4.6 Lessons from the soy and beef moratoria in Brazil

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Introduction

The Amazon rainforest is the largest continuous forested landscape in the tropics. Its ecosystem services support livelihoods at the local, regional and global scale. Since 60% of the Amazon biome is located in Brazil, the country has a large responsibility for its conservation and development. Between 1990 and 2015, Brazil experienced the highest annual rate of tropical forest loss in the world, and to date some 780,000 km^2 of native forests have been replaced by alternative land uses in the Brazilian Amazon.

Since the 1960s, the expansion of cattle ranching has been a major driver of deforestation in the Amazon. As of 2014 there were 480,000 km^2 of pasture — an area larger than Sweden — representing two-thirds of the cleared forest in the region. The conversion of land for soybean production began to play an important role in the region in the 1990s, but it became a major concern only starting in the 2000s, with the release of specially bred soybean varieties adapted to Amazonian conditions and with associated infrastructure investments. There are currently 39,200 km^2 of soybean fields in the Amazon, about one-tenth of the area planted nationwide. The rapid and widespread adoption of the crop to meet the increasing international market demand contributed to the major deforestation peaks observed in the Amazon after 2000. In that context, public and zero deforestation initiatives started emerging to tame uncontrolled deforestation.

Beef and soybean moratoria put strategic pressure on a few powerful actors.

Supportive public policies

In 2004, to redress spiking deforestation rates in the region, the federal government launched the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon. It fostered the creation of protected areas and focused on monitoring municipalities considered to be deforestation hotspots. A "blacklist" was drawn up, which sanctions and restricts federal credits for agricultural expansion in 52 of 760 municipalities, which

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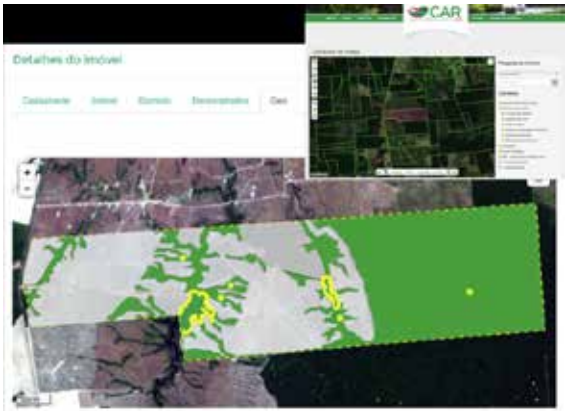
are responsible for half of all deforestation in the Amazon. In 2008, the Brazilian Central Bank issued Directive 3545, which limits access to credit in the Amazon to those rural properties that comply with environmental rules.

The main environmental legislation regulating land use change in Brazil is the Forest Code; it protects sensitive areas (riparian zones, springs, hilltops and slopes) and limits clearing. In the Amazon biome, 50–80% of landholdings must be protected under the Code. It was first enacted in 1965, and was revised in 2012, with the inclusion of the important new Rural Environmental Registry (the *Cadastro Ambiental Rural* or CAR; see Figure 1). This national system, which is mandatory for all landholders, links them to their geo-referenced properties. Also, by registering the percentage of native vegetation cover, the CAR assists the government in identifying and punishing environmental misconduct.

All these initiatives rest on the federal Program for the Estimation of Deforestation in the Brazilian Amazon (PRODES), which was established in 1988. It detects clearings larger than 6.25 hectares, and provides the official estimate of annual rates of forest loss in the region (see Figure 2). Complementing PRODES, the DETER program has mapped forest conversion since 2004, identifying fire scars and forest clearings on a daily basis and supporting surveillance operations. These programmes indicated that forest loss rates dropped 44% in the 2006–16 period. This reduction was made possible by the outstanding efficacy of public policies and by two supply chain initiatives: the soybean and beef moratoria.

Figure 1. The Rural Environmental Registry (CAR), Brazil



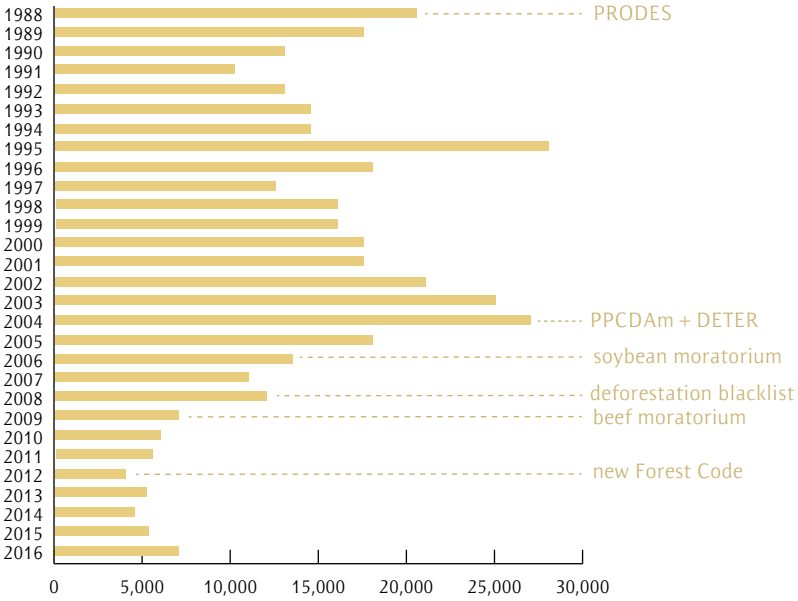
Source: Paulo Massoca

The emergence of two moratoria

The implementation of the soybean moratorium in 2006 was triggered by two key events led by Greenpeace. First, the *Eating up the Amazon* report published in 2006 (Greenpeace 2006) revealed and tracked the actors behind the expansion of soybean cultivation, leading the way for public campaigns and protests in Europe against retailers who buy

soy and soy-derived products. Second, pressed by public opinion, some companies formed the European Soy Customer Group and asked commodity traders in Brazil to eliminate deforestation from their supply chains. Concerned with maintaining market share, the Brazilian Association of Cereal Exporters and the Brazilian Association of Vegetable Oil Industries (ABIOVE) — which together represent 90% of all soy purchased in Brazil — signed the Soybean Moratorium in 2006 and agreed to ban the purchase of soy grown on land cleared in the Amazon after this date. A broad group of traders, NGOs, banks and government officials meet regularly under the Brazil Soybean Working Group to ensure continued monitoring of and compliance with moratorium commitments.

Figure 2. Deforested area (km²), Brazilian Amazon,1988–2016



Source: PRODES

Two parallel initiatives started in 2008 that expanded in scope and complexity and led to what is known as the beef moratorium. The first was when the Federal Public Prosecutor's Office of Pará (MPF/PA) started suing ranchers and meat-packing companies, and threatened to prosecute beef and leather retailers for purchasing goods produced on illegally deforested land. The second involved international actors attacking the public image of commercial enterprises. Following the successful strategy of the soybean moratorium, Greenpeace released *A farra do boi na Amazônia* in 2015, another key report. It revealed how meat-packing companies, the Brazilian government, banks and retailers in Brazil and worldwide were contributing to deforestation in the Amazon. Thousands of farms breed, fatten and trade cattle in the region, but only three meat-packing companies own half of all the registered slaughterhouses in the Amazon: JBS/Bertin, Marfrig, and Minerva.
In response to public pressure, many retailers stopped purchasing from these companies, even before the MPF-TAC Agreement between them and the government came into effect. See Table 1 for a comparison of the soy and beef moratoria.

Table 1. Comparison of soybean and beef supply chains, Brazilian Amazon

Soybean supply chain	Beef supply chain
Commodity characteristics	
▪ Cropland (2015–16): 332,000 km² (Brazil), 39,200 km² (Amazon biome) ▪ 243,000 soybean farmers in Brazil ▪ Soybean is harvested once or twice a year	▪ Pasturelands (2015): 1.67 million km² (Brazil), 480,000 km² (Legal Amazon) ▪ Cattle herd (2014): 208.3 million head (Brazil), 60 m animals (Legal Amazon) ▪ >92% of cattle slaughtered before 36 months
Market (2015–16)	
▪ Brazil: second largest producer and exporter worldwide (95.6 m tonnes in 2015–16) ▪ 70% of production (bean, meal, oil) is exported ▪ Soybean sector exports: US$ 28 billion, or 14.6% of Brazil's total exports in 2015 ▪ 70–90% used to feed livestock	▪ Brazil: second largest cattle herd worldwide ▪ 79% of beef is consumed internally ▪ Brazilian beef consumption: 39.2 kg/person/year (second highest rate worldwide) ▪ Livestock sector economy: US$ 120 billion (7% of Brazil's GDP in 2014) ▪ Livestock sector exports: US$ 7.2 billion
Supply chain	
▪ Soybean farmers (predominantly large farmers) -> ABIOVE and ANEC (trading 90% of the soybean in Brazil) -> Retailers (European Soy Customer Group)	▪ Breeding, calving, and fattening farms (all property sizes) -> Direct suppliers (fattening farms) -> Meat-packing companies (slaughterhouses) -> Retailers
Area currently covered by the agreements in the Amazon biome	
▪ 87 municipalities >5,000 ha of soybean in the Amazon biome (extension to the cerrado biome currently debated); ▪ see Figure 3	▪ 129 slaughterhouses purchasing cattle in Pará, Acre, Rondônia, Roraima, Amazonas, Mato Grosso, Maranhão; ▪ see Figure 4
Commitment	
▪ No deforestation after July 2008 (including legal clearings)	▪ No illegal deforestation after 2008 ▪ Listing of properties in the Rural Environmental Registry (CAR) ▪ Compliance with the Forest Code ▪ No slave labour ▪ No clearing of protected areas or indigenous land
Monitoring system	
▪ Federal monitoring program (PRODES) monitors 98% of soybean plantations ▪ Independent monitoring by ABIOVE and ANEC since 2013–14, using satellite images to detect noncompliant soybean plantations ▪ Blacklist of embargoed farms released by the Soybean Workgroup (GTS)	▪ Federal monitoring program (PRODES) monitors deforestation in the Amazon ▪ CAR provides georeferenced information on registered suppliers (fattening farms) ▪ Cattle herd registry with agricultural agencies ▪ Slaughterhouses disclose information on direct suppliers of cattle

Soybean supply chain	Beef supply chain
Stakeholders committed to the agreements	
▪ Soybean Working Group (GTS) ▪ Private sector: ABIOVE and ANEC ▪ Public sector: Ministry of Environment, INPE, the Bank of Brazil ▪ Civil society: Greenpeace, Imaflora, Earth Innovation Institute, IPAM, TNC ▪ European Soy Customer Group: Carrefour, McDonald's, Nestlé, Ahold, Marks and Spencer, Waitrose, Sainsbury's, Tesco, MVO	▪ Direct suppliers (fattening farms) ▪ Meat-packing companies (129 firms, or 38% of total) ▪ Brazilian Supermarket Association (ABRAS) ▪ Greenpeace ▪ Brazilian Prosecutor's Office (MPF)
Costs of compliance	
▪ ABIOVE and ANEC pay for part of the monitoring system (satellite imagery is made available to the public by the government, but analysis of noncompliant soybean plantations has to be paid for)	▪ Ranchers pay the costs of registering their properties on the CAR ▪ Ranchers pay the costs of registering their cattle herds with agricultural agencies ▪ Meatpacking companies must verify the origin of cattle from fattening farms and inform their suppliers
Motivation for behavioural change	
▪ European Soy Customer Group companies' reputational concern to avoid linking deforestation and other illegal activities to their institutional image ▪ ABIOVE and ANEC's desire to maintain their market share, by responding to international buyers' demand ▪ Farmers' dependency on ABIOVE and ANEC to purchase and finance their production	▪ Meatpacking companies' concern about their institutional image, as well as with punishment and sanctions by the MPF ▪ Cattle ranchers' desire to assure their market share with the main meat-packing companies in the region, as well as their concern with punishment and sanctions by the MPF
Drawbacks	
▪ Moratorium criteria are stricter than federal legislation, even prohibiting legal deforestation ▪ The moratorium does not cover the cerrado (savanna) biome, where much soybean is cultivated (e.g., Mato Grosso), at the border of the Amazon biome, which may cause leakage of deforestation	▪ Calving and breeding ranches are not part of the agreements, allowing cattle laundering and deforestation leakage across the region ▪ Agricultural agencies do not release information regarding cattle registered in their tracking systems ▪ Supermarkets do not release their institutional polices regarding the purchase of beef

Figure 3. Soybean in the Amazon biome

Figure 4. Beef in the Amazon biome

The companies then agreed to monitor and disclose information about their suppliers, and committed themselves to banning direct supply from ranches established following illegal deforestation. The same companies then signed the Zero Deforestation Cattle Agreement with Greenpeace, which committed them to eliminating all deforestation from their supply chain. These two agreements gained further signatories; they currently encompass 129 meat-packing companies, which represent 38% of the meat-packing facilities in seven states.

What has worked, and what has not

Recent studies have provided data and analyzed the effectiveness of the agreements in the beef and soy supply chains (Greenpeace 2014; Nepstad et al. 2014; NWF 2016). Soybean expansion over forestlands dropped from around 30% before the moratorium to 1% after it, in 2014 (Gibbs et al. 2015b). The most recent report on the implementation of the soybean moratorium (ABIOVE 2016) stated that soybean plantations accounted for only 1.2% of the total area deforested in the Amazon after 2008 in the 87 municipalities that are responsible for 98% of soybean grown in the biome. This is a striking result considering that the soybean area in the Amazon increased three-fold between 2009 and 2015, from 12,800 km^2 to 39,200 km^2. The explanation for this expansion without deforestation is that the soybean cultivation was carried out on pastures cleared before 2008.

The efficacy of efforts to remove deforestation from the beef supply chain in the Amazon is uncertain; there are few hard figures as available, as there are for the impacts of the soybean moratorium. But Gibbs et al. (2015a) show that meat-packing companies committed to the beef agreements have substantially reduced the purchase of cattle from fattening ranches associated with illegal deforestation in Pará state. Moreover, the authors found that beef agreements have strongly influenced farmers to register georeferenced information for their ranches with the rural environmental registry (CAR). However, the profile of direct beef suppliers has changed. The average area of fattening ranches has increased, and the average proportion of forests remaining on these ranches has reduced. Considerable illegal deforestation still appears to be associated with

ranching because of deforestation leakage and cattle "laundering" (i.e., animals and animal products from noncompliant ranches or slaughterhouses manage to enter the beef supply chain).

The challenge of cattle

In spite of similarities in the history of the two moratoria and the way they are structured, their efficacy in tackling deforestation is strongly affected by the very different characteristics of each commodity and their respective supply chains. Soybean fields are static, whereas cattle herds are transient across the landscape, thereby complicating monitoring strategies. While the soybean moratorium essentially monitors deforestation in the fixed area where it is planted, the beef moratorium requires monitoring of both the suppliers' farms and the cattle herd itself, as this dual monitoring is the only way to ensure that animals do not enter the supply chain from properties engaged in illegal deforestation.

Unfortunately, guaranteeing the individual traceability of cattle is still far from possible in the region. One hindrance to the verification of cattle origin is that the information regarding the registering of cattle and transportation required by governmental agencies is not publicly available (Barreto and Gibbs 2015). Another problem is that calving and breeding ranches are not included in beef agreements. Therefore, cattle raised and fattened on illegal properties continue to feed consumers in urban centres, and animals from illegal properties are still sold to smaller local slaughterhouses that have not committed to the agreements. Also, since slaughterhouses are not required to trace cattle from breeding and calving farms, fattening farms that supply meat-packing companies that have signed the agreements are able to launder illegal beef.

Such laundering is possible because the beef supply chain is broader and more complex than that of soybean. Cattle are almost everywhere in the region, on small and large properties and in both remote and consolidated rural areas. Local slaughterhouses that supply local and regional markets are also widespread. And while the soybean moratorium worked directly with the two major associations that control most of the soy purchased in Brazil, the two beef agreements focus on meat-packing companies that represent only one-third of the beef produced in the Amazon. Therefore, although beef agreements have succeeded in removing deforestation from much of the beef sold in large urban centres in Brazil, further initiatives are required to pressure the key actors who still supply and trade beef linked to deforestation.

Moratoria as hybrid mechanisms

The soybean and beef moratoria are both multi-stakeholder initiatives and are examples of the hybrid mechanisms emerging around the world to fight deforestation (Lambin et al. 2014). They differ from traditional command-and-control approaches that rely solely on public sector initiatives, which burden governments excessively. As the two moratoria show, these hybrid mechanisms include private-sector and civil society stakeholders, engaging a larger set of actors to tackle the specific drivers of deforestation.

The beef and soybean moratoria have strategically narrowed the scope of the problem by targeting a limited set of supply chain actors who drive deforestation in specific geographic areas. Instead of pursuing cattle ranchers and soybean farmers, who comprise the weaker and more numerous part of the supply chain, the beef and soybean moratoria strategically pressure a small number of powerful actors, such as large meat-packing companies in Brazil and international retailers in Europe, who are more concerned with their institutional image. And since these agreements develop from collective initiatives — including stakeholders from the private sector — pressure from within the supply chain causes behavioural changes among participants, who are concerned with their market share. This distinguishes these market-led initiatives from top-down governmental policies to fight deforestation.

Since actors with a stake in these supply chains often withhold privileged information, it is important to engage a diverse set of stakeholders. This favours shared responsibility among those involved, and supports the task of collecting, disclosing and auditing information. This information sharing is further enhanced because communication barriers among decision makers tend to dissolve in the process, reducing the distance — literal and metaphorical — between interested parts and favouring the open exchange of information. Consequently, these hybrid mechanisms result in commitments that are developed and agreed to collectively, and that are based on detailed and reliable information. All of this increases the success of such initiatives in tackling deforestation.

Conclusions

The beef and soybean moratoria have both contributed to the reduction of illegal deforestation in their supply chains. The expansion of soybean cultivation in the Amazon has occurred almost exclusively at the expense of pastureland, not forest, and meat-packing companies committed to the beef moratorium have excluded ranches involved in illegal activities from their supply chain.

The role of civil society (Greenpeace, in particular) in mapping and disclosing reliable information has been crucial in informing strategic actions against key actors within both supply chains. However, commodity characteristics and the organization of supply chains have influenced the effectiveness of these moratoria. Although satellite imagery has sufficed to monitor soybean expansion in the region, additional strategies are required to assure that cattle do not come from illegal ranches.

Both moratoria have successfully brought together key actors in collectively devising agreements and sharing responsibility for implementing, monitoring and enforcing their commitments. And by affecting institutional image and market share, both moratoria used direct economic pressure to trigger change. Contrary to command-and-control initiatives that enforce regulations by punishment and sanctions, market-led initiatives such as these moratoria rely on a small set of key actors to influence behavioural changes within the supply chain in a broad and effective way.

The soybean moratorium is managed by members of the Brazil Soybean Working Group, who control almost all national trade. Actors in the more complex beef supply chain are insufficiently represented in existing agreements. The beef moratorium still requires the involvement of additional actors, such as calving and breeding ranchers, to advance its goals, and engaging supermarkets to remove illegal slaughterhouses from their beef suppliers would apply more pressure to the supply chain.

The soybean and beef moratoria have been successful in leveraging government efforts, but additional initiatives are necessary to reduce deforestation, particularly in face of increases in deforestation rates in the region since 2013. Therefore, this analysis is important and timely. Despite the need for improvements in the existing moratoria, they are instructive for decision-makers and stakeholders in devising novel hybrid mechanisms to tackle other drivers of deforestation in the Amazon.

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