

BEEF IN BRAZIL: SHRINKING DEFORESTATION WHILE GROWING THE INDUSTRY

*Everyone knows where deforestation is in Brazil. Satellites can show you that.
The problem is, how do you know who the owner of the land is, and who is responsible?*

—Fernando Sampaio, Executive Director, Brazilian Beef Exporters Association (Abiec)¹

In June 2009, Greenpeace issued a damning report titled “Slaughtering the Amazon,” accusing the cattle industry of contributing to deforestation—the clear-cutting of mature forests—in the Brazilian Amazon.² Big brands that bought cattle products such as beef and leather were named as silent partners to the practice, including Adidas, BMW, Carrefour, EuroStar, Ford, Honda, Gucci, IKEA, Kraft, Nike, Tesco, Toyota, and Walmart. The pressure from Greenpeace and from the federal prosecutor in the Brazilian state of Pará led to major changes. The federal prosecutor began suing ranchers that had illegally cleared forest lands and threatened to sue retailers in an effort to persuade them to boycott meatpackers associated with forest-clearing ranches. In response, Brazil’s largest meatpacking companies, Bertin, JBS, Marfrig, and Minerva, responsible for one-third of exports, signed an agreement with the Pará government known as the Terms of Adjustment of Conduct, or the MPF-TAC (see **Exhibit 1** for a list of abbreviations used in this case). The MPF-TAC stated that companies would stop purchasing from direct suppliers (first tier ranches) and indirect suppliers (those who sold cattle to farms, which in turn sold to slaughterhouses) that cleared more forest than legally permitted by the Forest Code. The Forest Code was a law requiring that up to 80 percent of rural land be maintained permanently as forest

¹ Interview with Fernando Sampaio, August 25, 2015. Subsequent quotes are from author interviews or emails, unless otherwise indicated.

² “Slaughtering the Amazon,” Greenpeace International, June 1, 2009, <http://www.greenpeace.org/international/en/publications/reports/slaughtering-the-amazon/> (July 21, 2017).

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reserves. The law also prohibited the clearing of vegetation in sensitive areas, such as on steep slopes and along the margins of rivers and streams (effectively permanently protecting these areas legally).³ Agreements similar to the one in Pará were later replicated in the Amazonian states of Acre, Rondônia, and Mato Grosso.

A few months later, the meatpackers, also known as slaughterhouses, signed a more stringent agreement with Greenpeace. Under this new “Cattle Agreement,” they committed to buy only from direct suppliers and indirect suppliers that reduced deforestation to zero. Greenpeace’s cattle campaign worked, producing results similar to a 2006 campaign focused on Amazon deforestation from soy cultivation, which led to an industry-supported Soy Moratorium.⁴ Both the MPF-TAC and Cattle Agreement gave meatpackers a longer timeline to verify that their indirect suppliers were in compliance. Both agreements also required supplying ranchers to enroll on a public environmental registry called the CAR (Cadastro Ambiental Rural, in Portuguese), which identified the boundaries of their ranches and enabled the monitoring of changes in forest cover.⁵

Fernando Sampaio was in a unique position. Hired in 2009 as the sustainability coordinator of Abiec,⁶ the Brazilian Beef Exporters Association, he needed to help meatpackers that exported beef comply with deforestation agreements. Abiec’s primary mission was to defend and promote the interests of the Brazilian beef-exporting sector and, naturally, to grow the industry. But due to buyer pressure and new agreements, members were now expected to take a very active role in curbing deforestation associated with raising cattle. Reflecting on what drove this new expectation, Sampaio observed:

The decision was not very difficult. The main problem the major exporters had at the time was a commercial one. Customers didn’t want to have their brands associated with deforestation. And the main reason the strategy of both Greenpeace and the federal public prosecutor (MPF) succeeded was because they created a commercial problem for the packers, putting pressure also on the customers of the meatpackers, including big Brazilian retailers and big brands abroad. The public prosecutor even launched a television marketing campaign informing consumers about beef from illegal origins. It probably would have been very difficult for MPF to sustain their legal action in court given the lack of public information at the time, the insecurity regarding the Forest Code, and flaws in the regulations. But when it comes to the commercial side, the companies agreed to everything—the TACs and the commitment for zero deforestation from Greenpeace. When I started at Abiec those agreements were already signed. Our involvement came afterwards to find a solution to make those commitments real. So the focus became to create the monitoring system and solutions to get the beef value chain free of deforestation.

³ “Brazilian Forest Law: What is Happening?” World Wildlife Fund, http://wwf.panda.org/wwf_news/brazil_forest_code_law.cfm (January 19, 2016).

⁴ Daniel Nepstad, David McGrath, Claudia Stickler, et al., “Slowing Amazon Deforestation Through Public Policy and Interventions in Beef and Soy Supply Chains,” *Science*, June 6, 2014: Vol. 344 no. 6188, p. 1120.

⁵ Allie Wilkinson, “In Brazil, Cattle Industry Begins to Help Fight Deforestation,” *Science*, May 15, 2015, <http://www.sciencemag.org/news/2015/05/brazil-cattle-industry-begins-help-fight-deforestation> (January 20, 2016).

⁶ The full Portuguese name of Abiec was Associação Brasileira das Indústrias Exportadoras de Carne, <http://www.Abiec.com.br/> (January 13, 2016).

By 2016, Sampaio had helped some Abiec members make significant efforts to identify suppliers associated with Amazon deforestation. Sampaio rose to the position of executive director of the organization and drove changes in the practices of several members over the years. Since the Cattle Agreement was put in place, there had been a number of major strides. In 2015, third-party audits coordinated with Greenpeace had demonstrated that the three largest Abiec members' direct suppliers had few outstanding issues related to deforestation.

Deforestation dropped by over 80 percent from 2004 to 2014, a reduction that was attributed to a combination of factors including the cattle agreements.⁷ Of the registered slaughterhouses in the Amazon with export licenses (half of all registered slaughterhouses), two-thirds had established zero deforestation policies.⁸ All of this was clear progress, as the Greenpeace report had estimated that the cattle sector in the Amazon was the single largest driver of global deforestation.⁹ Furthermore, major beef buyers such as McDonald's were beginning to develop their own policies with ambitious time-bound targets, committing to deforestation-free and sustainable beef.¹⁰ To achieve such commitments, meatpackers would need to ensure that their direct suppliers and indirect suppliers were dedicated to sustainable practices that would not cause further deforestation.

Progress was still limited, for a number of reasons. Many corporate policies and those imposed by Greenpeace and the public prosecutors only influenced slaughterhouses that exported beef. Most slaughterhouses that sold within Brazil did not adopt the same environmental commitments. The exceptions were those selling to members of the Consumer Goods Forum (CGF), a global network of consumer goods manufacturers and retailers focused on sustainability. Even exporting slaughterhouses that were committed to compliance faced challenges, since "laundering" could occur where non-compliant ranches could sell cattle into legitimate supply chains through licensed ranches. "Leakage" was another concern. If the beef supply chain was converted to be deforestation-free without efforts to increase cattle productivity, it was possible that deforestation would occur elsewhere in Brazil or other parts of the world to achieve the growth in volume needed. Brazil was home to the world's largest tracts of remaining tropical forest,¹¹ and one of every five pounds of commercialized cattle meat came from Brazil.¹² What happened in Brazil mattered.

⁷ Nepstad, loc. cit.; Gibbs, et al, "Did Ranchers and Slaughterhouses Respond to Zero-Deforestation Agreements in the Brazilian Amazon?" *Conservation Letters*, April 2015, p. 2.

⁸ Nathalie F. Walker, Sabrina A. Patel, Kemel A.B. Kalif, "From Amazon Pasture to the High Street: Deforestation and Brazilian Cattle Product Supply Chain," *Tropical Conservation Science*, November 2013: Special Issue Vol. 6, Issue 5, p. 459.

⁹ Greenpeace International, "Slaughtering the Amazon Executive Summary," June 1, 2009, p. 3, <http://www.greenpeace.org/international/en/publications/reports/slaughtering-the-amazon/> (August 22, 2016).

¹⁰ "McDonald's Pledges to Eliminate Deforestation from Supply Chain," Union of Concerned Scientists, April 21, 2015, http://www.ucsusa.org/news/press_release/mcdonalds-eliminates-deforestation-from-supply-chain-0489#.VqAe4fkrIgs (January 20, 2016).

¹¹ Gibbs, op. cit., pp. 2, 8.

¹² Jessica Pothering, "Where's the Beef? In Brazil, an Investment in Sustainable Cattle," *Impact Alpha*, October 16, 2015, <http://impactalpha.com/wheres-the-beef-in-brazil-an-investment-in-sustainable-cattle/> (November 30, 2015).

By 2015, Brazilian Amazon deforestation had grown by 16 percent compared to the prior year, demonstrating that gains made over time were still fragile.¹³ How could Sampaio's organization, which represented the interests of 29 meatpackers in Brazil (responsible for 70 percent of slaughtering and 93 percent of exports¹⁴) persuade more of its members to adopt a zero-deforestation policy and demand compliance of their suppliers? Working with direct suppliers was one thing. But working with indirect suppliers, the ranches where cattle often spent time being raised before being sold to other ranches, was an extremely difficult task for meatpackers (See **Exhibit 2** for a graphic of the beef value chain). How could Abiec have a better sense of whether any recent deforestation was linked to its members? And how could sustainable practices keep pace with the rising demand for Brazilian beef?¹⁵ For Sampaio, his goal of growing sales for his members while curbing deforestation was a complex challenge that required working with many actors in the beef value chain.

FERNANDO SAMPAIO

An agricultural engineer, Sampaio moved from Brazil to France in 1999 to study the meat and milk market, after which he worked for a French beef processor. During that time, bovine spongiform encephalopathy (BSE), a fatal ailment more commonly known as mad cow disease, spread throughout Europe and beef consumption dropped. Europe was a net exporter of beef at the time. After the crisis, it became a net importer. In 2001, foot and mouth disease, a highly contagious viral disease that affects cattle and other hoofed animals, took hold in the United Kingdom, and the clampdown on U.K. production enabled Brazil to increase exports. According to Sampaio, from 1997 to 2007, Brazil beef exports grew around 1,000 percent. At the time, in many developing countries the middle class was growing, with rising incomes leading to an increase in meat consumption. As Sampaio noted, "Brazil's exporters were in the right place at the right time." Meatpackers benefitted from major investments by the Brazilian Development Bank, which aided their global expansion.

In 2008, Sampaio shifted to a Dutch beef import company and conducted beef trading in Brazil on behalf of the company. Then came the release of the Greenpeace report and the first agreements between processors and the Pará public prosecutor's office. In November 2009, Sampaio received a call from Abiec to accept a role created just for him—sustainability coordinator. In his previous job as a beef trader in Europe, he had worked on the Brazilian government's traceability system to guarantee the food safety of beef exports to Europe, and Abiec leaders hoped this experience would be transferable, and apply to the problem of deforestation.

Many Abiec members were resisting pressure from activist groups, retailers, importers, and the government to curb deforestation. Convincing members to take action would not be easy. Sampaio was tasked with coordinating the efforts of Abiec members, helping to take a uniform position on the issue and find solutions for assessing the socio-environmental risks in the supply chain. Sampaio faced pressure from many different groups to get farmers to become legally

¹³ Rhett A. Butler, "Amazon Deforestation Jumps in Brazil, But Remains Historically Low," November 27, 2015, *Mongabay*, <https://news.mongabay.com/2015/11/amazon-deforestation-jumps-in-brazil/> (August 23, 2016).

¹⁴ See the Abiec website, <http://www.abiec.com.br/> (November 1, 2016).

¹⁵ "Rabobank Global Beef Quarterly Q1: South American Beef Exports to Rise," Rabobank, March 29, 2016, https://www.rabobank.com/en/press/search/2016/20160329_rabobank-global-beef-quarterly.html (August 23, 2016).

compliant and commit to zero deforestation, and all these groups had slightly different requirements. He decided Abiec had to work on improving monitoring and the efficiency of livestock production, through the dissemination of good practices, legal compliance, and access to credit.

Initially, Sampaio's members were being pressured to force farmers to complete the CAR, which was expensive. After some farmers completed the CAR, they still found they were fined for non-compliance. The TAC stipulated that by January 2010 meatpackers had to start asking for the CAR for every cattle purchase. Plants were shut down, farmers' associations were protesting, and cattle prices went down. Abiec was involved in negotiations between farmers, meatpackers, and the MPF to change the CAR into a self-declaratory document, to be verified at a later point. Fines were suspended, and meatpackers helped farmers complete the CARs, leading to a significant increase in registrations. At the same time, Sampaio explored many deforestation monitoring system technologies, including costly individual traceability systems. Eventually, Abiec developed a protocol for a geographic monitoring system created by AgroTools, which many meatpackers adopted.

Sampaio reflected that it was a lot easier to put the pressure on a handful of companies at the time—rather than focus on so many ranchers. By the end of 2010, Sampaio had risen to the position of executive director (see **Exhibit 3** for an Abiec organizational chart).

ABIEC MISSION AND ACTIVITIES

Founded in 1979 to defend the specific interests of Brazilian meat exporters, Abiec had a threefold mission: defend the interests of the Brazilian beef export sector domestically and internationally; reduce trade barriers and promote Brazilian products abroad; and work to ensure representation of the sector in national and international forums to influence decision-making and regulatory and legislative processes affecting the international beef trade. The group planned to expand its membership, and worked with importer associations, foreign trade ministers, and other government officials to execute its mission. It was the key organization advocating for meat processors on labor, regulations, taxes, the environment, and other issues affecting the industry. Abiec also provided support on animal health, sustainability, marketing, and market and exports analysis.

CATTLE

Cattle had come to Brazil with colonizing Europeans, and were used for transportation, domestic food, and leather. By the middle of the nineteenth century, Brazil was producing jerked (i.e., dried) beef for the country. Exports began at the beginning of the twentieth century, when American and British companies began to produce corned beef (i.e., salt-cured beef). Once the capital shifted in 1960 from Rio de Janeiro to Brasilia, in the middle of the country, the government began to encourage the occupation of the west and northern regions of Brazil for the development of various industries. As the government invested in roads and power plants, thousands of people who worked in construction settled in these areas. Settlers were largely incentivized by being offered land—but only received title if forest land was cleared. Cattle were then raised on cleared land,

and Brazil's overall cattle herd grew from about 100 million head in the 1970s to 219 million head by 2016.¹⁶

In Brazil, ranchers raised cattle mostly on pasture land, so herds were grass fed. Often, small calving ranches bred the cattle, and then transferred them to fattening farms or other ranches. From this stage, the cattle were then sold to the slaughterhouse.¹⁷ In 2009, 37 percent of the country's cattle were located in the Legal Amazon, the nine states in the Amazon basin. As of 2013, there were 67 officially registered slaughterhouses in the Legal Amazon, 34 of which were licensed to export beef.¹⁸

Beef

About 80 percent of Brazilian cattle were zebu breeds, and 20 percent were taurine and cross breeds. Increasingly, the two breeds were being mixed to produce higher-quality beef.¹⁹ In 2015, Brazil had an average of 1.25 head of cattle per hectare, a relatively low rate of productivity (see **Exhibit 4** for details on Brazilian beef production and consumption). Although over 80 percent of Brazilian beef was consumed in-country, multinational buyers and banks were placing great pressure on cattle suppliers, which was having a significant influence on the overall industry in Brazil.

Global production of beef and veal was forecast to grow slightly in 2017.²⁰ A 2015 report cited Brazil as the world's second-biggest beef exporter (by weight) behind India, which mostly sold meat from water buffalo, which typically was classified as beef.²¹ Brazilian exports reached \$5.9 billion in sales in 2015.²² Exports were estimated to rise by 80 percent in the next ten years,²³ with future exports projected to be met by growing production in the Amazon region, with its cheap land and good climate. A food safety scandal in which Brazilian sanitation inspectors and companies were accused of conspiring to sell rancid products had put a dent in sales, with beef export volumes down 11 percent in March 2017 compared to March 2016.²⁴ Yet the government expected export levels to return to normal as more and more countries lifted their import bans.²⁵

¹⁶ Rob Cook, "Beef Cattle Inventory: Ranking of Countries," Beef2Live, August 15, 2016, <http://beef2live.com/story-world-cattle-inventory-ranking-countries-0-106905> (August 22, 2016).

¹⁷ Interview with Marcio Astrini, then senior campaigner for forests, Greenpeace Brazil, March 17, 2015.

¹⁸ Walker, Patel, and Kalif, op. cit., p. 450.

¹⁹ Rebeca Duran, "The Brazilian Cattle Industry," *The Brazil Business*, March 13, 2014, <http://thebrazilbusiness.com/article/the-brazilian-cattle-industry> (May 4, 2015).

²⁰ "Livestock and Poultry: World Markets and Trade," *USDA Foreign Agricultural Service*, April 2017, https://apps.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf (June 7, 2017).

²¹ Virginia Harrison, "Holy Cow! India is the World's Largest Beef Exporter," *CNN Money*, August 5, 2015, <http://money.cnn.com/2015/08/05/news/economy/india-beef-exports-buffalo/> (January 20, 2016).

²² "Brazilian Livestock Profile, Annual Report 2016," ApexBrasil and Abiec, 2016, page 6, <http://www.newsprime.com.br/img/upload2/sumario-ingles-010217.pdf>. (July 26, 2017).

²³ Walker, Patel, and Kalif, op. cit., p. 459.

²⁴ Ana Mano, "Brazil's beef export volume up 20 percent despite meat scandal: Abiec," Reuters, April 11, 2017, <http://www.reuters.com/article/us-brazil-beef-exports-idUSKBN17D2P1> (July 23, 2017).

²⁵ Ibid.

Other Products

Brazilian leather was typically sold as chrome-tanned hides, shoes, and other leather goods. A majority of Brazilian leather was exported in 2008 to the United States as finished goods or to Italy, China, and other countries for processing.²⁶ Bertin, acquired by JBS in 2009, was one of the world's largest leather traders. Many other cattle parts were used for commercial products. Tallow/fat, bones, intestines and other organs, blood, hooves, and horns were used in cosmetics, tennis racquet strings, antifreeze, paint, and many other products.²⁷ Brazil was a net importer of dairy products, however. In 2014 the country had 19 million dairy cattle (about 10 percent of all cattle).²⁸ Once dairy cows stopped producing milk, they were often sold to slaughterhouses. Since most dairy products were sold domestically and dairy farms were mostly located closer to urban centers in the south and southeast, the dairy industry was not a big target of anti-deforestation activists.

DEFORESTATION IN BRAZIL

Deforestation Drivers

Globally, agriculture and deforestation was second only to the energy sector for driving greenhouse gas emissions.²⁹ Commercial agriculture drove at least 71 percent of tropical deforestation between 2000 and 2012.³⁰ The worst of these forest impacts came from a few agricultural commodities—palm oil, soy, timber and pulp, and cattle.³¹ In Brazil, property speculation, lack of clear land titles, large infrastructure projects, legal uncertainty, and faulty governance all contributed to deforestation and the complex dynamics in the region.³² Since the Amazon contained the world's largest remaining tropical forest and forests store huge amounts of carbon in their vegetation and soils and contain extraordinary levels of biodiversity, curbing deforestation was critical to curbing global carbon emissions and reducing biodiversity loss.

Cattle Sustainability

In 2012, nearly 60 percent of the world's agricultural land was used for beef production, yet it accounted for less than two percent of calories consumed worldwide. Beef made up 24 percent of world meat consumption and beef production took up 30 million square kilometers of global land. In contrast, poultry accounted for 34 percent of global meat consumption and pork accounted for

²⁶ Walker, Patel, Kalif, op. cit., p. 454.

²⁷ Walker, Patel, Kalif, op. cit., p. 451.

²⁸ "Brazil Market Report," Wisconsin International Trade Team, <https://datcp.wi.gov/Documents/Brazil2014DairyandGenetics.pdf> (August 22, 2016).

²⁹ "Global Greenhouse Gas Emissions Data," U.S. Environmental Protection Agency, <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data> (August 22, 2016).

³⁰ Sam Lawson, et al., "Consumer Goods and Deforestation," Forest Trends, September 2014, http://www.forest-trends.org/documents/files/doc_4718.pdf (December 2, 2015)

³¹ "Supply Change: Corporations, Commodities, and Commitments that Count," Forest Trends, http://www.forest-trends.org/releases/p/supply_change_2015 (August 22, 2016).

³² "Mechanisms for Control and Mitigation of Deforestation in the Brazilian Amazon Biome," GTPS, http://www.grsbeef.org/sites/default/files/images/content/gtps_white_paper_on_mechanisms_for_control_and_mitigation_of_deforestation_in_the_brazilian_amazon_biome_livestock_cattle.pdf (February 4, 2016).

40 percent, but each used less than two million square kilometers of land.³³ Therefore, cattle required enormous resources of feed and water compared to other meat sources.³⁴ Cattle had a large impact on greenhouse gas emissions for two reasons: 1) forests were cut down to create grazing pasture; and 2) cows produced methane emissions from belching and, to some extent, flatulence.

Impact of the Greenpeace Campaign

The environmental action group Greenpeace was known for its daring tactics to shed light on environmental problems. According to Marcio Astrini, senior campaigner for forests at Greenpeace Brazil at the time: “Greenpeace’s business was the forest, and the problem was deforestation. We looked at the problem, and tried to act.”³⁵ The 2009 report described how major meat and leather companies were selling products sourced from ranches implicated in deforestation, most of it illegal, and how the Brazilian National Development Bank was the major funder of a rapid expansion of slaughterhouses into the Amazon.³⁶ Several companies had negative reactions to the report, claiming it contained inaccuracies. But within two weeks of the report being issued, major suppliers lost significant share value: Minerva shares lost 11.3 percent, Marfrig lost 10.2 percent, and JBS lost 7.5 percent.³⁷

Certain customers cancelled contracts and took immediate action against some of the slaughterhouses, due to consumer pressure. Adidas, Nike, Timberland, and other shoe companies using Brazilian leather in their products agreed to develop a zero deforestation plan and committed to cancel contracts unless their products could be guaranteed to be free from any links to Amazon destruction. The Brazilian Association of Supermarkets, which included Walmart and Carrefour, called for the beef they sold to be deforestation-free. Soon, the tone of several slaughterhouses turned to one of cooperation, primarily driven by pressure from European customers. They agreed initially to require their directly supplying ranches to register with the CAR, and agreed to implement supply chain monitoring systems and be subject to third-party audits coordinated with Greenpeace. (See **Exhibit 5** for a timeline of key events.)

Challenges with Compliance

According to Sampaio, it was no mystery, even before 2009, where deforestation was occurring in Brazil since satellite data was available. The problem was determining who the owner of the land

³³ “Agriculture at a Crossroads – Meat and Animal Feed,” International Assessment of Agricultural Knowledge, Science and Technology for Development, <http://www.globalagriculture.org/report-topics/meat-and-animal-feed.html> (April 28, 2015).

³⁴ “Meat’s Large Water Footprint,” December 16, 2013, foodtank, <http://foodtank.com/news/2013/12/why-meat-eats-resources> (May 6, 2015).

³⁵ Interview with Marcio Astrini, March 17, 2015.

³⁶ Nathalie Walker, Barbara Bramble, and Sabrina Patel, “From Major Driver of Deforestation and Greenhouse Gas Emissions to Forest Guardians? New Developments in Brazil’s Amazon Cattle Industry,” National Wildlife Federation, December 2010, <http://www.nwf.org/Global-Warming/Policy-Solutions/~media/4878226C49BF48EB9EB54C1B7C616327.ashx> (August 22, 2016).

³⁷ Miriam Leitão, “Slaughterhouses Come in Low on the Bovespa [stock exchange] After Complaints,” *O Globo*, June 17, 2009, <http://blogs.oglobo.globo.com/miriam-leitao/post/frigorificos-entram-em-baixa-na-bovespa-apos-denuncias-196431.html> (January 19, 2016).

was, and who was responsible for the deforestation, which the government was not capable of assessing. The only information available was a list of farmers practicing illegal deforestation published by the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA)—the government organization responsible for controlling illegal deforestation. Once IBAMA found evidence of illegal deforestation, the farmer’s name would be placed on a list. Abiec members thought that if they looked at that government-controlled list, they had done their due diligence. However, Greenpeace found a great deal of deforestation that was not reflected on the IBAMA list, so Abiec became involved to help members take greater ownership in monitoring deforestation. Sampaio remarked, “It was a difference of interpretation of our role, actually. They were giving private groups the government’s responsibility.” Public prosecutors had told Abiec members they were not following the law because they bought from farmers that didn’t comply with the Forest Code. Sampaio said, “Ninety percent of our farmers didn’t comply. That was the problem. Everyone was illegal, according to the Forest Code. When the occupation process happened, land was being cleared and people were not paying attention to regulations.” In fact, clear ownership records existed for less than four percent of private land in the Amazon,³⁸ and there were few resources to track properties in such a vast region.

When first embarking on monitoring efforts, Sampaio faced significant challenges getting Abiec members to cooperate with one another. Since farmers often supplied cattle to more than one meatpacker in the same region, Sampaio’s initial vision was to create a single shared database platform containing geographical and document-based information for members to monitor deforestation. Meatpackers would feed information about suppliers into the platform and earn credits, which could be used to consult the platform for information. Since multiple packers could report on one supplier, the supplier data would become richer over time. The cost of the database would be shared among meatpackers based on usage. Ultimately, meatpackers pushed back on Sampaio’s vision. The shared database had been intended to only show meatpackers data on their own suppliers. However, meatpackers felt their supplier data was too valuable to feed into a shared database. Sampaio’s plan for a single platform failed, leading Abiec to work with meatpackers on developing individual databases.

In addition to creating effective databases for members, another challenge Abiec faced was determining what legal compliance actually meant. The Forest Code had evolved greatly over the years. One requirement pertained to the percentage of farmland that had to be preserved as forest—80 percent if the land was in the Amazon. Another requirement related to the permanent preservation areas. For example, if a river ran through a farm, it had to keep a certain level of vegetation on the border of the river. Areas surrounding lakes, hills, and other land features had to be preserved. Often the land had been occupied before regulations were put in place, which made it complicated to determine compliance.

Abiec had many disagreements with the public prosecutor regarding the extent to which meatpackers should be responsible for monitoring suppliers and helping them improve. Government data was poor, making Abiec’s job more difficult. For example, the TAC stipulated suppliers with more than 5,000 hectares of land should register in the CAR by a specific deadline, and yet, there was no government record of farms of that size. Due to issues like these, the TAC

³⁸ Alexei Barrionuevo, “Brazil Aims to Prevent Land Grabs in Amazon,” *The New York Times*, December 26, 2009, <http://www.nytimes.com/2009/12/27/world/americas/27brazil.html> (December 2, 2015).

had to be renegotiated many times. At one point, a frustrated Sampaio said, “We need a legion of lawyers to buy a single head of cattle.” In July 2012, after discussions with the Pará public prosecutor, Abiec members received more clarity on how to establish legal compliance within the supply chain.

ACTION ACROSS THE VALUE CHAIN

A combination of government and supply chain interventions were deployed over time to tackle beef-related deforestation. Abiec was involved in many industry collaborations designed to gain better visibility of the problem, enforce compliance, and incentivize supply chain actors to make changes and focus on continuous improvement that could reduce deforestation and improve business performance. Other initiatives outside of Abiec were also making an impact.

Increasing Industry Collaboration

Global momentum as a whole had been growing to advocate for deforestation-free commodities. In 2010, the CGF announced its commitment to zero net deforestation related to beef, soy, palm oil, and paper in member supply chains by 2020. This commitment reinforced the demand signal for deforestation-free beef from companies like Walmart, Carrefour, Unilever, and others. While “zero deforestation” meant no forest areas were cleared or converted, “zero net deforestation” allowed for the clearance or conversion of forests in one area as long as an equal area was replanted elsewhere.³⁹ Additional companies such as Cargill and McDonald’s committed to zero deforestation beef as part of the New York Declaration on Forests. The Tropical Forest Alliance 2020 was formed in 2012 as a public-private partnership between the U.S. government and the CGF to mobilize all actors to reduce commodity-driven tropical deforestation, including local governments.

Abiec actively worked in other partnerships with NGOs, government organizations, and agribusiness consultancies to address deforestation reduction, child labor, protection of indigenous communities, cattle production intensification, greenhouse gas emission reduction, and environmental compliance of the beef supply chain. The organization had Technical Cooperation Agreements (ACTs in Portuguese, for “Acordos de Cooperação Técnica”) with the Federal Public Ministry and Ministry of the Environment to support the implementation of the Forest Code. Sampaio was also the president of GTPS (Grupo de Trabalho da Pecuária Sustentável, which translated as the Brazilian Roundtable on Sustainable Livestock), a working group committed to zero deforestation and sustainable beef. GTPS comprised environmental organizations and beef supply chain representatives including input suppliers, farmers, banks, research centers, retailers, and others.

The GTPS felt three main practices could address the issue: stricter deforestation control, increased livestock efficiency, and financial incentives for farmers.⁴⁰ But the organization contended that improving efficiency depended on farmers having access to technology and credit. GTPS developed national interpretations of standards set by the Global Roundtable on Sustainable Beef

³⁹ Sarah Lake and Elizabeth Baer, “What Does it Really Mean When a Company Commits to ‘Zero Deforestation’?” World Resources Institute, May 4, 2015, <http://www.wri.org/blog/2015/05/what-does-it-really-mean-when-company-commits-%E2%80%9Czero-deforestation%E2%80%9D> (February 4, 2016).

⁴⁰ GTPS, op. cit.

(GRSB), an international multi-stakeholder initiative advancing continuous improvement in beef value chain sustainability. A group actively engaged with GTPS was the National Wildlife Federation (NWF), which developed strategies to reduce the environmental impacts associated with large-scale agriculture, and led a joint working group on forests for the GRSB-GTPS focused on advising the CGF on reaching its goals.⁴¹

Before Sampaio became president of GTPS, the organization had explored a certification scheme for sustainable beef. However, farmers had difficulty complying even with existing rules, and given there was very little market demand for certified beef, Abiec threatened to pull out of the roundtable if certification was to be a goal. Once he became president, Sampaio instead helped the organization focus efforts on disseminating best practices, supporting pilot projects, and creating a self-assessment tool. In December 2015, Sampaio and the GTPS executive committee represented the organization at the 2015 United Nations Climate Change Conference, COP 21, held in Paris. At the occasion, GTPS launched its position paper entitled “Brazilian Livestock and Its Commitment to Sustainable Development,” which presented some key messages on the role livestock production can have on sustainable development.

Individual retailers found support from the various working groups focused on sustainable beef. Global retailer Tesco had begun working closely with CGF in 2010 on efforts to reduce deforestation related to cattle, palm, soy, and timber, partly due to Greenpeace’s accusations that Tesco’s corned beef was linked to deforestation since it was sourced from JBS. Tesco had set a goal to become a zero-carbon business by 2050, and to use scarce resources responsibly, including in its supply chain. Tinned corned beef from Brazil amounted to less than five percent of Tesco’s beef products and yet, due to intense activist focus, the company had done a great deal, working with the CGF and NWF to trace that supply chain. Since tinned corned beef involved only one ingredient, supply chain traceability with respect to deforestation was relatively simple. A key next step for Tesco was to get the industry to focus on indirect farms. Tesco was working with multi-stakeholder groups as part of a broader strategy to raise standards for the entire sector. According to Charlotte Williams, group sustainability manager at Tesco, “It is good if you can get your own supply chain to look good, but if you can transform your market, that’s where you want to go.”⁴²

In the spring of 2014, McDonald’s announced its commitment to global deforestation-free commodity sourcing for beef, poultry, palm oil, and packaging. This move was the result of work with many groups, including the World Wildlife Fund (WWF), and was poised to affect 3,100 of the company’s global direct suppliers and countless indirect suppliers. Given that McDonald’s purchased five percent of all Brazilian beef, this was a very important step.⁴³ David McLaughlin, vice president of agriculture at the WWF, commented on the significance of the move, saying, “McDonald’s brings size and scale to the debate of sustainable sourcing. Their reach is large, they are global, they work closely with the suppliers and so this outreach can only help.” The

⁴¹ “GRSB-GTPS Joint Working Group on Forests (with Consumer Goods Forum),” <http://www.grsbeef.org/working-group/grsb-gtps-joint-working-group-forests-consumer-goods-forum> (December 2, 2015).

⁴² Interview with Charlotte Williams, group sustainability manager, Tesco, March 31, 2015.

⁴³ Sri Srinivas, “McDonald’s to Axe Deforestation from its Global Supply Chain,” *The Guardian*, April 21, 2015, <http://www.theguardian.com/sustainable-business/2015/apr/21/mcdonalds-deforestation-global-supply-chain> (December 1, 2015).

announcement followed similar pledges by Dunkin' Donuts, Krispy Kreme, Yum Brands, and many other companies, in a wave of deforestation-free commodity sourcing pledges globally.⁴⁴ Brazilian grocery retailer Pão de Açúcar also made a public announcement in 2016 agreeing to stop sourcing beef linked to deforestation.⁴⁵

Traceability Efforts

Several Abiec members were making serious efforts to trace deforestation in their supply chains. Sampaio recounted how, in 2009, Abiec told Greenpeace that if the government was not controlling deforestation, Abiec would have to create its own system. There was one government system that focused on animal health control, but it only tracked cattle movements and vaccinations for health purposes. Abiec started a program to place farms on a map, and then cross-referenced each location with maps of deforestation, indigenous lands, and conservation areas, using satellite imagery. The main problem was not cross referencing the information, but rather, to create the database. "I can't do that only with GPS [Global Positioning System] at a farm with one dot," said Sampaio. "If I have deforestation five miles from here, I don't know if it's inside a farm or not. I need the entire boundary of a farm mapped." This mapping effort had huge costs for the industry, as there were hundreds of thousands of suppliers all over the Amazon to map. Abiec staff started with GPS point location to have an idea of the size of the problem. They created a scale of geographic information of the farm. They would start with a municipality, go to the GPS dot, go to a map, then to a map with documentation to prove deforestation. It was a complex and expensive exercise. Abiec was the organization that initiated the contact with specialized geospatial consulting firms to define criteria and the functioning of the monitoring system. The largest exporters then started building their own geographical databases of suppliers. Smaller Abiec members lacked the resources and the expertise to do the same, and were not under the same pressure. Abiec took the lead in efforts with smaller members and in negotiations with MPF and Greenpeace.

Marfrig, based in São Paulo, Brazil, was the third-largest beef processor in the world, supplying to large global brands such as McDonald's. Sixty percent of its business involved exports. Mathias Azeredo De Almeida, sustainability manager for the beef division in Brazil, was tapped to take the lead on the issue following the Greenpeace report's release. The company developed a monitoring system using satellite technology that tracked over 8,000 direct supplier farms in the Amazon biome. As a result, Marfrig blocked some 2,000 farms from supplying to the company because they caused Amazon deforestation since the 2009 signing of the MPF-TAC agreement. Reflecting on what drove Marfrig to improve practices, Almeida said the federal public prosecutor's office in Pará state was more influential than anyone else in spurring change through its litigation. "Without

⁴⁴ Forest 50 website, <http://forest500.org/> (October 5, 2016).

⁴⁵ Richard George, "Brazilian supermarket giant Pão de Açúcar tops buying deforestation beef," Greenpeace, April 1, 2016, <http://www.greenpeace.org.uk/blog/forests/brazilian-supermarket-giant-p%C3%A3o-de-a%C3%A7%C3%BAcar-stops-buying-deforestation-beef-20160401> (September 29, 2016).

our overall sustainability practices, perhaps we could not have sold to markets such as Europe where consumers are very environmentally conscious.”^{46, 47}

Brazil-based JBS was the largest meat-processing company in the world, based on sales. Like Marfrig and Minerva, JBS had undertaken enormous efforts after the cattle agreements to trace its supply chain. Like the other companies, JBS used deforestation maps produced by the Brazilian Institute for Space Research (INPE) to identify deforestation on their direct supplying properties, which sold half of the cattle slaughtered in the Brazilian Amazon. Bertin, originally part of the cattle agreements, was subsequently purchased by JBS.

A research study led by Holly Gibbs from the University of Wisconsin-Madison examined the effect of the zero-deforestation agreements in the Brazilian Amazon state of Pará using property-level data on beef supply chains.⁴⁸ The study analyzed daily purchases by four JBS slaughterhouses in Pará state before and after the agreements and found that they avoided purchasing from properties with deforestation, which was not the case prior to the agreements. Supplying ranches registered their properties in the CAR nearly two years before surrounding non-supplying properties, and 85 percent of ranchers surveyed indicated the agreements were the driving force. When the Cattle Agreement was signed in October 2009, only two percent of purchases were with registered properties, despite the legal requirement to register. By 2013, 96 percent of transactions were with registered properties, showing the influence of the agreements. In 2009, 36 percent of properties supplying to JBS had recent deforestation, and this fell to four percent by 2013. While the study highlighted important changes in the beef supply chain, the researchers noted the narrow scope of the agreements. For example, implementation of the Cattle Agreement by that time did not cover indirect suppliers, which meant diminished outcomes for forest conservation. Therefore, it was important that going forward, more direct and indirect suppliers became involved in sustainability and a broader group of meatpackers signed and implemented commitments.

In addition to the three largest meatpackers, other Abiec members began tracking their suppliers as well, and used geospatial consultancies to crosscheck their supplier information with lists highlighting indigenous and conservation areas. While meatpackers made extensive efforts to develop traceability methods, they had difficulty guaranteeing they were purchasing exclusively from farms with the CAR. In June 2012, a Greenpeace report titled “Broken Promises” accused JBS of having connections to illegal deforestation, slave labor, and invasion of indigenous land. JBS took legal action, but Greenpeace and JBS made an agreement to withdraw the case. JBS and Greenpeace eventually started a new dialogue, with JBS recommitting to promises made in the 2009 Cattle Agreement.⁴⁹

⁴⁶ “Cattle Ranching Goes Green in the Brazilian Amazon,”

<http://www.Abiec.com.br/news/texto.asp?idN=438&id=9238#.Vl4jI3arQgs>, (December 1, 2015).

⁴⁷ Interview with Mathias Azeredo De Almeida, then sustainability manager for beef at Marfrig, March 24, 2015. Subsequent quotes are from author interviews or emails, unless otherwise indicated.

⁴⁸ Unless otherwise noted, information from this section was gathered from Gibbs, et al, op. cit., pp. 1-10.

⁴⁹ Jess Miller, “JBS Recommits to Cattle Agreement in the Amazon,” Greenpeace, December 19, 2012, <http://www.greenpeace.org/international/en/news/Blogs/makingwaves/jbs-recommits-to-cattle-agreement-in-the-amaz/blog/43470/> (January 6, 2016).

Meanwhile, in a movement to increase transparency and accountability among major multinational corporations and investors, several organizations launched global transparency platforms to publicly expose and track the policies and practices of commodity buyers that purchased high deforestation risk commodities, including beef. For example, the Global Canopy Programme launched an ambitious project called the Forest 500 to identify, assess, and track the key players who could eliminate deforestation from global supply chains. They rated 50 jurisdictions, 250 companies, 150 investors and lenders, and 50 other powerbrokers on their efforts to tackle deforestation. The Stockholm Environmental Institute was working with the Global Canopy Program to develop a global transparency platform that would link deforestation, commodity trade, and individual companies. An international nonprofit organization called Forest Trends developed a program called Supply Change, which was a platform for real-time news, data, and analysis that catalogued and contextualized global progress toward deforestation goals.⁵⁰ The World Resources Institute, a research organization, created an online platform called Global Forest Watch Commodities to help stakeholders link deforestation to specific commodities.

Monitoring

As part of monitoring efforts cited in the Cattle Agreement, JBS, Marfrig, and Minerva agreed to have their efforts to remove deforestation from their direct suppliers audited. In April 2014, Greenpeace declared that it found Brazilian processors had systems in place to block the purchase of cattle from farms operating on cleared forest land, farms linked to slave-like working conditions, or farms located on indigenous lands or conservation areas. This was based on company audits covering operations in 2013. The audits detailed the companies' thorough geo-referencing systems that checked a sample of the property boundaries of their suppliers. The level of non-compliance by these three companies, based on the Cattle Agreement, was less than one percent for all criteria.⁵¹ Audits in 2015 told a similar story.

The tracking systems based on geo-referenced databases developed with Abiec's members provided, for the first time, a view into which farms were responsible for deforestation. However, given the complex process and the cost involved in managing the tracking system and developing and updating the databases, it was difficult to scale this system to many meat processors, especially small ones without the resources to pay for it. Over time, technology was improving, making monitoring more affordable. According to Sampaio, having the CAR also helped to improve the capacity of companies to monitor suppliers.

In 2009, the large meatpackers were asking Greenpeace and the MPF to pressure other companies to adopt the same agreements, in order to level the playing field. Otherwise, they were concerned that excluded farmers could sell cattle to meatpackers that hadn't signed agreements. Abiec and Sampaio were in a delicate position, knowing that smaller meatpackers couldn't afford monitoring systems and the heavy requirements of the TAC. Smaller meatpackers did not sign the Greenpeace agreement, but they had to somehow comply with MPF pressure. JBS, Marfrig and Minerva realized over time that their databases had become assets to gain new clients, have good public

⁵⁰ Forest Trends, loc. cit.

⁵¹ Bob Moser, "Greenpeace Approves Actions by JBS, other Brazil Processors," meetingplace, April 3, 2014, <http://webcache.googleusercontent.com/search?q=cache:3tOKnRGDtmYJ:www.meetingplace.com/Industry/News/Details/49289&hl=en&gl=us&prmd=ivns&strip=0> (December 2, 2015).

relations, and reduce risk. Sampio recalled, “We came to a situation where in the same [large] company, cattle buyers wanted other meatpackers to have the same requirements as they had to level the competition, but traders and managers wanted to say they were the only company with so much control of their supply chain in the world...Of course, as Abiec, we wanted the same rules for everyone, and that’s how we proceeded in our strategy.”

Abiec’s protocol provided a guideline for how to improve monitoring systems over time, and smaller meatpackers adopted risk assessment tools and utilized geographical systems as they became more affordable. According to Sampaio, “It was not an easy job. Many of the smaller meatpackers had no sustainability department, or the sustainability department was the lawyer negotiating TACs. They had no idea of how their suppliers were disposed geographically, and the only one that knew where farms were was the truck driver that collected cattle.” Ultimately, retailers helped pay for smaller meatpackers’ monitoring systems after coming under pressure from Greenpeace and the large meatpackers.

Technology was playing an increasingly important role in monitoring efforts. Many brands and meat processors had begun to use customized products from the Brazilian company AgroTools, which provided detailed product safety information and deforestation monitoring of territories. The company counted McDonald’s, Walmart, JBS, BRF, and Marfrig among its clients. In 2015, a start-up called Terras App Solutions launched a tracking system under a freemium business model, largely driven by the demand of small and medium-sized meatpackers that lacked the resources for monitoring their supply chains. Terras was a spinoff of Imazon, a renowned nonprofit working on deforestation monitoring in the Amazon.

Penalties and Incentives

The government was beginning to employ a host of penalties and incentives to change rancher behavior. The Critical Counties Program was an example of a government program using penalties to promote compliance. Launched in 2007 by Brazil’s Central Bank and Environment Ministry, this program suspended access to agricultural credit for farms and ranches in 36 counties with high deforestation rates. Eleven counties eventually succeeded in drastically reducing deforestation. Leonardo Fleck, program officer of the conservation and markets initiatives at the Gordon and Betty Moore Foundation, recalled, “This program was a testament to the power of financial institutions.”⁵² In response, the state of Pará launched a Green County program to help blacklisted counties reduce their deforestation rates and reestablish access to credit.

The government also introduced several positive incentives as well. The National Climate Change Policy launched subsidized farm-level low carbon credits with the goal of reducing deforestation by 80 percent by 2020. A program called Reducing Emissions from Deforestation and Degradation (REDD) was designed to compensate states for reductions in deforestation and associated carbon emissions. The government of Norway made a pledge to provide \$1 billion to Brazil if the country was able to demonstrate measurable reductions in deforestation.⁵³

⁵² Interview with Leonardo Fleck, program officer, conservation and markets initiatives, Gordon and Betty Moore Foundation, January 20, 2015.

⁵³ Nepstad, *op. cit.*, p. 1119.

The investment community was increasingly becoming active on deforestation. J.P. Morgan and 11 other banks adopted the “Soft Commodities Compact,” an initiative of the Banking Environmental Initiative and the CGF that involved aligning banking services with CGF companies’ sustainable procurement policies, and identifying interventions whereby banks could support the growth of commodity production meeting zero net deforestation standards.

Meatpackers were also exploring the use of incentives for their suppliers. One initiative that aimed to take a holistic approach to sustainability was Marfrig’s Club Program, developed by the company following legal requests and client demands. This farmer relationship program involved evaluating suppliers based on environmental, social, and animal welfare criteria. Suppliers with strong ratings could earn a small premium for their cattle, as an incentive for them to adopt good practices. The challenge with such a program was that only select buyers were willing to contribute to that premium.

Marfrig planned to take advantage of a “green bond”—debt used to fund projects with positive environmental benefits. The company expected to pay a lower interest rate on this bond, using proceeds to buy deforestation-free cattle from the Amazon. Marfrig would benefit by purchasing cattle at a lower capital cost than with traditional debt. In recent years, given droughts in parts of the United States and Australia, and problems in other countries, the price of cattle was high. Looking into future threats of drought, the emergence of non-animal meat replacement products, and other factors, Almeida reflected, “We need to improve the efficiency of our business.” A big problem Almeida observed was the lack of willingness of most customers to pay for improvements in sustainability. He commented, “Everybody wants sustainable beef but no one wants to pay the bill.” Commenting on the challenge of being a supplier in the center of the value chain, he said “We are in the middle between ranchers and the buying markets.”

Increasing Farm Yields

Many organizations were involved in efforts to improve the efficiency of livestock production so that farmers would have more incentives to intensify production instead of looking to cut down forests on new land. One Marfrig-led initiative involved partnering with U.S. retail giant Walmart and the environmental group The Nature Conservancy to turn some farms in Brazil into environmental and economic models of meat production that could be replicated in other parts of the Amazon. Through this program, farmers were taught how to conduct field rotation and were trained on improving cattle genetics and pasture management, all with the intent of increasing the number of cows per hectare, which would reduce the need for additional deforestation. Lacir Soares, a 69-year-old farmer who participated in the program, said in 2013 that he was able to feed 2.3 cows per hectare (about 2.5 acres) versus the Brazilian average at that time of 1.23 cows per hectare. “The balance between cattle and forest is not just a legal obligation, it also ensures higher productivity,” said Soares.⁵⁴

While efficiency gains were promising and some evidence suggested that increasing yields could contain deforestation,⁵⁵ other research suggested this did not always hold in a world with

⁵⁴ Abiec, op. cit., “Cattle ranching goes green in the Brazilian Amazon.”

⁵⁵ “When Enough Should Be Enough: Improving the Use of Current Agricultural Lands Could Meet Production Demands and Spare Natural Habitats in Brazil,” *Global Environmental Change*, September 2014, Vol. 28, pp. 84-97.

globalized supply chains. A study by Derek Byerlee, et al indicated that increasing efficiency through technology-driven intensification was saving land on a global level when accompanied by stronger governance of natural resources. Yet, market-driven intensification led to deforestation, especially for export commodities during times of rising prices.⁵⁶ It was evident from this and other studies that efficiency solutions, which could save ranchers costs due to a higher yield per animal and per hectare, needed to be coupled with other complementary interventions such as zero-deforestation supply chain policies, traceability and monitoring systems, and effective regional governance.

Impact Investments

Instituto Centro de Vida, a Brazilian nongovernmental organization, had worked with several partners to create an innovative initiative called Novo Campo. Its goal was to help create and scale the supply of fully verified deforestation-free, sustainable beef. To implement the initiative the Instituto Centro de Vida created a spin off called PECSA (Pecuária Sustentável da Amazônia), a partner organization of JBS, which helped ranchers access financing and implement better management practices on their farms. Abieci supported the PESCA initiative and recommended that the Althelia Climate Fund invest in it. Sampaio said, “To put private capital into this business is essential to provide the necessary scale up of sustainable beef production in Brazil.” In 2015, PECSA raised a first round of 11.5 million Euros (\$12.6 million⁵⁷) of impact investment funds from Althelia to scale up sustainable cattle ranching activities. With this initial investment, Novo Campo aimed for a five-fold increase in beef production and ranchers’ incomes while restoring 10,000 hectares of rainforest.

Instituto Centro de Vida planned to teach farmers on 20 mid-sized farms with 34,000 heads of cattle how to manage their land, feed, and water resources better. The pilot aimed to demonstrate the possibility of a fully traceable, environmentally compliant, high-quality beef production system (inclusive of indirect and feed suppliers) that was proven at the technical and commercial levels. A second phase, for which the group hoped to attract additional investment, would be ten times as large, expanding Novo Campo to 200 ranches, covering 100,000 hectares of pastures and 340,000 cattle by 2020. The project aimed to generate revenues from carbon-offset credits in the second phase. While returns to Althelia Climate Fund, the investor, were likely to be low for the pilot, it was hoped that achieving proof of concept, providing price premiums and, ultimately, the carbon credit incentive would generate enough returns to attract future impact investments.⁵⁸ In 2016, McDonald’s announced the sourcing of verified deforestation-free, sustainable beef in Brazil, choosing PECSA as its primary supplier.⁵⁹

⁵⁶ Byerlee, et. al., “Does Intensification Slow Crop Land Expansion or Encourage Deforestation?” *Global Food Security*, Volume 3, Issue 2, July 2014, pp. 92-98.

⁵⁷ Based on exchange rate November 9, 2016, obtained via <https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=euro+to+dollar+exchange+rate>.

⁵⁸ Pothering, op. cit.

⁵⁹ “McDonald’s Announces Purchase of Beef Produced in Areas With Sustainable Practices,” August 17, 2016, PECSA, www.pecsa.com.br/mcdonalds-anuncia-compra-de-carne-produzida-em-areas-com-praticas-sustentaveis/ (October 5, 2016).

Sustainability as a Revenue Driver

Several companies were making efforts to leverage deforestation-free cattle to grow revenue. For example, Gucci, owned by apparel and accessories company Kering, introduced a new handbag line in 2013 that used sustainably produced leather sourced from ranches in the Brazilian Amazon that had earned the Rainforest Alliance certified seal of approval. According to Sabrina Vigilante, director of strategic initiatives at the Rainforest Alliance, “Gucci’s new line sets a shining example in the fashion industry, demonstrating that leather can be produced in a way that benefits the environment and farming communities, while promoting the humane treatment of livestock.”⁶⁰ Rossella Ravagli, Gucci’s head of CSR and sustainability, said, “Our new sustainable bag line addresses consumer demand for sustainability, while perfectly matching Gucci’s exacting style standards.”⁶¹ Kering had a goal of sourcing 100 percent of its leather from responsible and verified sources.⁶²

Cascading Sustainability to Indirect Suppliers

Influencing indirect suppliers remained a big challenge for meatpackers, though, and there was little credible work being done on the problem. Marfrig had created a “request for information” tool, which was used to ask ranchers where they bought animals from. Ranchers gave their name, identification number, and farm name. Still, it was not possible to really know if that rancher bought from a farm linked with deforestation. Self-reporting always left open the prospect of fraud, and there was no enforcement mechanism to control the quality of information. For specific customers that demanded it, like McDonald’s, Marfrig assessed indirect suppliers on a small scale.

Although the government could technically cross-reference animal transit guides with the CAR and other data to identify cattle grazing on deforested land, governmental bureaucratic hurdles would make it very difficult to cross-check the information. Even if that worked, Sampaio felt this would ultimately prevent thousands of farmers from selling their animals if they were noncompliant. Sampaio expected multinational companies, the government and civil society to put pressure on meatpackers to solve the problem. Through the GTPS and other discussion fora, Abiec had proposed a set of possible instruments to address the issue, including linking the animal transit data to the CAR database and the IBAMA list, a risk assessment per municipality, and changes in other regulations. The way forward was unclear.

FUTURE CHOICES

Looking ahead, Sampaio believed the government would need to continue its focus on controlling the illegal occupation and clearing of land. After Abiec’s significant role in enabling key members to be compliant with various laws, codes, and agreements, the organization was focusing on diffusing good compliance across the industry, and on developing sustainable initiatives to promote deforestation-free growth. On August, 6, 2015, Abiec launched the Beef Industry Socioenvironmental Protocol, a risk-management tool focused on continuous improvement of

⁶⁰ “Gucci Goes Sustainable: New Handbag Line Made with Leather from Rainforest Alliance Certified™ Ranches,” March 4, 2013, <http://www.rainforest-alliance.org/newsroom/press-releases/gucci-goes-sustainable> (April 29, 2015).

⁶¹ Ibid.

⁶² Ibid.

Abiec members. Companies received a rating level based on criteria slaughterhouses monitored, including environmental and slave labor public lists, GPS point farm location, georeferenced farm location crosschecked with indigenous lands and conservation units, and the CAR. The Protocol aimed to bring together the socioenvironmental risk management of all Abiec members, since several already did this type of monitoring. By adopting the Protocol and sending Abiec data on the slaughterhouses' suppliers, it was finally becoming more possible to evaluate the big picture of Brazilian beef.

Yet there were challenges ahead for Abiec members. The Cattle Agreement only involved one-third of exporters. The remaining two-thirds included both legal and illegal slaughterhouses, which serviced domestic and international markets. It was particularly difficult to monitor the clandestine market and indirect suppliers. Commodity prices were rising, and the Brazilian *real* was weak. Furthermore, the growth markets for Abiec members were in the developing world, where consumers historically tended to focus less on sustainability even if multinationals selling to them made it a key issue. And, if the various sustainability pilots taking place could not be scaled, sustainable beef could become a niche market rather than a transformational force in the industry. Furthermore, the business environment was challenging in Brazil, with corruption scandals and continually changing regulations, making it difficult to develop strong long-term strategies.

How could Abiec work beyond the largest meat processors to diffuse sustainability more broadly? How could it work with indirect suppliers such as calving ranches to promote sustainability at a deeper level? Monitoring efforts were improving. Increasing livestock efficiency on a large scale was a key area of focus. Financial incentives were being explored for direct and indirect suppliers to make changes (e.g., finance degraded pastures, provide access to credit). Various groups were discussing the possible development of entire geographic zones certified to have low sourcing risk. The government would also need to continue to focus on stemming illegal land occupation, reducing forest clearing, and expanding reforestation.

There was cause for hope. Holly Gibbs' research had shown that zero deforestation cattle agreements in the state of Pará led to slaughterhouses avoiding purchasing from properties with deforestation, which was not the case prior to the agreements. And while other research highlighted the fact that farm yield improvements weren't a panacea to reduce global deforestation in every case, strides in farm efficiency had indeed been made. Over the prior decade, productivity in heads per hectare increased 25 percent.⁶³ Paulo Barreto and Daniel Silva da Silva of Imazon authored a report estimating that it would cost 1 billion Brazilian *real* per year for cattle ranching to be intensified until 2022 to reach forest restoration and conservation goals along with agricultural production goals.⁶⁴

Sampaio was optimistic yet realistic about what lay ahead. He believed public and private sector efforts could address some of the key problems that remained:

⁶³ "The beef sector – Brazilian livestock," <http://www.brazilianbeef.org.br/texto.asp?id=18> (April 28, 2015).

⁶⁴ "How to develop the rural economy without deforesting the Amazon?" Imazon, <http://imazon.org.br/publicacoes/how-can-one-develop-the-rural-economy-without-deforesting-the-amazon/?lang=en> (November 1, 2016).

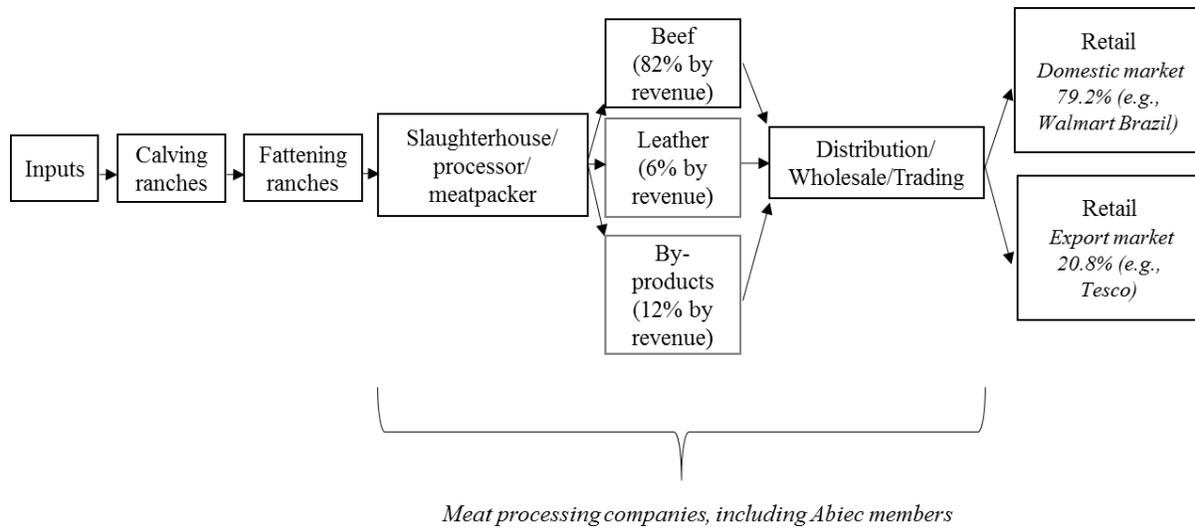
In the past we had a lot of areas occupied that were simply not suitable for agriculture. Those could be restored. And we still have areas good for agriculture that remain today in poverty, and agribusiness is the only chance they will ever have to develop. To say zero deforestation sometimes means to condemn entire populations and communities to poverty. We can produce where we have to produce, and of course we will preserve and restore what has to be restored... There are 25 million people in the Amazon today because at some point in the past these people were told to go there.

The industry had come far. As Astrini from Greenpeace saw it, customers demanding more sustainable products was critical. “Deforestation cannot be part of a product you will buy in the future, because it will become unacceptable. And this is definitively the best way to extinguish deforestation.” With the many organizations involved in setting objectives and guidelines and with Abiec’s support of meat processors and ranchers, the parties working at the core of the issue, there was hope that big changes could continue to be made in the industry. Sampaio had a vision that Brazil could have good infrastructure for beef processing, managed professionally, surrounded by a cluster of efficient farmers, all legally compliant, with no deforestation. He said, “I believe that can happen soon.”

Exhibit 1 List of Abbreviations

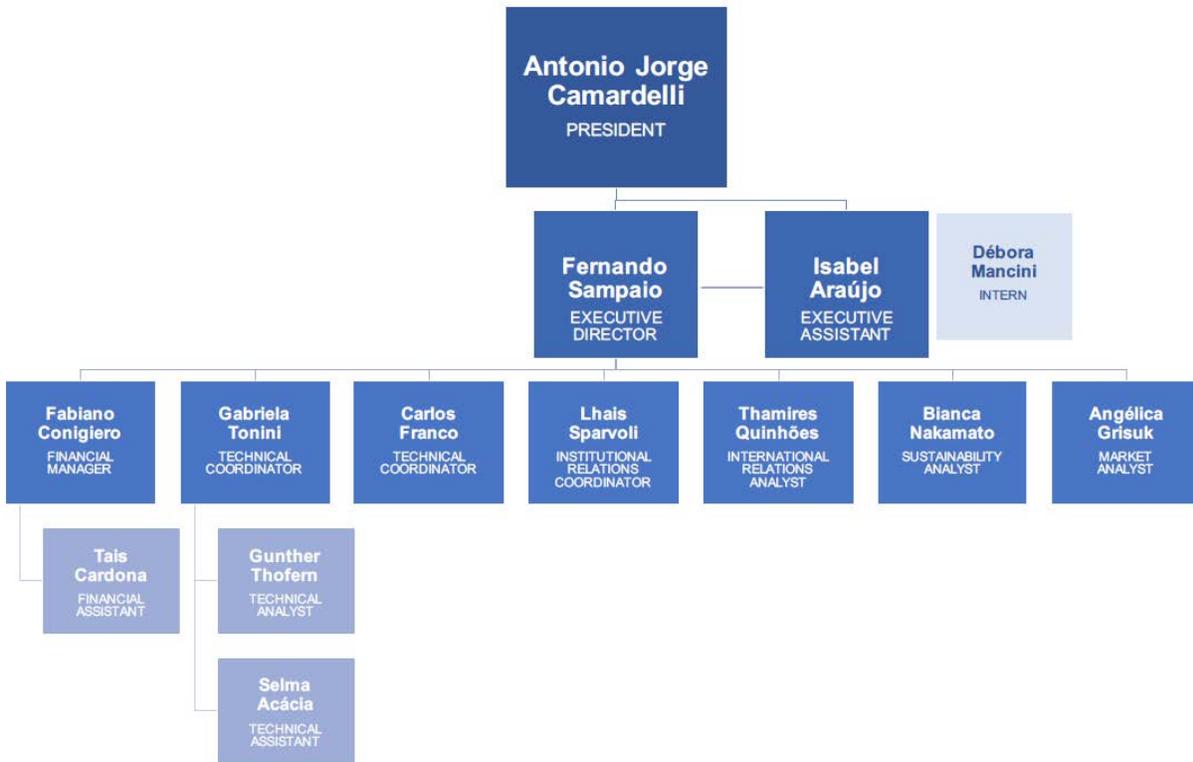
Abiec:	Associação Brasileira das Indústrias Exportadoras de Carne (Brazilian Beef Exporters Association)
ACT:	Acordos de Cooperação Técnica (Technical Cooperation Agreement)
CAR:	Cadastro Ambiental Rural (Rural Environmental Registry)
CGF:	Consumer Goods Forum
COP21:	21st Conference of Parties, also known as the 2015 Paris Climate Agreement
GPS:	Global Positioning System
GTPS:	Grupo de Trabalho da Pecuária Sustentável (Brazilian Roundtable on Sustainable Livestock)
GRSB:	The Global Roundtable for Sustainable Beef
IBAMA:	Instituto Brasileiro do Meio Ambiente E Dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Renewable Natural Resources)
INPE:	Instituto Nacional de Pesquisas Espaciais (National Institute for Space Research in Brazil)
MPF:	Ministério Público Federal (Federal Public Prosecutor)
MPF-TAC:	Terms of Adjustment of Conduct
NWF:	National Wildlife Federation
PECSA:	Pecuária Sustentável da Amazônia
REDD:	Reducing Emissions from Deforestation and Degradation

Exhibit 2 Brazilian Beef Value Chain



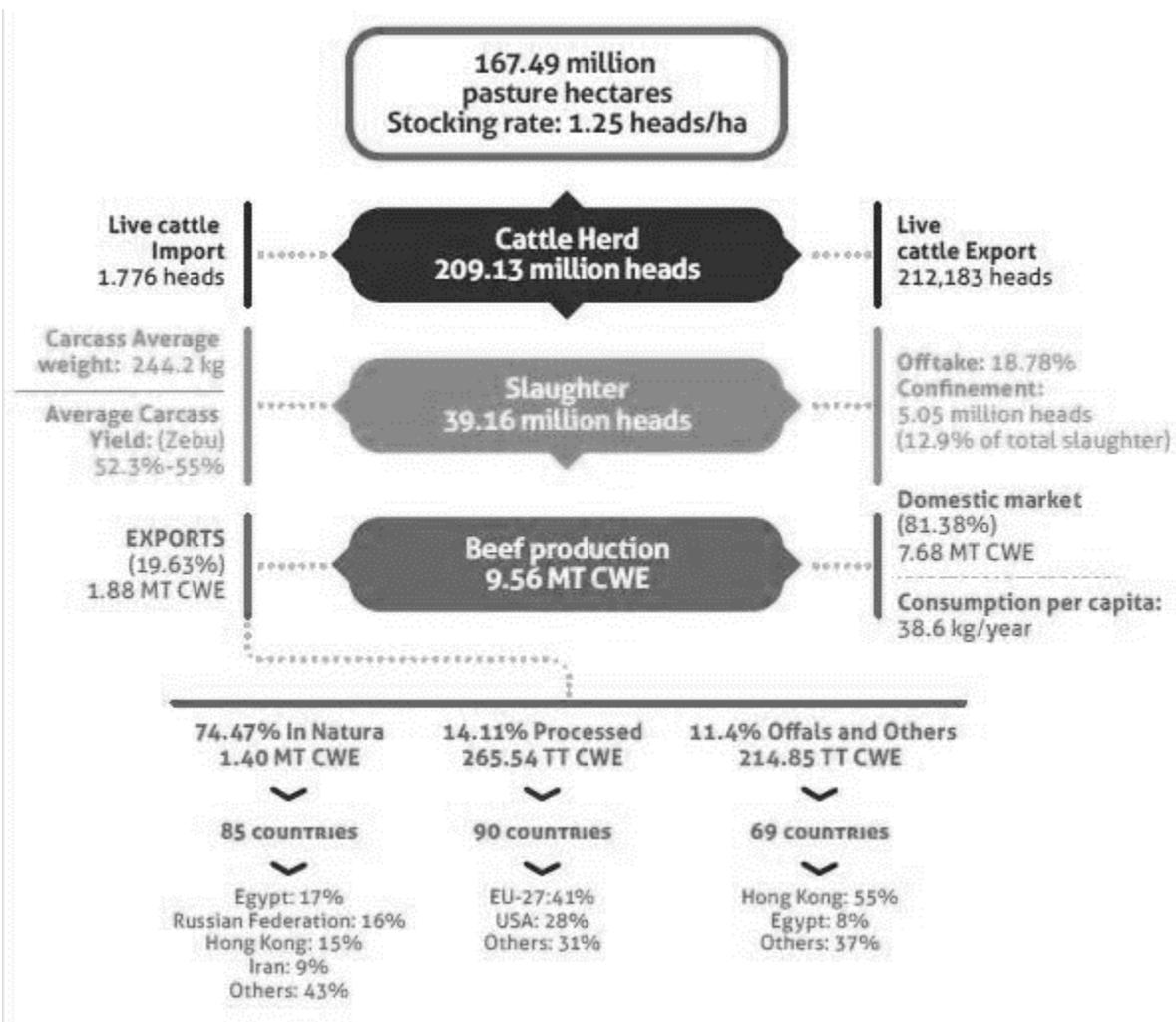
Source: Compiled from data provided by Abiec.

Exhibit 3 Abiec Organizational Chart



Source: Provided by Abiec. Reprinted with permission.

Exhibit 4 Brazilian Beef Consumption in 2015



Source: Graphic provided by Abiec. Reprinted with permission.

Exhibit 5

Phases in the evolution of public policies and supply chain initiatives to control Amazon deforestation 2000-2013

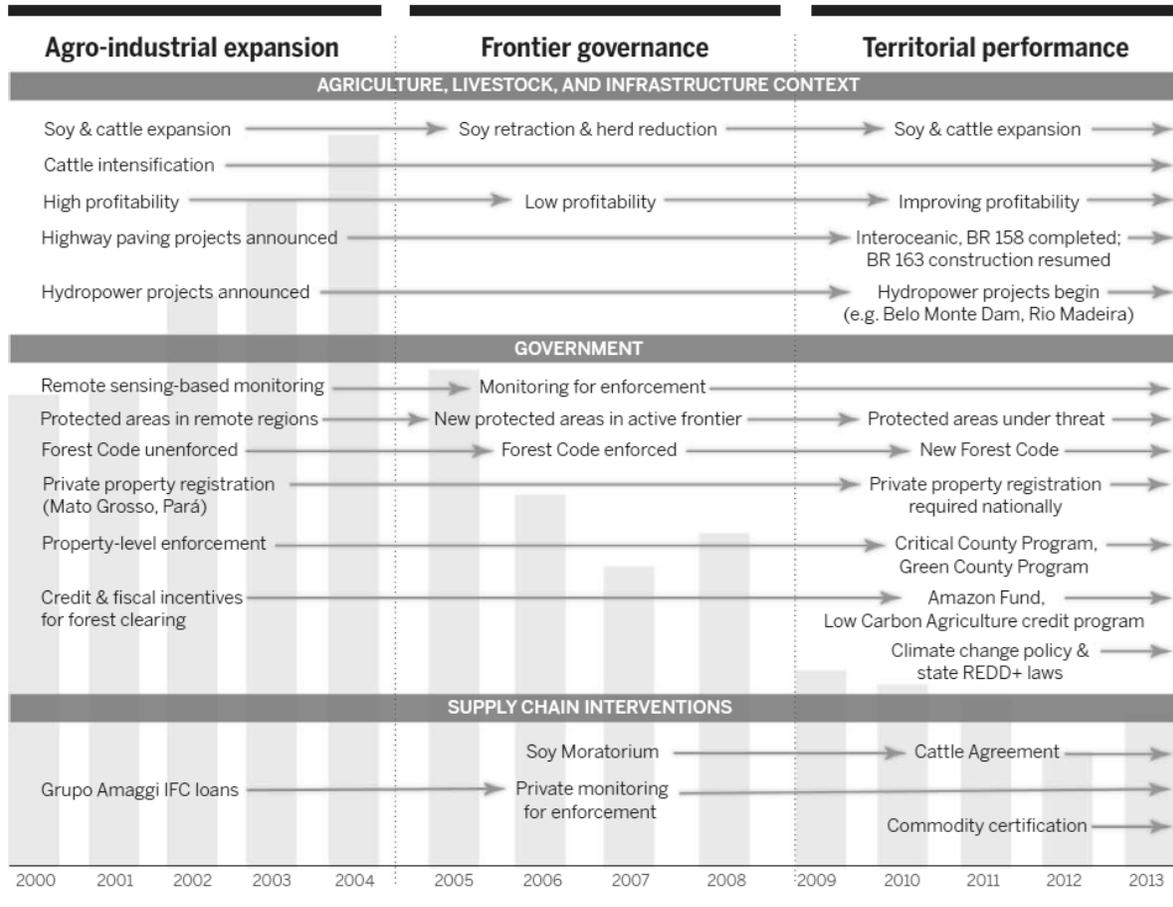


Fig. 2. Phases in the evolution of public policies and supply chain initiatives to control Amazon deforestation: 2000 to 2013. The underlying bar graph is the annual deforestation trend as shown in Fig. 1A. Sources for policy interventions are in table S2.

Source: Daniel Nepstad et al, “Slowing Amazon deforestation through public policy and interventions in beef and soy supply chains,” *Science*, June 6, 2014: Vol. 344 no. 6188 p. 1120. Reprinted with permission from AAAS.