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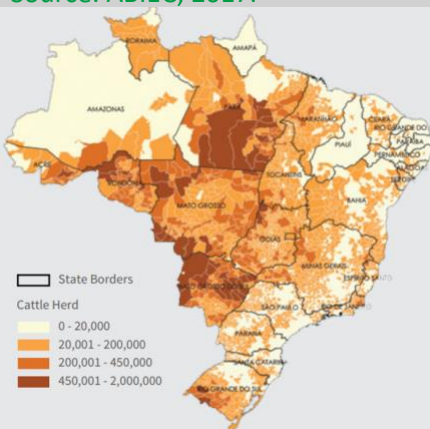
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Figure 1: Geography of Brazilian cattle herd.

Source: ABIEC, 2017.



Cattle-driven Deforestation: A Major Risk to Brazilian Retailers

September 2018

Cattle ranching in Brazil, home to the world's second largest herd, remains a major cause of deforestation. This trend continues despite meatpackers and retailers having made commitments to deforestation-free supply chains in the last ten years. This report describes the economic role of the cattle sector in Brazil, key supply chain actors, their role in deforestation, and potential solutions to improve sustainability performance. The supply chain relationships of the top five retailers and meatpackers with Amazon plants expose the Brazilian retail sector to material risk from sourcing unsustainable beef.

Key Findings

- **Eighty-one percent of Brazilian beef is consumed domestically, and retailers are the key supply channel.** Carrefour (FR), GPA (Group Casino (FR)), Walmart Brasil (Advent International (U.S.)), Cencosud (CL), and Grupo Muffato (BR) control 75 percent of the retail market. Retailers are exposed to deforestation risks through the beef they source. Carrefour, GPA, and Walmart have committed to zero-deforestation.
- **The top retailers source from meatpackers with Amazon plants.** Ninety-nine meatpackers are responsible for 93 percent of slaughters in the [Amazon](#). Supply sheds overlap with the agricultural frontier and regions with high deforestation rates.
- **Slaughterhouses in the Amazon that have not signed agreements (TAC) with the Brazilian government to tackle deforestation hold 30 percent of active slaughter capacity.** They do not monitor the origin of cattle and create leakage of deforestation-linked beef. This situation poses high risk to any retailer that sources from them. 23 of these active plants hold licenses to export across state borders.
- **Sourcing from slaughterhouses with TACs may also carry large risks, as their supply sheds have experienced deforestation.** TAC slaughterhouses have seen an estimated 8.3 million ha of deforestation within their buying zones between 2010 and 2015. Links between TAC-signatories and ranches with deforestation were documented in Pará in 2016.
- **Meatpackers lack effective tracking systems to monitor and control their indirect supply chains.** While TAC-compliant slaughterhouses monitor their direct suppliers, cattle commonly move between various locations during their lifespan. Thus, cattle may be raised on recently deforested pastures before moving to a compliant ranch. A lack of access to tracking data, insufficient law enforcement, and limited finance for sustainable intensification complicate the issue.
- **Retailers with deforestation-linked beef in their supply chains are exposed to financial risks. These financial risks could result in reputation risk, revenue-at-risk, higher operational costs, and higher financing costs.** For retailers, this risk may shift to their (publicly-listed) foreign parents.

Figure 2: Brazilian beef production, consumption and export, 1996-2017.

Source: [USDA FAS, 2018.](#)

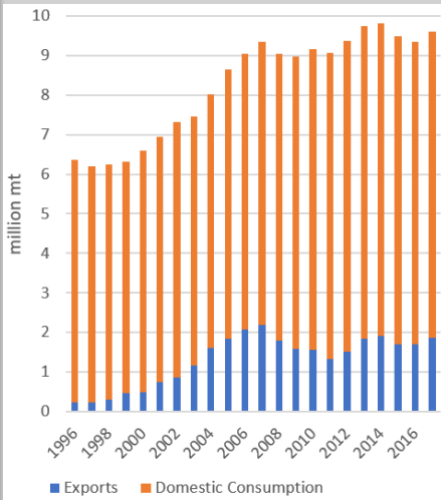
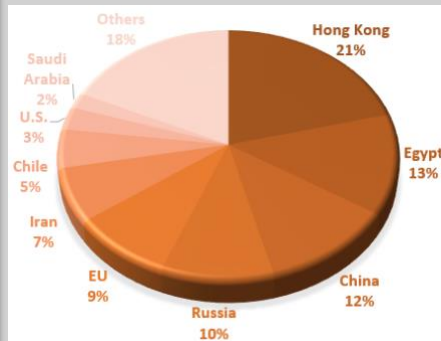


Figure 3: Brazilian beef export destinations, 2016.

Source: [ABIEC, 2017.](#)



Livestock Farming: 7.3 percent of Brazil’s 2016 GDP

Cattle ranching primarily takes place in the North region, overlapping with the Amazon Biome and the Central West region of the country. That region overlaps with the Pantanal, a large tropical wetland area. As shown in Figure 1, the Northeast region, including the Cerrado, a biodiverse wooded savanna, is also home to a large cattle herd.

Livestock farming generated BRL 458.2 billion (USD 140.7 billion) in 2016. This amount accounted for 31 percent of Brazil’s agribusiness GDP and 7.3 percent of its total [GDP](#). Livestock farming generated USD 6.2 billion in [export](#) revenues in 2017 while creating 360,000 direct [jobs](#). Brazil’s cattle [herd](#) has grown from 158 million heads in 1996 to 219 million in 2016. During this period, pasture used for this cattle herd decreased from 184 million ha to 167 million ha, leading to an increase in stocking rate from 0.86 heads per ha in 1996 to 1.31 heads per ha in 2016. Brazil’s herd is the world’s 2nd largest [cattle](#) inventory, accounting for 23 percent of global stocks.

Brazil’s domestic market consumes eighty-one percent of the country’s beef -- a per capita consumption of 36 kg. As shown in figure 2, Brazil’s beef production increased 51 percent since 1996, reaching 9.6 million metric tons (mt). Brazil accounts for 15 percent of global production. Nineteen percent (1.9 million tons) goes into export, making Brazil the leading exporter of beef globally. As shown in Figure 3, key [export](#) markets are Hong Kong, Egypt, China, Russia, and the EU. Altogether, they accounted for 65 percent of Brazilian beef exports by volume in 2016.

Brazilian Cattle: Few Slaughterhouses Dominate the Market

Within the Legal Amazon, 128 active slaughterhouses belonging to 99 companies were responsible for 93 percent of [slaughtering](#) in 2016. Of these, 71 slaughterhouses are under Federal Inspection (SIF). SIF allows these slaughterhouses to trade across state borders, and they often have export approval. The other 57 fall under State Inspections (SIE). SIE allows for marketing in the production state.

The largest players in the beef production sector are JBS, Minerva, and Marfrig. These companies [control](#) around 70 percent of the cattle slaughter capacity in the Amazon. JBS and Minerva also have slaughterhouses in the Matopiba region (Maranhão, Tocantins, Piauí and Bahia), the agricultural frontier area of the [Cerrado](#). From 2007 to 2013, the Brazilian government ran the "National Champions" initiative to transform companies into large multinational corporations. This action helped several Brazilian meat companies become global industry [leaders](#), which was also enabled by a wave of international consolidation in the industry. Massive investments of public money through the Brazilian development bank BNDES and its investment arm BNDESPar, namely in JBS, Marfrig, and BRF, supported this effort.

Ten large slaughterhouses with processing units in the Brazilian Amazon and Cerrado states are listed in Figure 4.

Slaughterhouses typically procure cattle locally. The [radius](#) in which a slaughterhouse purchases cattle depends on several factors, particularly transport costs and the

availability of cattle in the surrounding area. Buying zones of slaughterhouses with SIF registration reach on average 360 km, while those of SIE registered plants on average reach 153 km. In extreme cases, the reach may be up to 1,000 km for a slaughterhouse in a remote area with limited cattle supply and with access to cheap river transport. Meat from the Amazon is sold throughout Brazil.

Figure 4: Ten leading meatpackers in Amazon and Cerrado states, 2016.

Source: Imazon, 2017; Ministry of Agriculture, 2018.

Company	Owner-ship	National slaughtering capacity (heads/day) ^b	Amazon & Cerrado States ^a	
			# of active facilities	Presence
JBS	Listed	34,240	21	MT, AC, RO, PA, MA, TO
Minerva	Listed	11,880	4	TO, MT, RO
Marfrig	Listed	10,000	7	MT, RO, PA
Mercúrio	Private	2,000	2	PA
Masterboi	Private	1,700	2	PA, TO
Vale Grande/Frialto	Private	4,050	5	MT, RO
Frigol	Private	3,000	2	PA
Frigon	Private	1,500	1	RO
Fribal	Private	1,000	2	MA
Coop. dos Produtores de Carne e Derivados de Gurupi	Private	280	1	TO

^aStates: Acre (AC), Maranhão (MA), Mato Grosso (MT), Pará (PA), Rondônia (RO), Tocantins (TO).

^bassuming 30 working days per month.

A small share of cattle raised in the Amazon states is slaughtered in SIF-controlled plants in other states. For example, 21,099 animals originating from Amazon states were slaughtered in the state of São Paulo in 2015 (one percent of total slaughters in Sao Paolo). In 2014, this figure stood at 69,485 animals (two percent of total slaughters).

Brazilian Cattle: Retailers Are Key Beef Sales Channel

Supermarkets are the most important distribution channels for food in Brazil, accounting for more than 50 percent of food sales. Within this channel, the leading retail chains likely account for a large share of the beef volume sold in the country. Figure 5 lists the five leading supermarket groups in Brazil. Among these, foreign parents control the four largest.

Figure 5: **Top-5 retailers in Brazil, 2017.**

Source: [Abranet, 2018](#), [USDA FAS, 2016](#).

*Walmart announced in August 2018 that it sold 80 percent of its stake in Walmart Brasil to Advent International (US).

Retailer	Parent	Owner-ship	Revenue 2017 (USD mln)	Market share 2017
Carrefour Comercio Industrial	Carrefour (FR)	Listed	14,983	26.5%
Grupo Pão de Açucar (GPA)	Groupe Casino (FR)	Listed	14,616	25.8%
Walmart Brasil	Advent International (US)*	Listed	8,505	15.0%
Cencosud Brasil Comercial	Cencosud (CL)	Listed	2,576	4.6%
Irmaos Muffato & Cia	Grupo Muffato (BR)	Private	1,814	3.2%
Other			14,075	24.9%
Total			56,569	

Carrefour, GPA, and Walmart have stores throughout the country, including several Amazon states, as shown in Figure 6 below. These stores may also source from SIE-controlled slaughterhouses in Amazon states. Cencosud and Grupo Muffato are not present in Amazon states and can only source from SIF-slaughterhouses in the Amazon.

Figure 6: **Presence of top retailers in Amazon states.**

Source: Retailer websites.



Cattle Sector Causes Eighty Percent of Brazilian Deforestation

Cattle ranching is connected to a range of social and environmental impacts, including slavery, corruption, high GHG emissions, water consumption, and deforestation. Up to **80 percent** of Amazon deforestation is attributable to the cattle sector. Cattle is also a key contributor to land conversion in the neighboring Cerrado Biome. The dynamic of soy cultivation replacing cattle pasture has led to ranchers moving deeper into agricultural frontier areas and converting yet-untouched forest.

Figure 7: Commitments under G4 and TAC sustainability agreements.

- Buy from suppliers registered with the Rural Environmental Registry (CAR).
- Not located in protected or indigenous areas.
- Not on Ministry of Labor list of work analogous to slavery.
- Free of deforestation-related embargoes (IBAMA).
- Greenpeace G4: no deforestation post-2009; Implement tracking systems for indirect suppliers by 2011.
- MPF TAC: no illegal deforestation as defined in Brazilian Forest Code.

Cattle Sustainability Commitments Since 2009

In 2009, [Greenpeace](#) exposed the role of cattle breeding and ranching as a driver of deforestation in the Amazon. It uncovered illegal practices linked to slaughterhouses, such as forest destruction and modern slavery. As shown in Figure 7, this report led to **Greenpeace and four of the major beef producers in Brazil (JBS, Marfrig, Minerva, Bertin - acquired by JBS later the same year) to sign multilateral [Cattle Agreements \(G4\)](#) to increase sustainability in the sector.**

At the same time, the [Federal Prosecutors Offices](#) (MPF) initiated 21 civil actions against beef companies, asking for BRL 2 billion (USD 1.1 billion) in compensation due to environmental damage. Sixty-nine companies -- including leading Brazilian retailers Carrefour, Walmart, GPA -- were asked to exit sourcing relationships with suppliers involved in illegal Amazon deforestation.

The lawsuits led to slaughterhouses signing legally binding [Terms of Adjustment of Conduct \(TACs\)](#) as a federal counterpart to the G4 (Figure 7). Initially limited to Pará, the TACs have since expanded to other Amazonian [states](#), including Acre, Rondônia, Amazonas, and Mato Grosso.

As of 2016, TACs [covered](#) 63 out of 128 active SIF slaughterhouses in the Amazon. If not followed, the MPF is authorized to carry out [sanctions](#) against companies. The implementation of both the G4 and TAC agreements so far focus on direct suppliers of cattle from the last farm where an animal stayed before slaughter.

The Brazilian Development Bank (BNDES) introduced [Resolution 1854](#) in 2009. The Resolution requires companies active in cattle slaughtering and/or production of meat products to reach certain social and environmental criteria and guidelines when requesting financial support. These targets are in addition to existing legal requirements. Companies also must submit monthly performance auditing reports.

Deforestation Rates Declined From 2006 to 2013

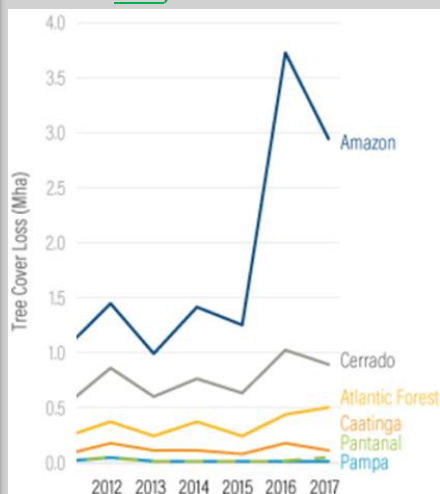
A combination of factors led to a considerable decrease in deforestation in the Brazilian Amazon between 2006 and 2013. Impactful actions included: the 2006 [Soy Moratorium](#), a voluntary agreement between civil society organizations, authorities, soy traders and buyers; credit restrictions imposed by Resolution 3545 by the National Monetary Council aiming to reduce financial incentives for deforestation and Resolution 1845 by BNDES; and slaughterhouses signing the G4 and TACs.

As a result of the above requirements, the registration of properties in the Rural Environmental Register (Cadastro Ambiental Rural, CAR) increased rapidly after 2009. The CAR is a type of identification card for a property and its owner required under the Brazilian Forest Code. In Pará, the [share](#) among suppliers of the four large slaughterhouses that signed both supply chain agreements increased from two percent in 2009 to 96 percent by the end of 2013.

Deforestation Rates Increased Again Since 2014

Figure 8: Brazilian tree cover loss, 2011-2017.

Source: WRI, 2018.



However, since 2014, deforestation rates have **increased**, as shown in Figure 8. Illegal deforestation and human-induced fires used to clear land for cattle or other agricultural activity have largely driven this development. An amnesty of illegal deforestation, lack of **enforcement** on prohibitions of deforestation and fires, and a **reduction** of protected areas under the current Brazilian administration have led to these circumstances.

The influential agri-business **lobby** in the Brazilian Congress, the *bancada ruralista*, has initiated legislative and administrative changes that enable the further conversion of native forest to pasture and cropland. Offenders have faced little risk of punishment. Obtaining property rights for illegally occupied and cleared lands became easier while the government weakened land rights for **indigenous peoples**. Even though 95 percent of fines imposed by the environmental agency IBAMA were never paid, president Temer in October 2017 implemented an **amnesty** of USD 2.1 billion in fines for illegal deforestation. Meanwhile, the government also cut **budgets** of the environmental **agencies** (IBAMA and ICM-BIO) and the National Indian Foundation (FUNAI), further undermining their ability to achieve deforestation-related duties.

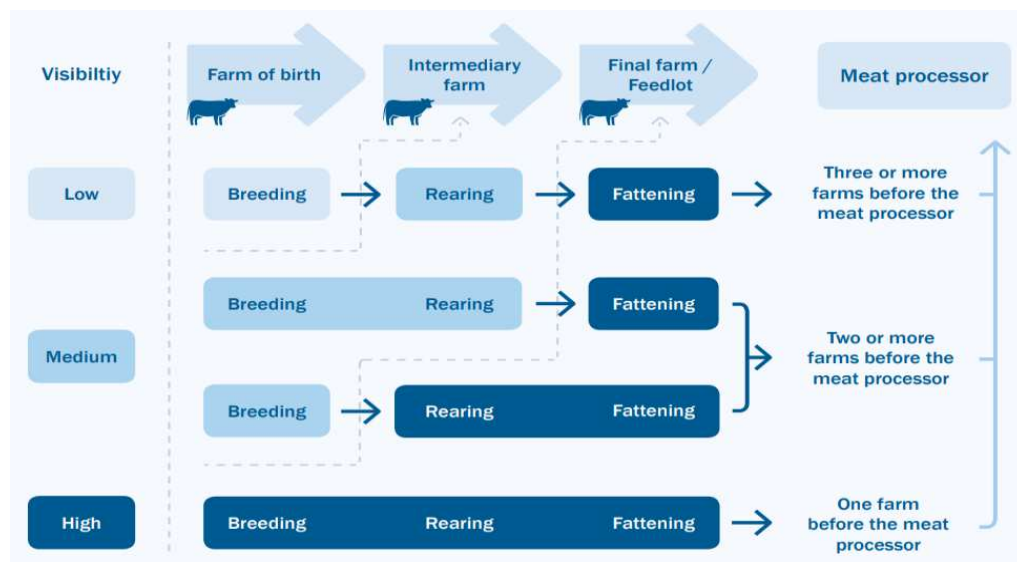
Cattle ranching continues to be the leading cause of Amazon and Cerrado deforestation. This trend is due in large part to the cattle agreements focusing on the direct suppliers of slaughterhouses and leaving the indirect cattle supply chain thus far unmonitored. A TAC is thus no guarantee of deforestation-free beef, due to leakage and insufficient **monitoring** and implementation.

Risks Present in Indirect Cattle Supply Chain

As shown in Figure 9, the Brazilian cattle supply chain involves various locations from **birth to slaughter**, leading to different levels of transparency and visibility. For each direct supplier of a meat processor, indirect suppliers may also be involved. They could include several transactions of animals between birth and slaughter.

Figure 9: Visibility stages in the Brazilian cattle sector.

Source: Proforest, 2017.



Cattle may spend up to **75 percent** of their lives on indirect supplying ranches. With cattle raising in Brazil taking up to 4 years, which is one year longer than in the U.S. or Canada, the window of potential exposure to illegal practices becomes larger.

Leakage and Laundering Undermine Effect of Cattle Agreements

The slaughtering process is a bottleneck in the beef supply chain. With a comparatively small number of slaughterhouses sourcing from a huge number of cattle ranches, introducing the G4 and TAC at this point was a strategic choice. However, that was not strong enough to stop the advance of cattle-driven deforestation. According to research by University of Wisconsin-Madison professor Holly Gibbs et al. (2018, unpublished), under the agreements, only 17 percent of ranches in Pará and Mato Grosso are monitored as direct suppliers of TAC slaughterhouses.

Initiatives for cattle supply chain monitoring have so far focused on the *direct* relationships, covering the fattening stage in the last three to twelve months before slaughter. Leakage and fraud in the *indirect* supply to slaughterhouses are not prevented, despite the mix of policy interventions and supply chain initiatives aiming for a decoupling of deforestation and cattle ranching. Neither the private sector nor the MPF have yet to effectively control the indirect supply chain of cattle.

Consequently, cattle fattened on noncompliant properties still enter the beef supply chain covered by TAC or G4 (Figure 10). Different strategies to launder cattle destined for a compliant slaughterhouse are as follows:

- Ranchers have multiple properties/CAR registrations. They raise cattle on embargoed or otherwise restricted areas and move them to a compliant and CAR-registered property of the same owner.
- Calving ranches and other intermediary cattle raising locations sell cattle to intermediaries or tier-one suppliers that are not showing up on the Brazilian Environmental Institute (IBAMA) or state embargo lists. The intermediaries or tier-one suppliers can then sell to signatory slaughterhouses.

The restriction of public access to information regarding CAR registration and transport of cattle between ranches and from ranches to the meatpacking plants can facilitate laundering. The Animal Transport Permit (GTA) is obligatory for veterinary health reasons. State animal health control agencies issue the permits. However, Pará is the only state in the region that allows full public access to CAR data for ranches.

Leakage into unregulated supply chains occurs when cattle from properties implicated in illegal practices is sold to slaughterhouses without monitoring systems or commitments. Leakage undermines the effect of agreements and poses unfair competition for compliant companies that exclude ranchers involved in illegal practices. Deforestation can also be "exported" to other states as ranchers can sell to meatpacking plants in neighboring states. For example, ranchers from Pará can also sell to slaughterhouses in Tocantins, Amapá, Amazonas, and Maranhão. In addition, there is a limited number of live transports to slaughterhouses outside the Amazon.

Figure 10: Leakage and laundering of deforestation-linked cattle. Source: Gibbs et al, 2015

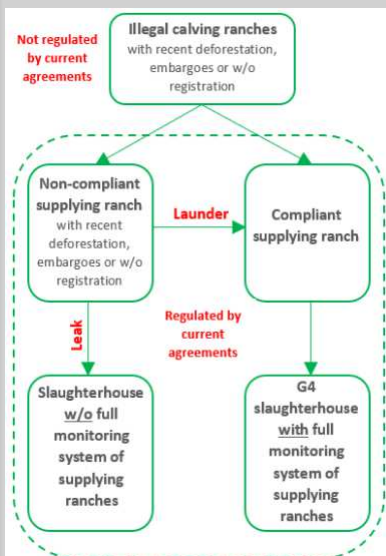


Figure 11: SIF-registered active slaughterhouses without TAC in 2016.

Source: [Imazon, 2017](#).

Meatpacker	State
Frigorífico Nosso Ltda	Acre
Frisacre - Frigorífico Santo Antonio do Acre Ltda	Acre
Fribal - Comercial de Carne Ltda	Maranhão
Fribal - Rio Grande Comércio de Carnes Ltda	Maranhão
Brasfri S/A	Mato Grosso
VPR Brasil - Importações e Exportações Ltda	Mato Grosso
Abatedouro de Bovinos Sampaio Ltda	Pará
Frigorífico Fortefrigo Ltda	Pará
Masterboi Ltda	Pará
T. M. da Silva de Carvalho Frigorífico	Pará
Distriboi - Indústria, Comércio e Transporte de Carnes	Roraima
Friogoari - Frigorífico Ariquemes S/A	Roraima
Frigomil - Frigorífico Mil Ltda	Roraima
Frigon - Frigorífico Irmãos Gonçalves	Roraima
Mafir - Matadouro Frigorífico de Roraima	Roraima
Boiforte Frigoríficos Ltda	Tocantins
Cooperativa dos Produtores de Carne e Derivados de Gurupi	Tocantins
Frigorífico Paraíso Ltda	Tocantins
Indústria de Carnes e Derivados Bonutt Ltda	Tocantins
Indústria e Comércio de Carnes e Derivados Boi Brasil Ltda	Tocantins
Masterboi Ltda	Tocantins
Novo Progresso - Alimentos A. M. I.	Tocantins

Despite the persisting sustainability problems in the indirect cattle supply chain, Alix-Garcia et al. [documented](#) in 2015 that the G4 meatpackers continued to acquire plants in deforestation hotspots in Mato Grosso and Pará after signing G4 and TAC agreements.

TAC Signatories Remain Exposed to Largescale Deforestation Risk

A 2017 [study](#) by Imazon analyzing companies with SIE or SIF registration in the Legal Amazon found that these companies can directly or indirectly influence an estimated 390,000 ranches. These ranches hold an estimated cattle herd of 79 million heads, 93 percent of the total in that region.

As of 2016, 30 percent of the active capacity in the Amazon is in slaughterhouses that have not signed a TAC. Of these 65 plants, 23 have a SIF registration and can thus trade their products across state borders (Figure 11). Of a potential [total](#) of 59,824 daily slaughters in active meatpacking facilities, 17,751 were not covered by a TAC.

Out of all active meatpacking plants in the Amazon registered with SIF and SIE, 63 (49 percent) had signed a TAC in 2016. These slaughterhouses remain exposed to deforestation risk, as the estimated purchasing zones of those companies jointly cover:

- 86 percent of the total of embargoed areas by IBAMA;
- 83 percent of the area deforested from 2010-2015 that was not embargoed (although a large part may be illegal);
- About 85 percent of the areas under greatest risk of deforestation from 2016 to 2018 (of a total of 1.68 million ha of forests).

The overwhelming majority of slaughterhouses in the Amazon remain exposed to the risks associated with deforestation:

- TAC-signatories do not control their indirect suppliers and are thus affected by fraudulent conduct;
- Non-signatories do not adopt any form of control over direct or indirect suppliers, providing leakage channels for ranchers involved in unsustainable practices.

Based on Imazon calculations, some meatpackers active in the Amazon are much more exposed to deforestation risks in their buying zones than others (Figure 12). This situation is particularly an issue for JBS, the largest beef producer in the Amazon. A second group, with slightly lower exposure, includes Frigorífico Redentor, Vale Grande (Frigol), Frigo Manaus, Marfrig and Mercúrio Alimentos.

Figure 12: Ranking of 20 meatpackers most exposed to deforestation risks in potential buying zones in Brazilian Amazon, 2016.

Source: [Imazon, 2017](#).

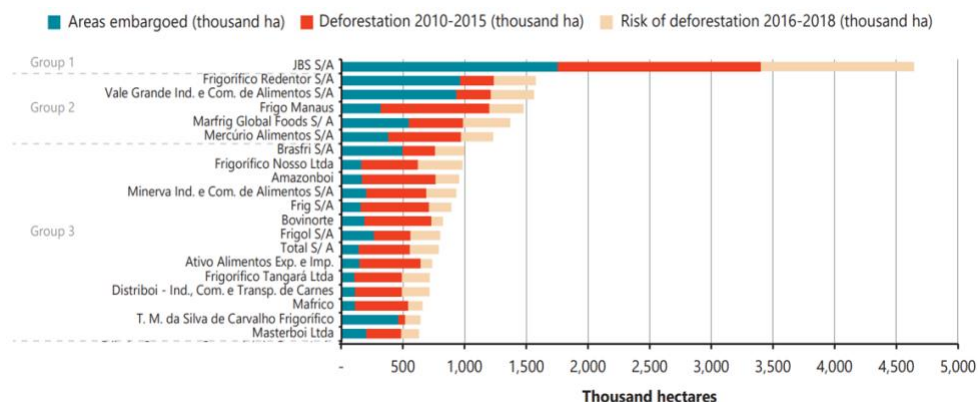


Figure 13: Meatpackers found to be linked to illegal deforestation in Pará, 2016.

Source: [MPF-Pará, 2018](#).

Monitoring results from Pará found that in 2016, 17 slaughterhouses had purchased more than 245,000 heads of cattle from farms with irregularities, i.e. in breach of the terms of the TAC. The findings presented by the [MPF](#) of Pará in March 2018 show that at least 145,000 or 15 percent of the total originated from properties involved in Amazon deforestation.

Several of the high-risk companies identified by [Imazon](#) in its 2017 [study](#) were among the offenders. They included JBS, Masterboi, Mercúrio, Minerva, and Frigol (Figure 13). JBS was responsible for the largest number of cattle (118,459) purchased from properties involved in irregularities. That totaled 19 percent of its analyzed purchases in the Amazon. Some 84,420 animals, or 13.8 percent of total purchases by JBS, came from deforested Amazon areas. Next on the list was MasterBoi, with 31 percent of acquired animals having irregularities. Moreover, 28,231 heads of cattle were linked to deforestation (22 percent).

In April 2017, IBAMA accused two of JBS' plants of buying from ranches that were embargoed due to [deforestation](#). JBS, beef processor BRF, and several smaller competitors also came under accusation of bribing federal meat inspectors. JBS' involvement in a wide-ranging political [corruption](#) scandal led to a leniency [deal](#), with a record payment of USD 3.2 billion by the controlling shareholder of JBS. Shortly afterward, Greenpeace suspended its participation in the implementation of the G4 commitment in [June 2017](#), due to repeated scandals in the livestock sector and the ongoing social and environmental setbacks in the political arena.

Options for Farm-to-Fork Transparency and Traceability

Various instruments for social and environmental [monitoring](#) of cattle are currently publicly available in Brazil:

- [IBAMA](#) list of farms embargoed due to environmental legislation breaches.
- Slave labour list of the Ministry of Labour and Employment (MTE).
- [Maps](#) of indigenous lands, conservation units, Quilombola territory.
- Remote sensing [data](#) to monitor deforestation in the Amazon.

Despite these sources of information, full traceability is not possible without tracing animals back to their origins.

Meatpacker	# of animals from deforestation	% of total purchases
JBS	84,420	13.8%
MasterBoi	28,231	22.1%
Frigol	8,290	5.2%
Aliança	7,530	30.3%
Frig Ribeiro	3,332	11.6%
SOCIPE	3,075	6.3%
Planalto	2,854	13.0%
Forte Frigo	2,434	3.3%
Frig Altamira	2,109	34.7%
Mercúrio	1,315	0.3%
Flávio DR Nobre	1,192	20.4%
Ativo alimentos	518	0.3%
MR Souza Junior	324	8.3%
BR Comércio de Carnes	165	2.1%
Cruzeiro do Sul	113	0.8%
COAGRO Pará	111	0.2%
Wellard	26	0.1%

Authorities, using several types of systems, are required to track Brazilian cattle:

- **The mandatory Animal Transit Guide (GTA) records cattle movement for sanitary control purposes and tracks cattle during transportation.** Cattle lots received by meat processors are accompanied by GTAs. However, these GTAs do not [indicate](#) previous farms from which the lot derives, despite the whole lot, or at least part of it, might have stayed at other farms. This factor and the fact that GTAs are not fully publicly accessible for all states sharply limit Guide's usability as a traceability tool.

The GTA is not an error-proof system. In regions with many small ranchers, [merchants](#) gather the cattle of various small ranchers. This system may include animals from producers that are not eligible to receive a GTA. In a region where a larger number of producers than entities registered by the sanitary inspection suggest, middlemen may provide the necessary documentation to cover up for informal producers.

- **The mandatory registration in the Environmental Registry CAR** from Brazil's environment ministry shows whether animals are raised on legally registered land that adheres to protection rules under the Forest Code. The data is only publicly accessible in Pará.
- **The voluntary System of Identification and Certification of Bovine and Bubaline Origin (SISBOV) for exports to the European Union was introduced in 2002.** Concerns over foot and mouth disease (FMD) were the original reason for this system. The voluntary system coordinated by the Brazilian Agriculture Ministry guarantees traceability of individual animals throughout the supply chain. For live exports and export of fresh beef to the EU and some other countries, cattle must be purchased from farms that are certified in SISBOV. The farms registered in [SISBOV](#) throughout Brazil account for less than 0.5 percent of all [farms](#), with more than 50 heads of cattle.

According to different experts, making the [GTA](#) fully digital, [publicly](#) accessible, and linked to other systems, namely the CAR, would serve as an important step in tracing legality of cattle. The [MPF-Pará](#) criticized in March 2018 that GTA is not linked to CAR. The Public Prosecutor called for increased transparency to stop deforestation: *"In addition to non-adherence to TACs or non-compliance with agreements, MPF considers that another major barrier to improving agreements and reducing deforestation in the Amazon is the lack of full transparency of the Rural Environmental Registry (CAR) managed by the Brazilian Forest Service and the Animal Transit Guide (GTA) belonging to the Agricultural Defense Agency of the State of Pará (Adepará)."*

Currently, a [lack](#) of cooperation by state agencies prevents IBAMA from enforcing the law. In July 2018, IBAMA informed the Federal Public Ministry that it was unable to [inspect](#) 47 slaughterhouses without TAC because it did not receive the relevant GTAs from the agricultural defense agencies of Roraima, Amapá, Maranhão, Amazonas, Rondônia, Mato Grosso, Acre and Tocantins.

A traceability solution consisting of a combination of CAR and GTA with monitoring by satellite imagery appears most promising. Despite known shortcomings in GTAs

and considering the complexity of the problems, such a combined system would be cost-effective, fast to deploy, and scalable in the short term. A database integrating CAR and GTA data from Mato Grosso, Pará and Rondônia as well as embargos and deforestation data has already been developed. A joint project of the University of Wisconsin, Imazon, and Instituto Centro de Vida has already produced such a product (Gibbs et al. 2018, unpublished).

A voluntary purchase protocol using a combination of GTAs and the CAR register as developed by the Indirect Suppliers Working Group ([GTFI](#)) was under validation by stakeholders in 2017. The process sought to prove the concept and understand how different links in the supply chain can contribute to tackling the problem. Led by Amigos da Terra - Amazônia Brasileira and the National Wildlife Federation (NWF), the GTFI is a multi-stakeholder group whose objective it is to align existing policies and discuss tools for monitoring the cattle production chain in Brazil.

In the medium term, the adoption of a mandatory and individual animal traceability system across the Brazilian beef sector would be most efficient to enhance both domestic and global trust in the Brazilian industry. It would ultimately allow better access to export markets. In contrast to methods such as hot iron or tattoos, ear tagging has the highest technical [efficiency](#). Ear tagging also requires less time for correctly reading and transcribing values to an electronic database. However, the connected [costs](#) appear too high to allow for a broad implementation now. With increasing application numbers, the economic viability indicators are, however, expected to improve considerably. The nationwide introduction of an individual tracking [system](#) from birth for cattle in Uruguay is considered conducive to opening export markets.

Moderate Intensification Reduces Leakage

A sustainable intensification of cattle ranching would form an important step in decreasing pressure on forests. So far, [cattle](#) in Brazil are still held in low stocking density and with marginal profitability per hectare. Despite improvements, the current productive [capacity](#) of pastureland in Brazil has reached only one-third of its potential. An increase to 52 percent would likely meet projected increases in demand for Brazilian beef and other agricultural products for the coming 20 years.

At the same time, pasture [degradation](#) is one of the main causes of low productivity of cattle production systems, and it is a driving force behind deforestation. According to [estimates](#), 50 percent of cultivated pastures in the Cerrado and more than 60 percent in the Amazon are considered degraded.

Low-tech and cost-effective [practices](#) for moderate intensification and sustainable ranch management can provide solutions to help improve pasture and herd productivity and prevent further degradation. These solutions should primarily be [introduced](#) in priority regions close to slaughterhouses and in agricultural frontier regions. However, technical assistance is required, and upfront costs to [farmers](#) may be high, especially for ranches with small pasture areas. Credit lines linked to environmental performance criteria are scarce and not easily accessible due to unclear land tenure status.

Supply Chain Links of Top 5 Retailers with Amazon Meatpackers

The delivery of beef from a meatpacker to a retailer can typically follow various [chains](#):

- **Slaughterhouses may buy cattle for slaughtering and cutting and then deliver to retailers.** While several retailers have introduced tracking tools for own-brand products, this solution does not apply for all beef products that are sold in the supermarkets. Fresh beef is also sold unpackaged and thus carries no code of origin.
- **Processors and meat retailers may purchase from third-party slaughterhouses.** Many brands of packaged and processed beef are available in the online stores of Brazilian retailers. These include private labels and brands linked to the large meatpackers (e.g. JBS with Swift, Friboi, Do Chef; Marfrig with Bassi, Montana). In addition, online shops offer products by specialty producers such as Frigorífico Silva with Best Beef (Angus, Hereford beef), Korin (organic), VPJ Alimentos (Angus) and Wessel (aged meat, specialty hamburgers etc), and other meat producers such as BRF, Cajuru Industria e Comercio de Alimentos, Magazzino and Vilheto Alimentos. Transparency regarding how much these companies source from the Amazon is limited.
- **Slaughterhouses may also produce and package beef for brands linked to other meatpackers.** For example, slaughterhouse company Masterboi, one of the top 10 meatpackers in the Amazon, states that it maintains a partnership with one of JBS's processed foods brands, [Seara](#). Various types of Seara-branded hamburgers are sold by [Carrefour](#). The lack of transparency keeps consumers and watchdogs from knowing whether the hamburgers are deforestation-free.

Retailers Carrefour, GPA, and Walmart have developed no deforestation commitments, with varying content, scope and level of implementation. By contrast, Cencosud and Super Muffato are lagging behind the others, with no public policies in relation to beef or deforestation. While these two chains do not operate stores in the Amazon, they may still be exposed to Amazon beef through SIF-slaughterhouses.

Some offer transparency portals for customers to identify the origin of certain fresh beef products, however, due to the enduring lack of traceability to breeding ranches this stops at the direct suppliers. For processed products, no origin information is available to consumers.

CRR identified some supply chain links between the leading retailers and beef producers with operations in Amazon locations (Figure 14). The findings are based on a quick analysis of company reporting and online advertisements.

JBS, Minerva, and Marfrig, the leading Brazilian meatpackers, are signatories of the G4 and TAC agreements. All top retailers have links to one or more of these three companies. Masterboi and Boi Forte have signed neither agreement, but they are SIF registered and thus allowed to trade across state borders.

Figure 14: Supply chain relationships between meatpackers with Amazon locations and top-retailers.

Source: CRR research.



Retailers' Deforestation Policies and Performance

Fast-food chain McDonald's already implemented a no-deforestation policy for the Amazon in 1989, in the form of a [commitment](#) to "no sourcing of beef from within the Amazon Biome." However, a broader uptake of such beef-related no-deforestation policies started only in 2009. In parallel with the G4 and TAC agreements with meatpackers, the downstream companies first took action. Among others, Carrefour Brasil, Walmart Brasil, and McDonald's joined the Working Group on Sustainable Beef, [GTPS](#). The Group was formally constituted in 2007. Its membership is made up of actors from all supply chain stages, including producers, processors, retailers, input suppliers, financial institutions, civil society organizations, and research institutions. It is involved in a range of pilot [projects](#) that aim to make the production of beef in Brazil more sustainable.

Carrefour

Grupo Carrefour Brasil is the [largest](#) retailer in Brazil, with a market share of 26.5 percent in 2017. It is operating as a subsidiary of the French Carrefour Group. It operates throughout the [country](#), with a total of 638 stores (see Figure 15). More than 4 percent of sales are generated in Amazon states. It exclusively sells Brazilian beef. In total, Carrefour [sells](#) more than 48,000 tons of beef annually. More than half (24,000 tons) is unprocessed "beef in nature," the remainder are other meat products (prepared meals, processed foods). Of the beef in nature, 2 percent or 480 tons is sold under its own brand. 98 percent are national brands.

On a national level, Carrefour Brasil announced in 2016 that it would use georeferencing to track 100 percent of its beef distribution. This action is to ensure that its own and national brands are not coming from areas linked to deforestation or other controversial activities. The policy for Brazilian beef has a broader scope than the global zero-deforestation commitment. The Brazilian policy applies to all brands of "beef in nature," but not to the beef products that are in prepared meals and in processed foods. Consequently, only slightly more than 50 percent of Carrefour Brasil's beef distribution has applied this policy.

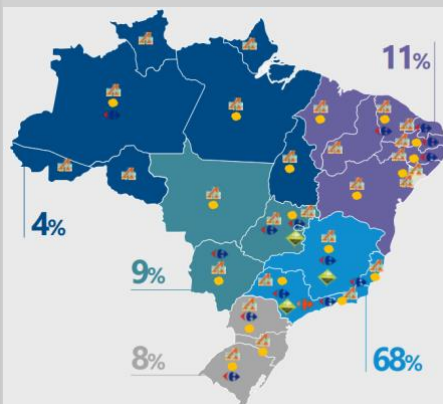
Carrefour states in its 2017 [CDP](#) Forests disclosure that its global reporting is limited to its own brand products. "[T]he deforestation risk linked to supplier/national brand products is evaluated by the brands themselves. Carrefour evaluates the risk for its own brand products [...] Our policy scopes all the cattle products we sell under Carrefour brand."

Engagement in sustainable beef initiatives includes:

- In 2009, Carrefour Brazil became part of the Working Group on Sustainable Beef (GTPS). It is also a member of the Indirect Suppliers Working Group (GTFI).
- Since 2012, Carrefour maintains a [partnership](#) with the Marfrig Group (SP) and the JD Group (Fazenda São Marcelo) to source fully traceable [Rainforest Alliance Certified beef](#). With an annual amount of around 120 tons, this initiative

Figure 15: Carrefour stores per region (based on sales).

Source: [Carrefour](#), 2018.



represents less than 0.25 percent of Carrefour's total annual procurement of more than 48,000 tons of Brazilian beef.

- To ensure sustainable sourcing of beef, Carrefour [announced](#) in 2016 that it would start in 2017 to monitor 100 percent of beef distributed in Brazil by geo-referencing it. Carrefour [stated](#) that initially its monitoring will reach 22 beef suppliers of the network throughout Brazil, of which six in the Amazon.
- In 2017, Carrefour became a signatory of the [Cerrado Manifesto](#), which calls on the private sector to react and commit to stop deforestation of this ecosystem.
- Its [traceability](#) system allows customers to identify the ranches that supply the beef they buy from Carrefour's "Garantia de Origem" program. This system can be accessed for individual products by using a QR code reader. No comprehensive supplier lists are published.
- In July 2018, [Carrefour](#) Brasil announced investment of EUR 1.9 million (USD 2.0 million) in a joint project with the Sustainable Trade Initiative (IDH). The three-year "Sustainable Production of Calves Initiative" is a partnership with the Mato Grosso state government as part of its Produce, Conserve and Include ([PCI](#)) strategy. The project covers 156,000 hectares of land and 450 farms. It includes ranching intensification, restoration of degraded pastureland, technical assistance and access to credit for farmers, and help to comply with the Brazilian Forest Code.

Carrefour and its competitor GPA did not reply to a 2017 inquiry by [\(O\)eco](#) that asked for a list of the Amazonian meatpackers among their suppliers and the average volume purchased from the region.

Carrefour, along with others, directly or indirectly sources beef from [JBS](#) and [Marfrig](#). Via JBS's brand Seara, the retailer may have supply chain links with Masterboi, a supplier of prepared foods to the brand. Masterboi has not signed a TAC. The MPF-Pará found that Masterboi sourced 22 percent or 28,231 animals in 2016 from ranches involved in deforestation. Other beef suppliers include [Wessel](#), [Vilheto Alimentos](#), and [Paineira](#). It is unknown whether they source from the Amazon.

Casino / Grupo Pão de Açúcar (GPA)

GPA is the [second](#) largest retailer in Brazil with a market share of 25.8 percent in 2017. Groupe Casino (France) is the controlling shareholder of Grupo Pão de Açúcar (GPA), which operates supermarkets in Brazil via its business unit Multivarejo. Banners include Pão de Açúcar and Extra. GPA operates [stores](#) in 22 of 26 Brazilian states, including the Amazon states Amazonas, Maranhão, Mato Grosso, Pará, and Tocantins.

According to 2016 data, GPA's banners [procure](#) around 72,000 tons of beef annually. In 2016, GPA [published](#) its Responsible Beef Sourcing Policy. Regarding beef from the Amazon, the company committed itself and its brands to the following:

- Achieve full transparency from the last supplying farm of fresh and frozen beef.
- Within a defined timeframe and implementation plan, procure only responsibly sourced beef, understood as meat:

- that has not been sourced directly from deforested lands, in any of its forms;
- that has not been sourced from farms using slavery; and
- that has not been sourced from farms involved in land ownership conflicts.
- Develop and provide tools for the supplying slaughterhouses, warehouses and processors.
- If the transparency/traceability solutions of slaughterhouses to track indirect suppliers seem viable and achieve sufficient market leverage, GPA will consider internalizing them.
- Communicate implementation results to all company stakeholders.

The company had planned to review the policy in January 2018. However, no revised version is available. GPA has not specified the mentioned "defined timeframe" in anyway. In 2017, the corporate global headquarter of [Casino Group](#) signed the manifesto to protect Brazil's Cerrado region as one of the world's richest ecosystems but highly threatened from ongoing conversion for agricultural use.

GPA published preliminary results of its supply chain [policy](#) in 2017. It lists JBS, Marfrig, and Minerva as suppliers, as well as 43 unnamed small and medium suppliers. Of these 43 suppliers, 27 (14 direct slaughterhouses, 5 processors with direct cattle purchases, 1 distributor and 7 processors that buy carcasses or meat from at that point 23 indirect slaughterhouses) adhered to the retailer's policy and the Traceability and Quality Management system, Safe Trace. The three leading meatpackers and the adhering small and medium suppliers represented 98.12 percent of beef bought in the first half of 2017. The remaining 16 small suppliers needed to adhere to the policy during the second half of 2017.

The general audit results found that at least 7,451 direct farms supplied cattle for GPA's suppliers. The audit identified that some 1,825 farms were located in the Amazonian forest. Ninety-seven of these farms were identified in areas embargoed by IBAMA (1.2 percent) and were suspended. Four producers were suspended due to their inclusion on the Transparency list published by the Ministry of Labor and Employment. Indirect farms further upstream are not considered in GPA's beef policy yet.

According to a company source quoted by [\(O\)eco](#), about ten refrigerators in the Legal Amazon provide meat for the more than 2,000 Brazilian stores. Reportedly, only the three largest slaughterhouses in the country among its suppliers -- JBS, Marfrig and Minerva -- have signed the TAC. Many of the smaller suppliers do not appear to have proper documentation of their direct suppliers. Grupo GPA did not reply to the request by [\(O\)eco](#) in September 2017 for concrete information on their suppliers in the Amazon, referring to the internal policy of not publishing supplier lists.

Other suppliers of beef and processed beef products include [Frigorífico Silva](#), [Korin](#), and [Wessel](#). Its traceability [system](#) for beef products was down for maintenance at the time of writing.

Walmart Brasil

Walmart Brasil is the **third largest retailer in Brazil, holding a market share of 15.0 percent in 2017**. It operates as a subsidiary of Walmart, the world's largest grocery retailer publicly listed in the US. Walmart has stores in 18 Brazilian [states](#), including the Amazon states Mato Grosso and Maranhão. In August 2018, [Walmart](#) sold an 80 percent stake in its Brazilian operations to private equity firm Advent International (U.S.). Advent International does not have a zero deforestation policy.

According to 2010 figures, [Walmart](#) Brasil sources 36,000 tons of beef annually. It made a [policy commitment](#) to battle deforestation in the Amazon in its soy, timber, and livestock supply chains. Walmart Brasil created a Responsible Beef Sourcing Buying [Policy](#) in 2011.

Engagement by Walmart Brasil in sustainable beef initiatives include:

- In the state of Mato Grosso, Walmart cooperates in a sustainable beef [project](#) with The Nature Conservancy, the Moore Foundation and Marfrig.
- In 2017, Walmart committed support to the Cerrado Manifesto. It is also a member of the Working Group on Sustainable Beef (GTPS).

According to the retailer, 40 percent of the meat sold in its 485 stores comes from the Amazon. In 2017, [\(O\)eco](#) asked Carrefour, Casino, and Walmart for a list of the Amazon meatpackers that supply them with meat and the average monthly volume purchased from the region. Only [Walmart](#) responded. It said that in the Amazon, the company sources beef from JBS and Marfrig, as well as Boi Forte (LKJ Frigorífico in Tocantins, [capacity](#) of 600 heads per day) and Masterboi (with one [slaughterhouse](#) each in Pará and Tocantins, with a total daily capacity of 1,700 heads). Boi Forte and Masterboi have not signed the TAC.

In the 2017 group level [Global Responsibility Report](#), Walmart states that it is monitoring 75,000 registered farms operating in the Amazon. This action is part of its goal to monitor 100 percent of the fresh beef from the Amazon sold in Brazilian stores to exclude deforestation.

These farms supply livestock to about 30 slaughterhouses owned by JBS, Marfrig, Boi Forte, and Masterboi. The retailer has created a geospatial monitoring system to track suppliers, volumes and farm locations and overlays. This information, which includes maps, show where deforestation is occurring. In the light of the 2020 zero net deforestation goal, this program is looking to expand to other sensitive biomes in Brazil. However, the system thus far only covers the finishing ranch and not indirect suppliers. While this problem is recognized by Walmart, no timeline is provided by which monitoring of the earlier stages is anticipated. The policy does not mention processed meat.

[Walmart](#) claims that since 2016 it has closed deals with only slaughterhouses that follow the TAC requirements. Every slaughterhouse that sells meat to Walmart is required to have a vendor monitoring system and go through an annual audit. Boi

Forte, and Masterboi refused to reply to (O)eco's request to provide details on their criteria. According to the mapping made by [Imazon](#), these two slaughterhouses alone buy livestock from a region that includes more than 420,000 ha of embargoed areas and recent deforestation. Masterboi was found by the [MPF-Pará](#) to have sourced more than 28,000 heads, or 22 percent of its 2016 purchases, from ranches involved in deforestation.

Cencosud

Cencosud is the [fourth](#) retailer in Brazil, holding 4.6 percent of the market. Cencosud is a Chilean company, publicly listed in Chile and on the NYSE. [Cencosud](#) operates in Bahia, Sergipe, Alagoas, Ceara (Gbarbosa), Minas Gerais, Goias (Bretas), and Rio de Janeiro (Prezunic). It has no store presence in Amazon states.

Cencosud has launched certification goals for fruit and vegetables, as well as a generic [goal](#) to “[...] seek to strengthen the traceability of our value chain and market sustainable products.” There are, however, no goals related to beef products or deforestation in its beef supply chain.

Cencosud's environmental [policy](#) is very general when referring to the Global Reporting Initiative (GRI) and the principles of the UN Global Compact. It does not contain principles on deforestation. The websites of all four Brazilian brands of Cencosud (G. Barbosa, Bretas, Perini, and Prezunic) show no sustainability policies or reports or any commitments on deforestation. [JBS'](#) Friboi brand is among its beef suppliers.

Grupo Muffato

In 2017, Grupo Muffato held national market share of 3.2 percent, making it the [fifth](#) largest player in the country. The company is the only one among the top five that is locally owned. It [operates](#) in Paraná and the interior of São Paulo, but it has no slaughterhouse presence in the Amazon.

It is unclear how much and from which suppliers the retailer is procuring its beef. Muffato has no product-specific or deforestation-related sustainability policies, and it is also not a member of the Working Group on Sustainable Beef (GTPS).

The company's beef [suppliers](#) include, among others, JBS and Marfrig, and specialty products suppliers Korin, Wessel, and VPJ Alimentos.

Meatpackers' Deforestation Policies and Performance

While many more are likely, at least five meatpackers with operations in the Amazon have been identified as supplying the top-five retailers. Profiles of JBS, Marfrig, Minerva, Boi Forte, and Masterboi are included in the Appendix. Among these five, JBS, Marfrig, and Minerva have signed the G4 and TAC agreements.

All these meatpackers face high exposure to deforestation risk. According to documented reports, they have purchased cattle from non-compliant suppliers in recent years. For suppliers of processed beef products or unlabeled fresh beef that is

linked to these retailers, it is not clear whether they source from slaughterhouses in the Amazon.

JBS and Marfrig enable retail consumers of some of its beef brands to identify the farm where the cattle were last located before being slaughtered. This identification process is available via the companies' websites. The firms use SIF (Federal Inspection Service) codes and production date on the product packaging. Yet, none of the meatpackers can effectively control its indirect suppliers.

Ativo Alimento has provided a best practice in transparency among larger meatpackers. Its Mafrinorte slaughterhouse in Pará publishes [lists](#) of its direct cattle suppliers on a daily basis, creating more transparency than other meatpackers. However, the [MPF-Pará](#) documented that in 2016, Ativo Alimento purchased 19 percent of its cattle from areas that engage in irregularities and deforestation.

Financial Risks of Exposure to Deforestation in Beef Supply Chain

Specific ranches, slaughterhouses/meatpackers and retailers are, or could be, involved in (illegal) deforestation in the Brazilian beef chain. They can disguise their actions due to the lack of transparency in the supply chain. **This situation creates various financial risks for these participants as well as financial opportunities.**

Financial risks can derive from:

- Reputation risk.
- Revenue-at-risk leading to lower utilization and lower net profits.
- Higher costs for systems related to monitoring and traceability.
- Higher financing costs (also due to loss of financial relations).

These risks might lead to investment losses for bondholders, banks, and shareholders.

Specific participants in every part of the chain are facing reputation risk. This risk originates in consumer markets where an increasing sensitivity to deforestation-related issues occur. Brazilian retailers, which serve consumers directly, may face relatively high reputation risk. **This risk could migrate to foreign owners of the retailers, particularly in Europe (Carrefour and Casino).** Large meatpackers, such as JBS, also face comparably high reputation risk.

Meatpackers and ranchers may face a relatively high revenue-at-risk from exposure to deforestation their supply chains. Brazilian retailers could decide to switch their sourcing to another meatpacker. Such a change would likely substantially impact the financial status of meatpackers with large presence in the Brazilian markets. For their part, meatpackers can stop sourcing from non-compliant ranches. This situation may lead to bankruptcies for non-compliant farmers.

All stakeholders in the Brazilian beef chain, including the government, will have to cover higher costs for systems related to monitoring and traceability. These systems require

multi-million US Dollar investments and operating costs, to be divided between all participants. As large-scale data gathering, and tracking technologies see declining costs, implementation may become less expensive in coming years.

Financing costs for non-compliant participants, on every part of the chain, may rise. Banks with NDPE policies may be less willing to offer loans, specific bondholders could decide to divest, and shareholders may have less incentive to invest. The increase in financing costs for specific participants leads to a competitive disadvantage.

Opportunities to Make Cattle Supply Chain Deforestation-Free

Compliant participants in the beef chain could see significant positive financial opportunities. In a 2017 [study](#) in *Harvard Business Review*, the authors analyzed financial risks and opportunities in the Brazilian beef chain. They concluded:

"[...] sustainable and deforestation-free practices created significant financial benefits for all players in the industry's value chain [...] embedded sustainability drives financial performance through mediating factors such as innovation, operational efficiency, risk reduction, employee recruitment, engagement and retention, customer and supplier loyalty, competitive advantage, reduced cost of capital, and improved marketing and sales."

Ranchers could gain 12 to 23 percent in sales from sustainable intensification methods (less land per cow) and innovative operations. That would lead to better quality of cows and meat, subsequently increasing prices from slaughterhouses.

Ranchers could gain benefits equal to [9 to 30 percent](#) of revenues from sustainable intensification methods (less land per cow) and innovative operations. This mainly stems from lower costs (for instance a decline in fertilizer costs). Also, it would lead to better quality of cows and meat, subsequently increasing prices from slaughterhouses. The increase in profitability of ranchers can be up to 6.8X.

The [study](#) says that slaughterhouses JBS and Marfrig saw benefits equal to 0.01-0.13 percent of revenues. These benefits are smaller in comparison to total business (versus slaughterhouses) and are more difficult to estimate due to the lack of data. The benefit of 0.13 percent of revenues translates into 5 percent of operating profit (or EBIT). Finally, Brazilian retailers could see similar gains as the slaughterhouses from selling compliant beef.

Appendix: Deforestation Policies and Performance of Amazon Meatpackers Linked Top Five Retailers

JBS

JBS is the largest beef producer in the world and in Brazil. It is also the largest slaughterhouse operator in the Brazilian Amazon. As of June 2017, it [controlled](#) 25 percent of the slaughtering capacity in Brazil, including 48 percent in Mato Grosso. It operates 32 slaughterhouses in Amazon states (of which 21 were active in 2016), creating high exposure to risks associated with deforestation.

JBS is part of the G4 Agreement that was signed between meatpackers and Greenpeace in 2009. Its active plants in Acre, Maranhão, Mato Grosso, Pará, Rondônia, and Tocantins have all signed a TAC. As required by the agreements, JBS has implemented a monitoring system. The 2017 [audit](#) report concluded that as of December 31, 2016, the company had over 70,000 farms on its register of suppliers, of which 5,749 were excluded for cattle purchases due to breaches of the company's socio-environmental criteria. The audit found that out of a sample of 9,198 purchases, JBS made three (0.03 percent) irregular purchases due to breaches of IBAMA-embargoed areas (two cases) and deforestation (one case). Crucially, though, the auditors do not have access to the GTA data from previous sales.

JBS can track 100 percent of its direct suppliers via the compulsory GTAs. Moreover, its packaged raw products branded Swift, Friboi, Swift Maturatta, and Swift Organic are traceable with a QR Code on the packaging. With the Code, consumers can identify the name and the locality of the direct supplying farms via an online [tool](#). Other JBS brands such as Seara are not traceable for consumers via the QR codes and online tool. The company has not implemented tracking of indirect suppliers.

JBS supports the Novo Campo Program in Mato Grosso, a [pilot program](#) that offers cattle ranchers guidelines on socio-environmental and productive issues. The program also aims to develop a system for tracking indirect suppliers.

[Imazon](#) identified 4.6 million ha with some risk in the potential buying zones of JBS' Amazon plants. This land includes 1.7 million ha of embargoed areas, 1.6 million ha of area deforested from 2010-2015, and 1.2 million ha of forest at risk of deforestation from 2016 to 2018.

The company has been identified twice in recent years as procuring cattle from farms with irregularities:

- The [MPF-Pará](#) in its TAC monitoring report published in March 2018 identified JBS as the meatpacker purchasing the largest number of cattle from farms with irregularities in 2016, i.e. in breach of the terms of the TAC.
- In 2017, operation "Carne Fria" carried out by IBAMA found JBS was the company that procured the largest number of cattle raised in embargoed and illegally deforested areas. Two of JBS' slaughterhouses in Pará (Santana do Araguaia and Redenção) were accused by [IBAMA](#) of acquiring 49,438 cattle or 84 percent of

the total number identified during the operation. The value of these purchases was BRL 110 million, according to estimates.

JBS has been identified as a beef supplier to all five top retailers: [Carrefour](#), [GPA](#), [Walmart](#), [Cencosud](#), and [Super Muffato](#).

Minerva

Minerva is the second largest meat producer in Brazil, with a daily slaughtering capacity of 11,880 heads. In 2016, [Minerva](#) had a total of 4,684 suppliers, of which 2,493 were new. It has four slaughterhouses in the Amazon, all of which are TAC registered. It is also a G4 signatory.

The independent [audit](#) of its conformity with minimum requirements under the G4 agreement as published in 2017 did not find cases of non-compliance. However, the auditor noted that Minerva does not have any monitorable and verifiable traceability system for its indirect suppliers to monitor all purchases of cattle in the Amazon biome, including the supply chain links preceding the fattening ranches that supply to the slaughterhouse.

The monitoring list of direct suppliers in Pará is accessible via an online [calendar](#), through the provision of a SIF number and production date from the package. For the other Amazon states, no list is published.

[Imazon](#) identified 931,000 ha with some type of risk in the potential buying zones of Minerva's Amazon plants. This includes 202,000 ha of embargoed areas, 483,000 ha of area deforested from 2010-2015, and 246,000 ha of forest at risk of deforestation from 2016 to 2018.

The 2016 sampling of the [MPF-Pará](#) found that Minerva purchased 186 animals, or 0.1 percent in the Amazon that were linked to irregularities.

Minerva has been identified as a beef supplier of [GPA](#). Considering its size as a meatpacker, it is likely that the company also supplies other retailers.

Marfrig

Marfrig Global Foods is the third largest meatpacker in Brazil with a daily slaughtering [capacity](#) of around 10,000 heads. The company has [four](#) active slaughterhouses in Amazon states (Mato Grosso, Pará, Rondônia), all TAC registered. It is also among the signatories of the G4 cattle agreement.

The audit [report](#) under the G4 agreement that was published in 2017 has not identified breaches of the minimum criteria as defined by Greenpeace. Marfrig is making efforts to control its indirect suppliers and has a proprietary [system](#) for tracking its production chain. The procedure includes verifying, analyzing, recording, and storing information that enables the company to monitor raw materials from their origin to the point of sale. However, this procedure does not yet provide systematic monitoring and verification -- the slaughterhouses have not adopted auditable procedures for indirect suppliers.

In 2012, a Marfrig unit in Mato Grosso became the first meatpacker to market [Rainforest Alliance Certified](#) beef. Since then, three more units received approval. The beef is sourced from the farms of São Marcelo in Mato Grosso, the only agricultural company engaged in cattle production that has received this certification.

Since 2013, Marfrig has [partnered](#) with The Nature Conservancy (TNC) and with retailer Walmart in a pilot project for sustainable livestock farming in São Félix do Xingu (southeastern Pará). This project [includes](#) the provision of technical assistance to ranchers for sustainable intensification, the development of a traceability model, and a model of supportive rural credit operations. Meat from these properties was first sold in 2016 in two Brazilian Walmart stores, supplying 70 tons per month. Phase II, running from 2016 until 2018, includes expansion to low-productivity pastures in the Amazon and Cerrado Biomes, along with the introduction of an improved tracking system from breeding stage to the final product. That would cover the complete supply chain and involve the addition of 300 farms with 170,000 ha that undergo intensification.

[Imazon](#) identified 1.4 million ha with some type of risk in the potential buying zones of Minerva's Amazon plants. This includes 544,000 ha of embargoed areas, 441,000 ha of area deforested from 2010-2015, and 382,000 ha of forest at risk of deforestation from 2016 to 2018.

Marfrig has been identified as a beef supplier of four of the leading Brazilian retailers, [Carrefour](#), [GPA](#), [Walmart](#), and [Super Muffato](#).

Masterboi

Masterboi has two [facilities](#) in Amazon States, in Pará and Tocantins, with total daily capacity of 1,700 heads. Both are controlled under SIF and thus allowed to trade across state borders. Neither of them has signed a TAC.

Based on the findings of [Imazon](#), as of 2015, Masterboi was exposed to 198,000 ha of embargoed areas in the Amazon, 284,000 ha of area was deforested between 2010 and 2015, and 146,000 ha was at risk of deforestation between 2016 and 2018.

[MPF-Pará](#) discovered that Masterboi sourced more than 28,000 heads, or 22 percent of its 2016 purchases, from ranches involved in deforestation.

Walmart mentions Masterboi as one of its suppliers. Masterboi's beef products might also end up on Carrefour's shelves. [Masterboi states](#) that it maintains a partnership with one of JBS's main beef brands, [Seara](#), and [Carrefour](#) offers Seara beef products. The lack of transparency regarding supply chain relationships does not allow consumers to verify whether the products are linked to a higher-risk slaughterhouse.

Boi Forte

Boi Forte operates the SIF-registered slaughterhouse LKJ Frigorífico in Tocantins, with a [capacity](#) of 600 heads per day. The meatpacker has not signed a TAC.

In 2017, two slaughterhouses in Tocantins, by [LKJ](#) and Minerva, were raided, as part of “[Operation Vegas](#),” for bribing the prosecutor of the Ministry of Agriculture in Tocantins with monthly payments of BRL 50,000 (USD 16,000). In turn, the prosecutor released tuberculosis-contaminated beef.

Based on the findings of [Imazon](#), Boi Forte’s potential buying zones contained 572,000 ha with some type of risk. Its exposure includes 143,000 ha of embargoed areas in the Amazon, 284,000 ha of area deforested between 2010 and 2015, and 145,000 ha at risk of deforestation between 2016 and 2018.

[Walmart](#) includes Boi Forte as one of its suppliers.