



LATIN AMERICA'S ENVIRONMENTAL POLICIES IN GLOBAL PERSPECTIVE

This series explores the international dimensions of Latin America's environmental challenges and the role of environmental issues in shaping the region's most important diplomatic and economic relationships.

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Supply Chain Management for Beef Production/Exports and Deforestation in Brazil

By Gabriel Lui

THE RISE OF AN AGRICULTURAL NATION

Agriculture has been the powerhouse of the Brazilian economy in recent years. The exports of agricultural commodities are mitigating losses in other sectors and avoiding bigger drops in the country's gross domestic product (GDP) since the political and economic crises that arose in 2015. Agribusiness is one of the few sectors where the comparative advantages of the country are being fulfilled. Brazil is the global leader in the production or exports of soybeans, sugar, coffee, chicken, and beef, and it is a solid rival of the United States in several other agricultural

products.¹ Despite the global economic downfall triggered by the COVID-19 pandemic, Brazilian exports of meat are growing and are expected to capture 23 percent of the global market in 2021.²

Notwithstanding the country's natural advantages, the pathway to the agricultural success of Brazil was not taken for granted. Massive public investments were made to modernize the conventional agriculture that has historically been performed in the country. The creation of the Brazilian Agricultural Research Corporation (Embrapa) in 1973 was key to developing high-level agricultural technology for the tropics, which promoted the acclimatization of crops, correction of soils, and the adjustment of fertilizers

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Photo credit: Nellore cattle on green pasture in Brazil: Tiago Oliveira Bispo, Shutterstock

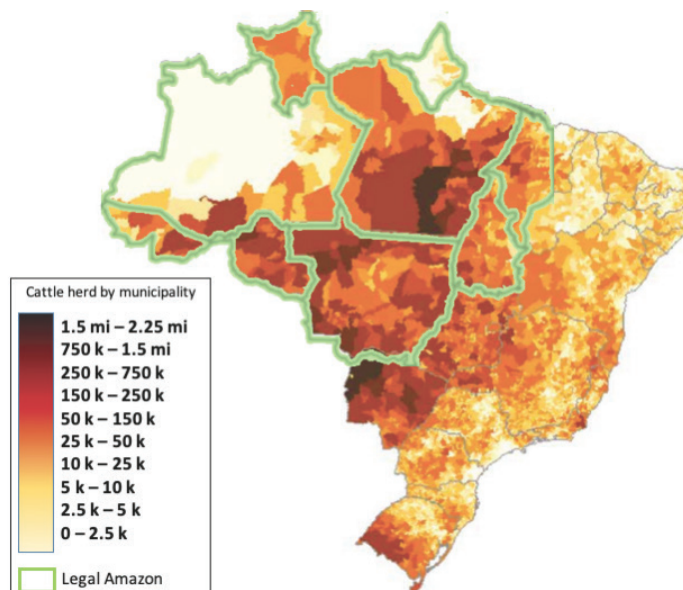


Figure 1. Cattle herd by municipality in Brazil. There is an increasing concentration of the herds in municipalities with lower land prices and fewer proper land tenure registrations. Source: IBGE/Pesquisa da Pecuária Municipal.

and agricultural machinery.³ Together with funding programs for agricultural expansion and incentives to colonize new areas, especially in the Cerrado and Amazon regions, Brazil transitioned from an importer of food in the 1970s to an exporter of commodities in the 2000s.⁴

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As in other aspects of the Brazilian economy and society, inequality is embedded in the agricultural sector. Due to a historic process of land concentration and a lack of a coordinated land policy and reform, only 0.3 percent of the farms contain 25 percent of the agricultural land, and the 10 percent bigger rural households occupy 73 percent of the total farmland available.⁵ The technological improvements and incentives described earlier were concentrated in a smaller number of farms. Consequently, along with a minor group of world-class exporting farms, the dominant land use of the Brazilian farmlands is low-productivity pastures in properties with few technical or financial supports.^{6, 7}

THE BEEF REALM

Brazil has the largest number of cattle in the world, with more than 214 million animals that occupy all regions of the country.⁸ Cattle were introduced to Brazil in the early 17th century, and cattle farming became a traditional activity among all levels of farmers. More than 50 percent of rural households have cattle, ranging from small-scale subsistence farming to large-scale commercial production.⁹ Despite its occurrence throughout the five regions of Brazil, large-scale ranching is moving toward the Center-West and North regions (Figure 1), where the land is cheaper and law enforcement is weaker. With that, the sector has lowered its production costs and increased competitiveness.¹⁰

Beef production in Brazil, as in most of the world, is distributed across a long supply chain where the animals are transferred between properties several times to complete the breeding, fattening, and processing cycle, which includes cow-calf production, stocker production, and finishing operations.¹¹ Most ranchers use extensive production systems based on African grasses (like *Brachiaria* spp. and *Panicum* spp.), which are often poorly managed and yield low productivity compared to other big exporters such as the United States and Australia.¹² The pasture area

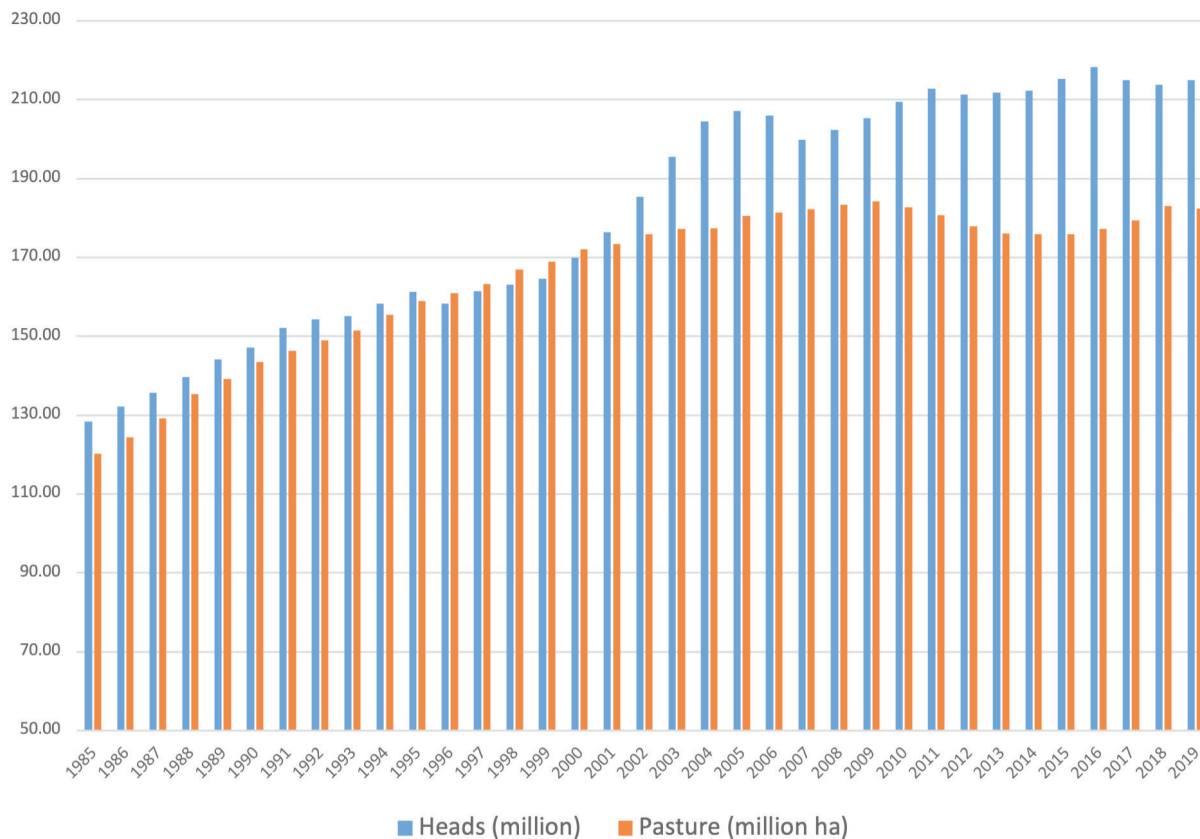


Figure 2. Evolution of the cattle herd and pasture area in Brazil from 1985 to 2019. The stocking rate was almost one animal per hectare until the early 2000s, when it started to ascend slightly. In 2019, the stocking rate reached 1.18 animals per hectare, which is still a very low productivity rate. Source: IBGE/Pesquisa da Pecuária Municipal and LAPIG/Atlas das pastagens brasileiras.

peaked in 2009, at more than 184 million hectares, but it has decreased and stabilized since then, reaching 182 million hectares in 2019 (Figure 2).¹³

Despite Brazil’s leading position in beef exports to the world, its domestic consumption takes the biggest share. Around 80 percent of production feeds the internal market.¹⁴ Beef consumption is high in Brazil compared to other countries—24.4 kilograms/year per capita, which is almost the same level as the United States and four times the world average.¹⁵ Of what is exported, the main destination is China (36 percent), followed by Egypt (10.4 percent), Russia (9.8 percent), and Iran (8.9 percent).¹⁶

The market value of the global beef supply chain is estimated to be more than US \$330 billion per year, and its fortune is mainly decided by the meatpack-

“Despite Brazil’s leading position in beef exports to the world, its domestic consumption takes the biggest share.”

ing industry.¹⁷ JBS, Marfrig, and Minerva, the three biggest Brazilian meatpacking companies, are also multinationals with global relevance. They have been concentrating their production structure and market share over the last several years through mergers and acquisitions, not only in Brazil but also other South American countries, as well as in the United States and Asia.¹⁸ In the internal market, they already account for more than 87 percent of production.¹⁹ With such a widespread and complex production system, the precise number of slaughterhouses operating in Brazil is hard to assess, especially since

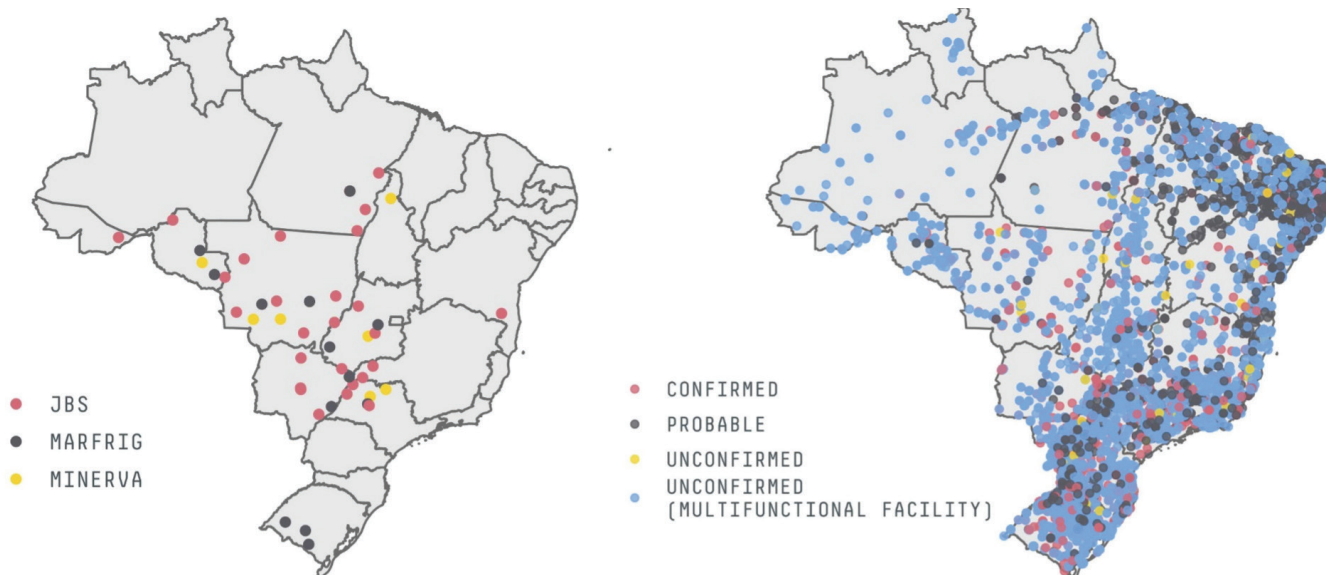


Figure 3. Distribution of slaughterhouses throughout the country, indicating the facilities of the three big meatpacking companies (JBS, Marfrig, and Minerva), and other facilities with formal and informal designations. Source: Trace Logistics.

part of the meat available in the market does not go through official food-safety inspections. Around 2,000 slaughterhouses have been registered by the public inspection systems, but there are at least 7,600 other facilities in the country that may also process or store animal products (Figure 3).^{20, 21} This situation adds up to a decentralized and multilayered ranching system that imposes an enormous challenge for the production stage of the beef sector in terms of sanitary, environmental, and labor compliance, especially in smaller cities with limited public infrastructure.

THE PRICE OF THE BEEF MARKET'S LEADERSHIP

Brazil is a tropical country where the natural conditions result in a landscape dominated by forest ecosystems. There are natural grasslands distributed throughout the country, but the current scale of cattle production could only be reached by the conversion of native vegetation into pastures. Since the standing forest has not yet been able to compete economically against any of the economic cycles that have happened so far, all of them based on primary products from extractivism and agriculture (timber, sugarcane, gold, coffee, rubber, soybean, and beef), deforestation became strongly associated with agri-

cultural expansion. Vast areas of native forests along the coastline were replaced with sugarcane fields, coffee plantations, and cattle pastures, following the economic cycles from the 16th to the 19th centuries. The modernization of agricultural technology and inputs in the 20th century enabled the spread of monocultures toward the countryside. The soybean, which was confined to the southern and colder parts of Brazil until the 1970s, was adapted to meet the conditions of tropical soils and temperature, and today it hits record production levels in the fringes of the Amazon. Overall, agricultural crops reached 64 million hectares, or 8 percent of land cover in Brazil, in 2019. Meanwhile, pastures covered 20 percent of the country.²²

But the expansion of food production alone cannot explain the deforestation rates that Brazil is experiencing. There is an underlying condition straining the growth of the agricultural sector, especially in the Amazon, and particularly in the beef supply chain: land grabbing. The Amazon is the last frontier of colonization in Brazil, and this wave of occupation is happening due to a lack of coordinated land policies and a failure by law enforcement on the ground to ensure compliance with the requirements of public and private settlements. Land tenure registers in the region are often absent or badly structured, hampering the

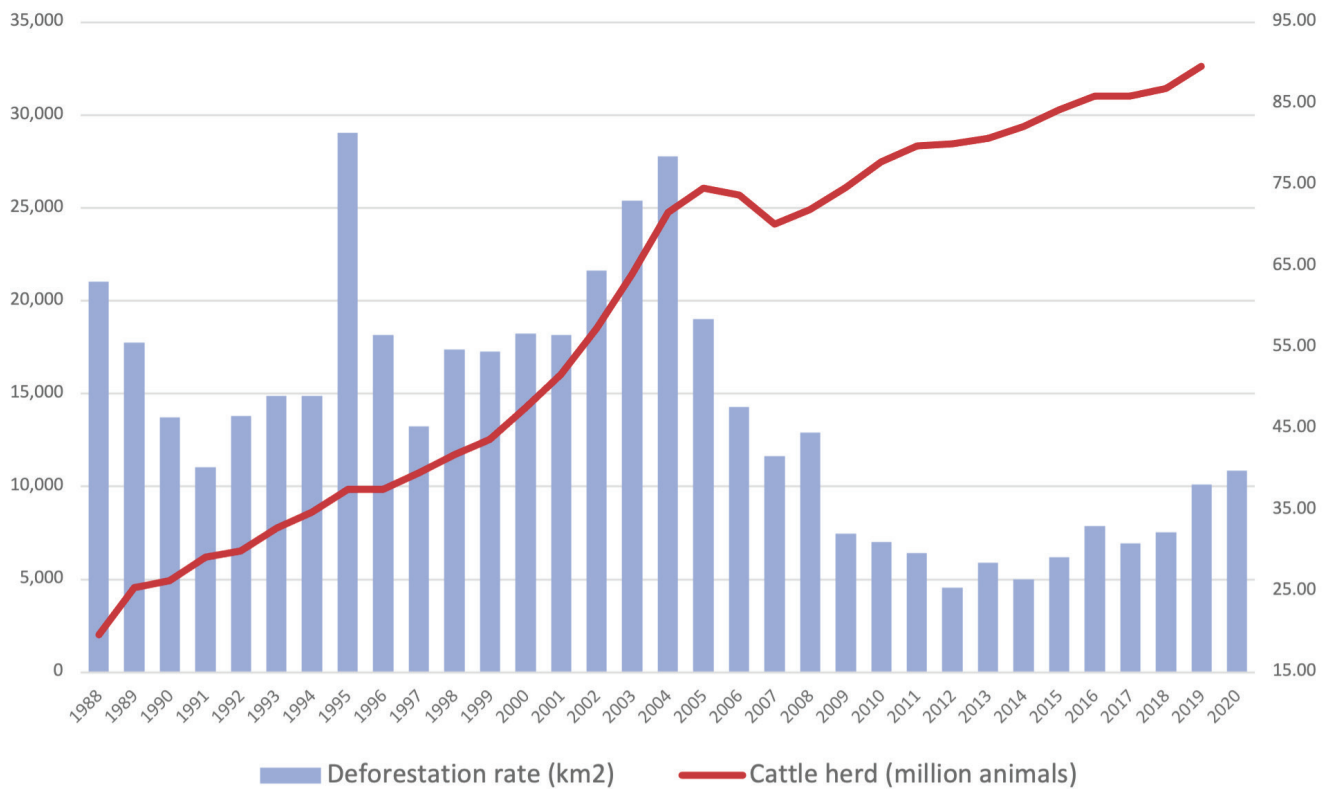


Figure 4. Deforestation rates in the Amazon and cattle herd sizes in the Amazon states. From 2008 to 2012, it was possible to decouple the growth of the cattle herd from deforestation, demonstrating that it is possible to increase production without putting the forest down. Source: INPE/Terrabrasilis and IBGE/Pesquisa da Pecuária Municipal.

ability to accurately track property boundaries and impose inspections and sanctions, and favoring frauds. The federal and state-level governments are also perpetuating this situation by not filling the gap of nonregistered lands in the Amazon. There are more than 70 million hectares of forests with no information or designation in the region that are susceptible to illegal occupation and further deforestation.²³ But even the public lands that are properly designated are not safe from this appetite for new real estate.²⁴ Considering the political shift that happened in Brazil in 2018, which moved the needle to the far right and brought anti-environmental policies to the fore, there is an increasing number of protected areas and indigenous lands that are being contested on the ground and in the National Congress of Brazil.²⁵ Consequently, land conflicts, which have long been a hallmark of the Amazon, are on the rise and are often settled by violence.²⁶ Deforestation is also growing, hitting a 12-year record after a decade of policies and initiatives that brought hope of eliminating such patterns

of economic exploitation of the Amazon (Figures 4 and 5).²⁷ ²⁸ Besides the socio-environmental consequences on the ground, this scenario also results in rising greenhouse gas (GHG) emissions, affecting the whole planet. Brazil has the 12th largest economy in the world, but it is the sixth highest GHG emitter.²⁹ ³⁰ And 45 percent of CO₂ emissions in Brazil are directly associated with the conversion of forests to other land uses, and another 27 percent is linked to agricultural production.³¹

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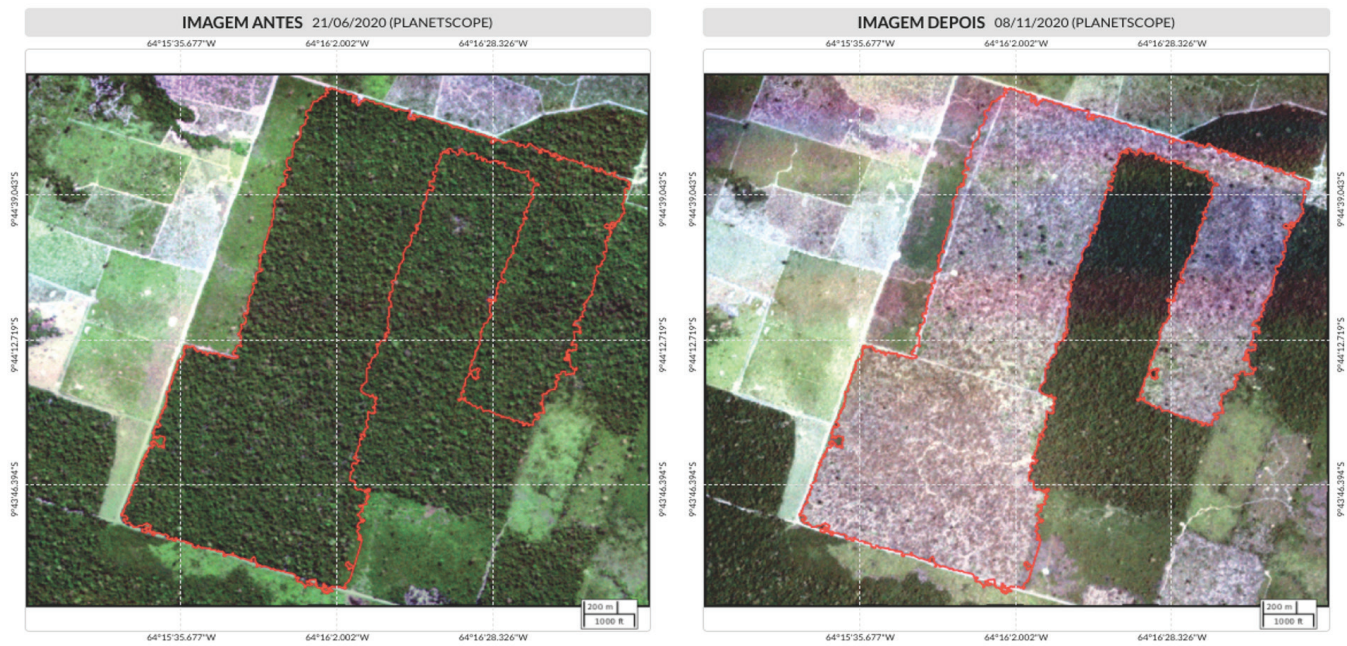


Figure 5. Example of land grabbing and deforestation inside a protected area in the state of Rondônia in 2020. The images show almost 400 hectares of forests destroyed in less than five months to implement pastures in a public area. Source: Mapbiomas Alert. ³²

In such a speculative environment, there is a risk associated with economic activity that eventually does not pay off and leaves the land wasted. There are huge numbers of pastures and other swaths of degraded land that were created by cutting forests down, and yet the land is not being used for food production. In the Amazon, 23 percent of the clear-cut areas were later abandoned and started some level of natural restoration.³³

But in the areas that remain involved in some sort of production, which is the majority, the implementation of pastures is usually the first step toward consolidating the occupation and preparing the soil for other future uses. Cattle are introduced to those areas to fulfill part of the animals' fattening cycle, but also as a gatekeeper to complement the signal of land ownership, and as a lawn mower to avoid the regrowth of the forest. By moving the cattle from farm to farm to complete the growth cycle, most ranchers do not trade the animals directly with slaughterhouses or meatpacking companies, positioning themselves instead as indirect suppliers.³⁴ In most cases, this is the step where the cattle raised on illegally grabbed and deforested areas will be absorbed by the supply

chains of the big companies and reach consumers' tables in Brazil and abroad.

Regrettably, land rights conflicts and environmental degradation are not the only problems triggered by the beef expansion in the Amazon. The informality and lack of control over the initial stages of the supply chain also create conditions ripe for misconduct related to labor and sanitary practices in the sector. Brazil has a specific legal framework for labor rights that typifies as a crime circumstances like forced labor, exhaustive workdays, degrading conditions, and debt bondage. Of the 55,000 workers who were rescued from some of these circumstances after inspection operations from 1995 to 2020, some 17,000 of them were working within the beef supply chain.³⁵ Since 2003, the federal government has monitored and published a blacklist of employers involved in forced labor, including several indirect suppliers of meatpacking companies.^{36, 37}

Considering the uncertain number of clandestine slaughterhouses operating throughout the country, the sanitary conditions in parts of the beef supply chain are also hard to track.³⁸ The federal and subna-



Photo credit: Livestock at a meat processing plant in São Paulo, Brazil: Alf Ribeiro, Shutterstock, March 2006

“Considering the uncertain number of clandestine slaughterhouses operating throughout the country, the sanitary conditions in parts of the beef supply chain are also hard to track.”

tional governments operate mandatory vaccination campaigns to eliminate diseases like brucellosis and foot-and-mouth disease, as well as public certification systems to permit internal trade and exports under hygiene and safety standards.^{39, 40} While most of the production seems to follow certification requirements, which has allowed Brazilian beef exports to reach more than 150 nations, the sector faced a crisis in 2017 due to a corruption scheme that involved food-safety inspectors overlooking the sale of expired products, falsifying export documents, and even failing to inspect some meatpacking plants altogether.^{41, 42} The Carne Fraca (Weak Flesh) operation was unleashed by the Federal Police, which deployed federal inspectors to facilities belonging to JBS, BRF, and several smaller companies. Key export markets, including China, the European Union, Japan, and Mexico, announced bans or restrictions on imports

from Brazilian meatpacking companies at that time.⁴³ The companies have denied any wrongdoing, but some of the defendants have already been tried and convicted by the Federal Justice.^{44, 45}

ENVIRONMENTAL COMPLIANCE AS A DRIVER OF REPUTATIONAL RISK

Despite the numerous layers of irregularities pointed to earlier, the problem that hit the beef supply chain hardest was the connection between cattle ranching and deforestation. Understanding that the implementation of pastures was the motivation behind 63 percent of the devastation to the forests of the Amazon, including protected areas and indigenous lands, various stakeholders—such as controlling agencies, researchers, nongovernmental organizations (NGOs), and investors—began to blame the meatpacking companies for their part in the socio-environmental damage being done to the region.^{46, 47} In 2009, the Federal Public Prosecutor’s Office in the state of Pará (MPF-PA) started to charge farmers that cleared the forest beyond the legal limits and the slaughterhouses that bought from them, as well as to threaten retailers based on the principle of solidary responsibility to persuade them to ban slaughterhouses connected to illegal deforestation.⁴⁸

This endeavor originated the Terms of Adjustment of Conduct (TAC) signed between the MPF-PA and meatpacking companies, with commitments to halt the purchasing of cattle from direct suppliers that trespass the legal limits of deforestation or the requirements of labor standards.⁴⁹ That same year, the four largest meatpacking companies in the country at the time (JBS, Marfrig, Minerva, and Bertin, which was later acquired by JBS) and Greenpeace signed the Public Livestock Commitment (Compromisso Público da Pecuária, or CCP), with the same principles as the TAC, but with additional commitments to exclude direct or indirect suppliers who engaged in any deforestation (legal or illegal) within the Amazon after October 2009, as well as farms on trespassed lands or those that were acquired using rural violence, according to complaints accepted by public institutions.⁵⁰ In 2016, the three main retailers operating in Brazil (Grupo Pão de Açúcar, Carrefour, and Walmart) also submitted to the CCP and committed to eliminating deforestation from their operations and to increasing transparency and isonomy in the control of suppliers. In 2017, after the corruption scandals involving the meatpacking companies, Greenpeace left the CCP, but the group is still convening and presenting its results and auditing reports.^{51, 52}

The TAC and the CCP (Figure 6) operate on the

assumption that the players in the beef supply chain acknowledge their connection to socio-environmental liabilities, and that they can be encouraged to improve their practices in order to keep access to the most valuable markets.⁵³ In fact, these agreements spread throughout other Amazon states in addition to Pará, and now cover most of the federally inspected slaughterhouses that are legally allowed to export beef from the region.⁵⁴ One hundred out of 132 cataloged meatpacking companies have signed the agreements in the Amazon so far.⁵⁵ However, after 12 years of operation under the TAC and CCP, the deforestation associated with beef production is still not controlled and the transparency and traceability instruments foreseen in the agreements are not fully implemented.

There is evidence that the commitments have promoted certain advances, however. These include (i) the acceleration of registration in the Cadastro Ambiental Rural (CAR),⁵⁶ which allows the accessing of information about environmental compliance at the property level; (ii) the reduction of purchases of cattle from recently deforested properties; and (iii) some avoided deforestation on registered properties, whose boundaries are transparent and publicly accessible. That said, most of the irregularities are coming from leakages or cattle laundering schemes

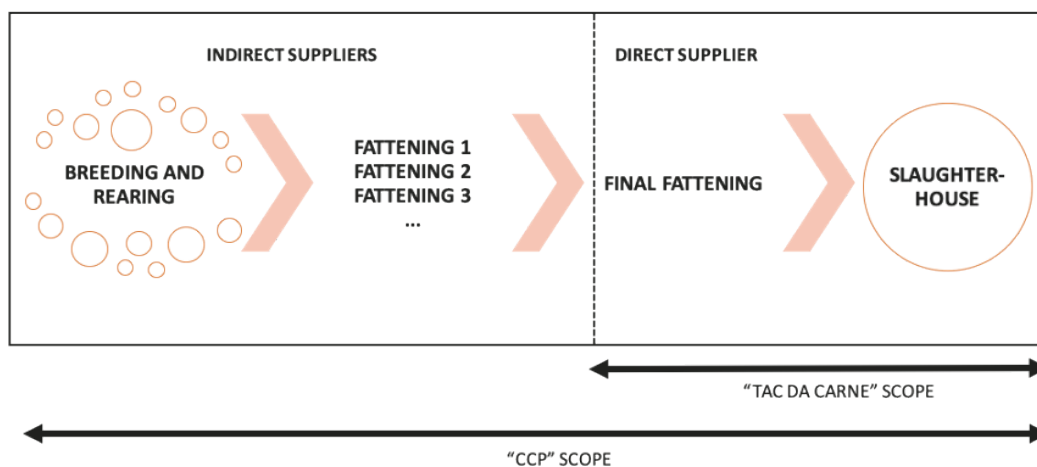


Figure 6. General framework of the production stage of the beef supply chain. Indirect suppliers are usually involved in the breeding and rearing stages, and in the initial fattening cycles. Direct suppliers are the final sellers to the meatpacking companies, but each one of them can have several suppliers to fulfill the production cycle. While the CCP's scope is more comprehensive than TAC's, the auditing procedures are less standardized and there is no binding commitment to the MPF.

that bypass monitoring systems.^{57, 58}

According to a comprehensive investigation by researcher Paulo Barreto and others, published in 2017, about the performance of the meatpacking companies after signing the two agreements,⁵⁹ there are three main challenges hampering the implementation of the commitments. These are (i) cattle ranchers who have evaded blacklisting by the meatpacking companies by using laundering mechanisms like renting in other areas that do not register illegal deforestation, or presenting different documents than the embargo lists of the environmental agencies; (ii) the lack of control of most of the meatpacking companies over the indirect suppliers, which means that the information about the compliance of the properties involved in the first stages of breeding and fattening will not be considered; and (iii) the fact that around 25 to 30 percent of the slaughter capacity is in facilities that are not covered by the agreements, which means that blacklisted cattle ranchers are still able to sell illegal cattle to meatpacking companies outside of the agreements, creating unfair competition for companies that are assuming the costs of monitoring and excluding noncompliant cattle ranchers.

“Inaction in fixing the problems of the beef supply chain carries not only a risk of socio-environmental disaster but also a financial and reputational risk.”

By monitoring only the direct suppliers, the traceability systems cover just 41 percent of the deforestation associated with cattle raising.⁶⁰ Therefore, it is essential to extend the monitoring to the indirect suppliers, as well as to include all of the meatpacking companies in the terms of the agreements, to fill in the gaps that allow noncompliant beef to reach the market.⁶¹ According to a study by geographer Holly Gibbs and others, published in 2015, the agreements

can be improved and made more efficient in terms of avoiding deforestation by taking five specific steps.⁶² These are (i) creating a common monitoring system for all meatpacking companies, regardless of size, which could also be accessed by the retailers who purchase from them; (ii) including calving ranches and other indirect supplying properties to encompass the full supply chain; (iii) releasing public databases like the Guide to Animal Transport (GTA), which tracks the movement of cattle between farms for animal health purposes, to support the identification of acts of noncompliance along the supply chain; (iv) accelerating the CAR implementation for all properties, including smallholders that face more difficulties in reaching the system; and (v) providing comprehensive, spatially explicit and independent auditing of slaughterhouse compliance.⁶³

Inaction in fixing the problems of the beef supply chain carries not only a risk of socio-environmental disaster but also a financial and reputational risk. The three main Brazilian meatpacking companies (JBS, Marfrig, and Minerva), for example, rely on European investors and banks for at least a quarter of their funding, including debt financing and equity holdings.⁶⁴ Nordea Asset Management, one of the largest financial groups in Europe, dropped JBS in 2020.⁶⁵ Six other investors, managing more than US \$2 trillion in assets, have threatened to do the same.⁶⁶ And this is true not only for the beef sector but also for other supply chains, as well as for the very positioning of Brazil in the geopolitical arena. In 2020, both the United Kingdom and the European Union released public consultations to reformulate their legal frameworks to reduce imported deforestation in their supply chains. The bills included voluntary and mandatory measures to restrain the access of noncompliant products to UK and EU markets, such as due diligence for all stages of the supply chain, implementation of standards and labels of international reference, and the adoption of certification schemes. Both bills are under review by the respective parliaments.^{67, 68} If fully approved and implemented, the promise of these new instruments is to raise the bar



Photo credit: Herd at the bank of the Amazon river near a burned section of the rainforest in Pará, Brazil: Juerginho, Shutterstock

for tropical forest commodities attempting to access the most developed markets. In the same direction, the signing of the European Union–Mercosur free-trade agreement, which was negotiated for more than 20 years and celebrated as an early victory by the Bolsonaro government at the beginning of his term,⁶⁹ has been postponed and threatened by the shameful results of the current socio-environmental policies in Brazil.⁷⁰ Even the admission of Brazil to the Organisation for Economic Co-operation and Development (OECD), which is also a priority for the current government, has been undermined by the way the country is tackling deforestation. A recent OECD report about the status of Brazil’s environmental policies and indicators highlighted that the country’s frameworks for environmental licensing and controlling deforestation, for example, are moving away from the recommendations of the organization—and indeed, meeting those recommendations is one of the steps needed for Brazil’s ascension to full OECD member.⁷¹

A NEW ROUND OF SUSTAINABILITY COMMITMENTS: FROM COLLECTIVE AGREEMENTS TO CORPORATE COMPETITION

In 2020 and 2021, understanding the message from investors and the international community, and connecting the narrative to the current climate emergency, JBS, Marfrig, and Minerva updated their pledges to eliminate illegalities from their suppliers and to reach fully traceable, deforestation-free, carbon-neutral operations. In addition to their interactions in the collective agreements, the companies have started individual campaigns targeted at consumers and other stakeholders to position their operations as highly sustainable and ambitious in providing socio-environmental well-being.

JBS has committed to reaching carbon neutrality for the whole company by 2040, including a deforestation-free supply chain by 2035 and eliminating illegal deforestation in the Amazon by 2025. The company will use blockchain technology to monitor indirect suppliers, and it expects to follow the socio-environmental compliance of 90,000 cattle ranchers.⁷² Marfrig has committed to becoming deforestation-free by 2030, with full traceability of its Amazon suppliers by 2025. The company will provide technical and financial support to indirect suppliers to improve production conditions toward compliance, and it will invest in traceability technologies that include blockchain and cattle tagging.⁷³ Finally, Minerva has committed to reaching carbon neutrality by 2035, including the elimination of illegal deforestation in its operations

in South America by 2030. The company intends to monitor indirect suppliers in all country-bases and to implement a low-carbon emission program for 50 percent of its beef suppliers.⁷⁴

The commitments and actions that these big companies are now undertaking are also a consequence of a multistakeholder environment that is developing the network and solutions for improving the beef production industry in Brazil. Initiatives like the Brazilian Roundtable on Sustainable Livestock (Grupo de Trabalho da Pecuária Sustentável, or GTPS),⁷⁵ the Working Group of Indirect Suppliers on Livestock (Grupo de Trabalho dos Fornecedores Indiretos na Pecuária Brasileira, or GTFI),⁷⁶ and Beef on Track (Boi na Linha)⁷⁷ are convening the private sector, civil society, and controlling agencies to develop guidelines and protocols to reduce the socio-environmental impacts and increase the compliance of the beef supply chain.

Thanks to these initiatives, traceability tools like Visipec have been created and validated. Visipec integrates information from public databases and provides regularly updated data to help reduce the exposure to deforestation risks that are present in the early stages of cattle raising. The system is based on a methodology developed by scientists and researchers from the University of Wisconsin-Madison.^{78, 79} In the same direction, the state of Pará and the Federal University of Minas Gerais developed the Selo Verde (Green Seal) as a public digital platform that crosses data sets such as rural property registries, animal transport records, deforestation spots, and schedules of fines. With that information, buyers are able to know whether the cattle that are being traded have been raised on illegally deforested land, on properties that have unpaid environmental fines, or with the involvement of crimes such as slave labor.^{80, 81}

CONCLUSION

The food sector continues to be rapidly and profoundly transformed by technological breakthroughs,

dietary shifts by consumers, and new sustainability and safety requirements by governments. Notwithstanding the current growth of the beef market, the companies in this industry are observing and adapting to these changes. The pressure on the big players and their supply chains will likely continue to increase, and there will be less and less margin for noncompliance. Large-scale illegal deforestation is concentrated in a minor part of the sector—2 percent of properties in the Amazon and Cerrado biomes are responsible for 62 percent of all potentially illegal deforestation⁸²—and the traceability solutions are within reach. Intensive beef farming, which can improve productivity and save land, is already expanding in the Amazon.⁸³ Shortening the lifespan of cattle and improving animal feed are also tools that can be used to increase yields and reduce emissions from the production.⁸⁴ Startups like Pecsá are mainstreaming sustainable ranching using these kind of methodologies, which resulted in up to 90 percent fewer GHG emissions per kilo of beef, compared with a conventional ranch in the same region.^{85, 86} Even the agricultural subsidy policies are moving forward on the sustainability of cattle ranching. The Low-Carbon Agriculture Plan from the Ministry of Agriculture, which includes support for the restoration of degraded pastures and the integration of crops-livestock-forest production systems, has just received US \$1 billion for the 2021—2022 harvest season—the biggest annual budget ever allocated to the plan.⁸⁷

“Considering its role as the main destination for beef exports, the Chinese appetite and standards for Brazilian production will play a vital role in the Amazon’s fate.”

But this bright future is not guaranteed. Although the European Union and other international stakeholders are working to eliminate deforestation from their supply chains, the commitment of China to raising the standards of supply chain imports is still a question

mark. While COFCO, the main Chinese soy trader, announced traceability and environmental performance targets, the country's beef importers have made no noteworthy moves.^{88, 89} Considering its role as the main destination for beef exports, the Chinese appetite and standards for Brazilian production will play a vital role in the Amazon's fate.

Moreover, the combination of rising beef prices and internal political turmoil promote a perfect storm for speculative deforestation in Brazil.⁹⁰ Even if the commitments made by the beef sector are improved and accomplished, if deforestation rates are not controlled it will be hard to separate the companies' efforts from the general trend that the Amazon is following. Stronger signals from the private sector will be necessary not only to fix their own activities but also to defend the public policies and institutional frameworks—including better enforcement of Brazil's own regulations—necessary to keep Brazil as reliable partner.

Gabriel Lui is a Brazilian environmental manager and coordinator of the Land Use and Food Systems portfolio at the Institute for Climate and Society in Rio de Janeiro. Lui is a civil public servant at the Brazilian Ministry of the Environment (on leave), having held director positions in the areas of forest economy, control of deforestation and climate change, sustainable rural development, and payment for ecosystem services. He is also a research associate at the Center for the Analysis of Social-Ecological Landscapes at Indiana University, Bloomington. Lui was lead author of “The Global Assessment Report on Biodiversity and Ecosystem Services” for IPBES, released in 2019. He holds a Bachelor of Science in environmental management and a Master of Science and a Doctor of Philosophy in applied ecology, all from the University of São Paulo in Brazil.

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One Woodrow Wilson Plaza
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