause people to internalize environmental externalities. Fuel taxes are the most widely used environmental tax, while private urban transport taxes are becoming more common in Latin America. T

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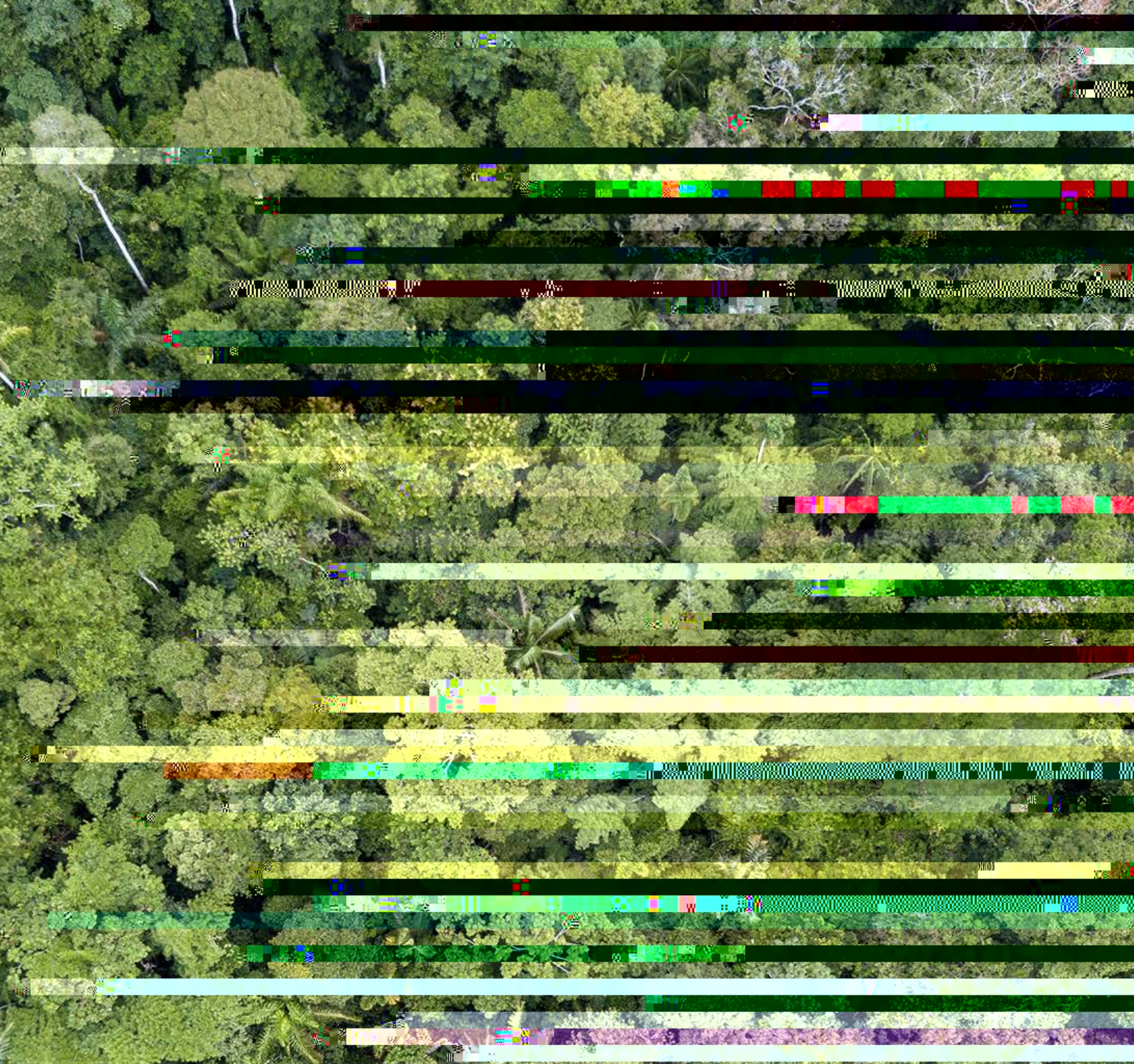
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