

The Modern Ecology of Brazil

By Isha Shukla

Brazil has long struggled to strike a balance between protecting its bountiful natural resources and making economic progress. At the center of this struggle are the livestock and soybean industries, which are responsible for the deforestation of the Amazon rainforest. The Amazon rainforest serves as a crucial natural resource and houses many Indigenous communities. The continued destruction of the rainforest comes with many consequences for the environment and the people of Brazil. However, the future of the Amazon rainforest is not without hope. Despite the destruction the rainforest has faced, future leaders could implement measures to restore it. In this paper, I will examine the trade-offs between economic growth and environmental sustainability in Brazil. The short-term economic gains from economic development are far outweighed by the long-term consequences of deforestation.

The Amazon Rainforest is an essential natural resource due to its sheer size and biodiversity. As explained by the World Wildlife Fund, the Amazon contains 10 percent of all species discovered by humans and “contains nearly a third of all the tropical rainforests left on Earth” (“Learn about the Amazon Rainforest”). Scientists discover new organisms in the Amazon every three days, attesting to the variety of life that exists in the rainforest. In fact, the Applied Ecologist has

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deemed Brazil “the most biodiverse country in the world” (Zenni et. al). The Amazon also serves as a massive carbon sink – a major absorber of carbon dioxide from the atmosphere. Ecologists estimate that the Amazon rainforest stores 76 billion metric tons of carbon and releases 20 billion metric tons of water into the atmosphere every day (“Learn about the Amazon Rainforest”). As a result, the destruction of the Amazon affects not only the country of Brazil but also global climate stability.

Brazil’s booming cattle industry is threatening the biodiversity and wide-reaching ecological impact of the Amazon rainforest. Demand for beef has been increasing due to rising disposable incomes, allowing more people to buy beef. Brazil consistently ranks among the world’s largest exporters of beef and boasts the second largest cattle herd in the world (Zia et al.). However, unlike the other drivers of deforestation, beef production has a disproportionately larger impact. Ranchers cut down and burn trees to clear land for cow pastures, a process known as land conversion. These fires often run rampant and turn into wildfires that unintentionally clear out large swathes of the rainforest (Spring and Dickie). As the World Wildlife Fund elucidates, beef production generates double the forest conversion of other industries, such as soy production and palm oil. The beef market is projected to expand as disposable incomes rise in predominantly Muslim countries that rely on Brazil’s production of halal meat. Given that beef comprises 8.5 percent of Brazil’s GDP, it is clear that Brazil’s emphasis on generating commodities for foreign markets contributes heavily to deforestation (Malafaia et al. 1).

Similar to the beef industry, the soy industry is a major cause of deforestation and comprises a large portion of Brazil’s economy. The soy produced in Brazil is largely used as fodder,

particularly for poultry and pork (“Deforestation”). Therefore, the global meat industry is a major driver of deforestation, as soy-based deforestation is ultimately used for meat production. The land conversion caused by soy is not as significant as that of beef. Nevertheless, Brazil is the largest exporter of soy in the world, accounting for 40 million hectares of soybean acreage (Anand). More notably, soy production has increased rapidly since the mid-2000s. The USA Economic Research Service puts it best: “Since the mid-2000s, Brazil has accelerated its transformation from an exporter of mainly tropical agricultural products such as coffee, sugar, citrus, and cacao to a major global supplier of commodities, including soybeans, grains, cotton, ethanol, and meats” (Valdes). In addition to its impact on the Amazon rainforest, the soybean industry threatens the Cerrado, Brazil’s tropical savanna. More than half of the land in the Cerrado has been converted for soybean farming (Anand). As the soybean industry continues to grow in Brazil, the Amazon rainforest and the Cerrado will become increasingly vulnerable to destruction.

When the cattle and soy industries raze Brazil’s rainforests and grasslands, they generate numerous consequences for the ecological health of this region. The Amazon rainforest is inhabited by millions of species that face habitat loss due to deforestation. Scientists have already identified plant and animal species as endangered and expect them to go extinct if this trend continues. A loss of biodiversity disrupts food chains and ecosystems in the Amazon, further accelerating the extinction of species (Thomson).

Furthermore, as humans encroach on animals’ habitats, the incidence of zoonotic diseases increases. Zoonotic diseases are animal-borne diseases that spread to human beings, such as influenza and SARS-CoV-2 (“Zoonotic Diseases”). These

diseases spread during spillover events, situations in which a wild animal infects a human being or a domesticated animal. Deforestation is a major cause of Brazil's vulnerability to zoonotic disease outbreaks. For instance, deforestation is associated with a spike in cases of malaria and leishmaniasis, a tropical parasitic disease spread by sandflies. In areas that have already been converted to farmland, hantavirus and yellow fever transmission has increased (Winck et al.). Essentially, as deforestation and habitat loss accelerate, the Amazon rainforest's delicate balance of species and nutrient cycles will topple. Additionally, the increase in contact between humans and wild animals will lead to higher rates of zoonotic diseases, potentially bringing about the next epidemic or pandemic.

Moreover, while habitat loss and zoonotic diseases have mainly local impacts on Brazil, deforestation also poses a threat to global atmospheric cycles. If deforestation in the Amazon rainforest continues, the Earth will lose large swathes of one of its major absorbers of carbon. Scientists from Brazil's National Institute for Space Research also warn that the rainforest will soon reach a critical point from which it will be unable to recover. If deforestation continues, the rainforest will lose enough moisture that it will experience dieback. Dieback is a phenomenon in which large areas of the rainforest dry out and turn into savanna. Such a massive loss of global rainforest area will hinder global progress toward mitigating climate change and reaching net zero emissions. This possibility could occur earlier than anticipated. Due to the recent wildfires in the Amazon rainforest, some parts of it may be releasing more carbon dioxide than they absorb (Harris et al. 237). This finding is disturbing given that the Amazon has historically served as a key absorber of carbon emissions.

Furthermore, beyond the ecological impact of deforestation, it is imperative to address its consequences for Indigenous communities. The Amazon houses more than 200 Indigenous tribes, a total of 800,000 people. A portion of these tribes is deemed “uncontacted,” in that the government believes they inhabit reserved land in the Amazon but has not been able to confirm their existence (Langewiesche). For these uncontacted tribes, deforestation is especially dangerous because contact with developers and loggers leaves them vulnerable to common diseases. As Survival International, an organization that advocates for Indigenous rights, explains: “Introduced diseases are the biggest killer of isolated tribal people, who have not developed immunity to viruses ... that most other societies have been in contact with for hundreds of years” (“Uncontacted Tribes”).

Additionally, deforestation destroys the natural resources that these hunter-gatherer societies rely on for their livelihoods. The Yanomami tribe has recently seen high rates of child malnutrition because deforestation has prevented them from following their traditional diet (“In the Amazon Rainforest”). In extreme cases, the developers directly kill tribal communities. For example, the Akuntsu tribe of Rondonia was brutally massacred by cattle ranchers in the 1980s. The ranchers proceeded to bulldoze their homes and use their land for farming. Today, only five members of the tribe remain (“Uncontacted Tribes”). Unfortunately, the fate of the Akuntsu tribe has been mirrored by other tribes whose way of life has been disturbed by environmental destruction. This exploitation of the Amazon rainforest not only threatens its biodiversity but also the thousands of Indigenous people who call the rainforest their home.

The ramifications of deforestation for Brazil's ecological stability, public health, and human rights call for solutions to this crisis. The Brazilian government bears much responsibility for regulating the rapid destruction of the Amazon rainforest. Unfortunately, deforestation and environmental destruction have been exacerbated under the administration of Jair Bolsonaro, Brazil's most recent president. According to the Council on Foreign Relations, two years into Bolsonaro's presidency, deforestation reached a fifteen-year peak. Moreover, his administration has weakened environmental protections on many fronts. Brazil's congress cut the environment budget by 24 percent, and Bolsonaro has voiced intentions to open Indigenous reserves for extractive purposes. Moreover, he refused aid from the Group of Seven, a forum of wealthy nations, when wildfires ravaged the Amazon in 2019 (Roy).

Despite most of his policies being environmentally destructive, Bolsonaro has made some pledges to protect the environment. In 2021, he claimed that Brazil would reach net-zero emissions by 2050 and recently pledged to end deforestation by 2030. However, these promises have been met with skepticism given Bolsonaro's history of making environmentally costly decisions (Spring and Paraguassu). These pledges have made little positive impact in comparison to the severe consequences of his pro-business and anti-climate policies. Nevertheless, future leaders may help Brazil make more progress toward Bolsonaro's carbon neutrality pledges.

Unlike Bolsonaro, Brazil's president-elect Lula da Silva has taken a far more environmentally progressive stance on deforestation. At the most recent United Nations Climate Change Conference, he announced that he would address illegal logging and plan to host the 2025 Climate Summit in the

Amazon rainforest. Moreover, he aims to work with Congo and Indonesia to protect tropical rainforests worldwide (Prengaman). Lula's remarks demonstrate his commitment to bringing international attention to environmental issues facing Brazil.

The Amazon rainforest is a crucial natural resource that provides a home for many organisms and Indigenous communities in Brazil. Globally, it regulates atmospheric carbon and water vapor levels, stabilizing the carbon and hydrological cycles. Despite these key contributions, the cattle and soybean industries are destroying large portions of the rainforest and catalyzing future ecological calamities. The consequences of deforestation extend beyond the environment; deforestation impacts humans as well. Increased development in the Amazon rainforest will cause more zoonotic diseases, which could lead to epidemics or pandemics down the line. Moreover, the Indigenous people who live in the Amazon face more vulnerability to diseases to which they have little immunity. The government plays a large role in addressing deforestation but has done more harm than good in the past four years. However, under Lula, there is more optimism for the future of the Amazon rainforest.

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