

# The potential of deforestation-free agreements to decrease deforestation and promote sustainable supply chains: The case of the Soy Moratorium in Brazil

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## Abstract

Deforestation trends in the Brazilian Amazon have been increasingly linked to globalized markets for beef, timber, soybean, and other commodities. In recent years there has been a remarkable proliferation of deforestation-free agreements to pressure corporations to adopt more environmentally responsible practices around the world. The Brazilian Soy Moratorium (SoyM), the first voluntary deforestation-free agreement carried out in the tropics, was implemented in 2006 and pressed major soybean traders to stop purchasing soy grown on deforested lands in the Amazon.

To better understand the uptake process of the SoyM, this research: i) explored the ways in which diverse forces (markets, international rules and norms, and direct access to domestic policies) influenced the agreement; ii) analyzed key concomitant events that took place throughout the agreement's implementation; and iii) developed recommendations to enforce deforestation-free agreements. Studies show that eight years after the establishment of the SoyM, soy expansion realized through deforestation in the Amazon has decreased considerably, yet the overall soy production continued to grow. Enforcement of laws, restrictions on access to credit, and expansion of protected areas appear to have contributed to this decline, as did a decline in the demand for new deforestation. This case study provides valuable lessons on the importance of a package of measures (public policies, monitoring systems, supply chain interventions) to slow the advance of a complex agricultural frontier.

## Introduction

Deforestation trends in the Brazilian Amazon have been increasingly linked to globalized markets for beef, timber, soybean, biofuels, and other commodities (May et al. 2011). In early 2016, the pace of deforestation in the region almost doubled from rates of 2015 (IMAZON 2016), transforming native forests into agricultural and pasture lands (May et al. 2011), especially in Pará, Amazonas, Mato Grosso, and Rondônia States (IMAZON 2016). This conversion of forest areas has

contributed approximately half of the country's total net CO<sub>2</sub> emissions (MCT 2010). Furthermore, deforestation results in severe social and environmental problems, such as the disruption of indigenous people's livelihoods, loss of biodiversity, and shifts in the precipitation regime.

The expansion of large-scale cattle ranching and agriculture at the forest frontier has become one of the major drivers of forest loss (Brown et al. 2005). Improvements in cultivation and productivity of adapted crop varieties have made Brazil a lead-

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ing producer of grains such as soy, and the agribusiness sector accounts for more than one third of Brazil's GDP (Carvalho 1999). Between 2001 and 2006, for example, soybean fields expanded by one million hectares in the Amazon biome.

The agricultural frontiers along the Brazilian Amazon have long been the world's most active hot spots for forest loss (FAO 2006; Santilli et al. 2005) and greenhouse gas (GHG) emissions (MCT 2010). Continued expansion of cropland production in the Amazon is likely for three reasons: i) extensive areas of the Amazon basin are thought to have suitable soils, climate, and topography for large-scale mechanized agriculture (Jasinski et al. 2005); ii) recent and planned development of critical infrastructure, such as roadways and ports, is intended to support farming operations by reducing the cost of transportation, and iii) there is a growing global market demand for agricultural commodities and high potential return on investment (Morton et al. 2006).

#### *Deforestation-free agreements and the case of the Soy Moratorium*

In recent years, non-governmental organizations (NGOs) have succeeded in pressuring corporations to adopt more environmentally responsible practices around the world. While critics of environmental campaigns claim that results are often ephemeral (Urs & Auld 2015), advocates emphasize the potential of market campaigns to influence corporate decision-making (Doh & Guay 2006), achieve positive environmental and social change in the absence of legislation (WWF 2008), or even inspire law enforcement and the creation of stricter environmental regulations.

In fact, in recent years there has been a remarkable proliferation of deforestation-free agreements<sup>1</sup> (alternatively, “no deforestation” or “zero-deforestation”) among governments, the private

sector, and NGOs, although the concept is still ambiguous. Deforestation-free or zero-gross-deforestation aims to end deforestation from supply chains and investments. The World Wildlife Fund (WWF) defines zero-deforestation as the elimination of deforestation from the production of timber and agricultural commodities, maintenance and enhancement of high conservation value (HCV) and high carbon stocks (HCS) areas, protection of peat lands, and prevention of primary forest from clearance (WWF 2008). Deforestation-free commitments do not consider offsetting gains in forest cover (TFD 2014). Nonetheless, zero-net-deforestation (ZND)<sup>2</sup> acknowledges that some forest loss could be offset by forest restoration, which is likely to collide with the ultimate goal of protecting biodiversity.

In 2010, the board of the Consumer Goods Forum (CGF) – a key international network of industry members including retailers, manufacturers, service providers, and associations – pledged to achieve ZND by 2020 through responsibly sourcing major agricultural commodities, including beef, soy, and timber (WEF 2012). To uphold this commitment, CGF joined with national governments, civil society groups, and other industry members to create the Tropical Forest Alliance (TFA), a public-private partnership that aims to address deforestation related to the sourcing of soy and other key commodities (TFA 2015). Individual companies, such as Mars, Marks and Spencer, Unilever, and Cargill, have made similar commitments.<sup>3</sup> Another important initiative is the New York Declaration on Forests, a non-binding international political declaration among governments, companies, and civil society to halve natural forest loss by 2020 and end it entirely by 2030 (United Nations Climate Summit 2014).

In Brazil, the private sector and NGOs are the predominant actors engaged with deforestation-

<sup>1</sup>This paper does not intend to present a comprehensive list of agreements. Some examples are mentioned to illustrate the different types of agreements and main actors involved.

<sup>2</sup>WWF calls for pledges of ZND by 2020.

<sup>3</sup>Personal communication with representative of the Rainforest Alliance, November 15th 2015.

free agreements; only a few subnational governments have signed these agreements, and the federal government's involvement has been relatively low. For example, the CGF pledge includes brands, traders, and retailers—such as Walmart, Cargill, and Carrefour—that commercialize commodities (beef, soy, and palm oil) produced in the Amazon region. In the case of the NY Declaration on Forests, Brazil did not sign the declaration as a country, but some subnational governments (e.g., the states of Acre, Amazonas, and Amapá), and national NGOs (e.g., IDESAM, IMAFLORA, and IPAM) are signatories to the pledge (United Nations Climate Summit 2014). The TFA 2020 includes two Brazilian NGOs (IMAFLORA and Amigos da Terra-Amazonia Brasileira), several international NGOs that develop projects in the Amazon region (The Nature Conservancy, World Wildlife Fund, Rainforest Alliance, Conservation International, etc.), and all of the CGF members (TFA 2015). Despite buy-in from NGOs and the private sector, commitments have been signed so rapidly that there has been little opportunity to reflect on the concepts, mechanisms, and targets of the commitments themselves (TFD 2014). Furthermore, these initiatives are voluntary and do not establish any binding targets or obligations of conduct.

The Brazilian Soy Moratorium (SoyM), the first voluntary deforestation-free agreement carried out in the tropics, was implemented in 2006 and pressed major soybean traders to cease purchasing soy grown on deforested lands in the Amazon. This historic agreement, initially between the Brazilian Vegetable Oil Industry Association (ABIOVE) and several national and international environmental NGOs, occurred as a response to increased pressures from retailers and NGOs driven by environmental stewardship. Gibbs et al. (2015) affirm that the SoyM agreement led to huge changes on the ground and dramatically decreased deforestation caused by soy crops. However, the long-term effectiveness of the SoyM is still unclear, as are its effects on the private sector practice, public policies, and deforestation leakage.

This research aimed to better understand the uptake process of the SoyM and the ways in which diverse forces (markets, international rules and norms, and direct access to domestic policies) influenced the agreement's implementation and results. Specifically, the research aimed to understand the role of the SoyM in reducing deforestation by exploring the following areas:

First, this work required a better understanding of the SoyM agreement, the stakeholders involved in the uptake of the SoyM, and their specific roles and motivations to adhere to the agreement. Questions explored in this phase include: what kind of causal pathways has the SoyM travelled through? What were the national and international forces that contributed to the SoyM implementation? To answer these questions, the pathways framework was used to identify the channels through which the SoyM may have influenced deforestation rates, domestic environmental regulation, and corporate responsibility in the soybean supply chain.

Second, concomitant and key events that occurred throughout the agreement's implementation were analyzed, as were the ways in which they have affected the SoyM performance. That is, what were the external constraints and drivers that impacted the SoyM? What interactions with market trends, environmental policies, and corporate citizenship have affected the SoyM implementation and outcomes?

Finally, the results and durability of the SoyM were explored, as was the potential for replication. Impacts of SoyM on deforestation rates and corporate sustainability were examined. Questions of best mechanisms available to enforce the agreement, maintain results, and ensure durability were also considered.

### *Methods*

Fieldwork was conducted in the States of São Paulo, Pará (in Belém and Paragominas municipalities), Mato Grosso, and Brasília. Preliminary research to identify important interviewees was carried out to

describe the story and impacts of the SoyM from different perspectives since its early beginnings in the 2000's.

Interviewees included corporate responsibility and sustainability directors of soy trading companies, federal and state associations of soy producers, the Brazilian Vegetable Oil Industry Association (ABIOVE), environmental NGOs and consultants, academic researchers and professors, representatives of the Ministry of the Environment, representatives of federal and state environmental agencies, and the Soy Working Group (GTS), among other important stakeholders. Data from secondary sources, such as scientific articles, reports, and news based on interviewees' recommendations, were also collected.

### Understanding the Soy Moratorium

In 2004, Greenpeace began to investigate the soy industry and identified three giant soy traders (ADM, Bunge, and Cargill) engaged in the deforestation of the Brazilian Amazon rainforest. Soy plantations in the region expanded by approximately 1.2 million hectares that year. Meanwhile ADM, Bunge, and Cargill were deemed responsible for 60% of the total financing of soy production in Brazil. Together they controlled more than 75% of the soy crushing capacity in Europe, which supplied soy meal and oil to the animal feed market. At the same time, Cargill had built an illegal port facility in the state of Para. Environmentalists became concerned that this would enable easier exporting of soy, thereby feeding external soy demand, which could ultimately result in a surge in deforestation rates. (Greenpeace 2005). With the world's attention on this port facility, Cargill partnered with several environmental NGOs, including TNC, to ensure that the soy purchased by the corporation was sustainably grown by local farmers and respected local rights (Garrett 2011).

In response to the increasing deforestation rates, Greenpeace launched an international campaign, "Eating up the Amazon", that targeted the companies linked to soybean production in the region. The incisive campaign alerted European consumers of the links between the soy products they were purchasing and deforestation in the Brazilian Amazon (Greenpeace 2005). The campaign was very pertinent because there were no monitoring tools to investigate land use at the time; therefore there was very little information about land occupation and the drivers of deforestation at that moment. Greenpeace understood that, as major soy consumers, restaurant chains acting in Europe would have an important impact on the supply chain. As a result of the campaign, McDonald's was moved to pressure its entire soy supply chain, reaching even the biggest soy traders in Brazil including Cargill, ADM, and Bunge (Greenpeace 2005). Soy traders were targeted because of their broader influence on the upstream practices of the soybean supply chain.<sup>4</sup> Financiers were also pushed to divest from deforestation-related activities (Dieterich & Graeme 2015).

Finally, in July 2006, ABIOVE and ANEC (National Association of Cereals Exporters), together with their respective affiliates<sup>5</sup> and civil society,<sup>6</sup> announced a two-year commitment, the SoyM, to exclude from their supply chains soy produced in newly deforested areas as well as farmers using forced laborers in the Amazon. The agreement had been renewed on an annual basis since then, but was indefinitely renewed in 2016 (Estrada 2016a). The members created a multidisciplinary Working Group (GTS) to ensure the implementation of the SoyM. The GTS generally meets bimonthly and decides strategies, makes decisions, defines work plans, and coordinates sub-groups. There are three active sub-groups in the GTS: i) Mapping and Monitoring, which identifies deforestation since

<sup>4</sup>Personal communication with representative of Greenpeace, May 21st 2015.

<sup>5</sup>Amaggi Group, ADM, Baldo, Brejeiro, Bunge, Cargill, IMCOPA, Louis Dreyfus, Oleos Menu, and ABC Inco.

<sup>6</sup>Coordination Soy-Brazil, Conservation International, Greenpeace, IPAM, The Nature Conservancy, WWF Brazil, Imaflora, and Friends of the Earth – Brazilian Amazon.

the agreement's signature and tracks advances in soy planting (the SoyM monitors 76 municipalities that are responsible for almost all the soy produced in the Amazon) (Greenpeace 2016); ii) Environmental Rural Registry (CAR), which aims to accelerate the completion of the CAR among the soy producers and develop strategies to spread environmental law compliance; and iii) Best Practices, which enhances and promotes sustainable agricultural practices in the sector (ABIOVE 2008).

Despite this rich history of environmental activism and stakeholder engagement, there have been few attempts to understand how corporate commitments to improving social and environmental practices are put into practice (Estrada 2016a). The pathways framework (Bernstein and Cashore 2012) is used to analyze how each pathway has potentially influenced the adoption of the SoyM and promoted environmental stewardship in the Brazilian Amazon. The approach identifies four main pathways that may result in internationalization, that is the process by which domestic policies are influenced by international processes and actors: 1) market access, 2) international norms and discourse, 3) direct access to domestic policy-making processes, and 4) international rules.

In the case of the SoyM, some pathways are more promising than others as a means to affect change. Domestic policies influenced by internationalization may be more or less durable depending on the interactions amongst pathways, the effect on national sovereignty, and the influence of global markets. Usually, a policy that travels multiple pathways is more durable than policies that navigate one single pathway.

#### *Market access pathway*

This pathway is pursued via boycott campaigns or the adoption of market mechanisms, such as certification systems and green labels that attempt to regulate markets and influence behavior through firm recognition and price premiums. In the case

of the former, NGOs or other actors can influence a government or companies to change their policies or behaviors through “naming and shaming” campaigns. Policies that result from this approach are likely to be durable if markets are reinforcing existing domestic rules and depend on exports.

Market pathways are the most common routes in the promotion of zero-deforestation agreements and commonly involve boycotting targeted companies (Buono & Cashore 2013) that cause deforestation across their supply chains. Support for these agreements has been possible when commodities depend on sensitive foreign markets or when the actors involved perceive these agreements as a means to bolster their own interests (Cashore & Stone 2013), such as access to new markets, and/or continued access to existing ones.

The SoyM experience indicates that the markets pathway may be a promising avenue for international actors and forces looking to curb commodity-induced deforestation. The agreement came out of increased pressures from international retailers and nongovernmental organizations in support of deforestation reduction. An assessment of the soy supply chain identified the most strategic actors (soy traders) and stages to push for supply chains free from deforestation. After an incisive campaign, Greenpeace targeted McDonald's because of its important role in influencing the supply chain upstream. Although the SoyM is still a voluntary agreement, the pressure from one of the major consumers was crucial for enforcing a clear target (zero legal and illegal deforestation) amongst the biggest soy traders in Brazil. Other national NGOs acted as important players when they joined the GTS to operate as inspectors of the agreement's compliance.

However, with emerging markets constantly changing and demanding different product standards, the effectiveness of market pathways may happen only in the short-term, with no guarantee of a durable impact. Some soy producers,<sup>7</sup> for ex-

<sup>7</sup>Interview with soy producers and associations in the state of Para and Mato Grosso, June 2015.

ample, stated that China is now their most important consumer, and the previous standards set by Europe are no longer relevant for soy production and exports. Other producers that are not part of the SoyM are trading directly with China and have indicated that their practices have not changed after the enactment of the agreement. For this reason, using the markets pathway in combination with other pathways might result in more durable outputs.

#### *International norms pathway*

This pathway seeks to develop norms or establish protocols that will change or reinforce certain domestic policies or behaviors. International norms can influence what is considered appropriate within a domestic setting. The influence of international norms depends on the moral vulnerability of the target state or firm and on the resonance with domestic ideology and policy goals in a country (Berstein & Cashore 2012). Policies that result from this pathway are potentially durable.

The risk that corporations are associated with Amazon deforestation is already one of the major barriers preventing Brazilian products from accessing international markets (Nepstad et al. 2015). Many companies demand “zero-deforestation” and “zero illegality” from their commodity suppliers, as they seek to protect their own reputations. This perception may translate into support for zero-deforestation commitments. In fact, a widespread hope is that the need to protect the Amazon and the importance of a good reputation can induce more sustainable farming.

The Greenpeace “Eating up the Amazon” campaign brought considerable attention to the relationship between soy production and deforestation. Similar campaigns, such as the “Slaughtering the Amazon” initiative might gradually change Brazilian actors’ perception of deforestation and commodity production in the Amazon. Continued campaigning from international NGOs and other actors is needed in order for the new norms to crystallize in the domestic setting. Partnerships with local

NGOs and other domestic actors might be necessary to create durable effects and campaigns. Private and public interactions within transnational networks and in formal and informal events also seem to be relevant for the dissemination of norms (Berstein & Cashore 2012).

#### *Direct access to domestic policy-making processes pathway*

The direct access pathway can influence a country’s domestic policy by building capacity, transferring technology, empowering disadvantaged groups, or directly funding particular projects. This pathway fosters independence, but depends on continued capacity building and funding from international organizations, NGOs, or states in order to be durable. This pathway may undermine national sovereignty, since external actors may pervade the domestic realm. However, some countries are likely to welcome external funding and technology transfers, in which case sovereignty would not be affected.

While markets are the primary pathway travelled by zero-deforestation agreements, the effectiveness of the commitment will require greater emphasis on domestic policies, monitoring, and verification capacity in order to ensure compliance with deforestation targets. The multi-stakeholder dialogue created by the GTS empowered domestic actors and engaged organizations in a push for deforestation reduction, while also encouraging compliance through the annual monitoring of deforestation caused by soy production in the Amazon. The establishment of a monitoring component pushed for the use and transfer of technology, capacity building, and third-party verification of the SoyM accomplishments to ensure a decrease in deforestation rates. Monitoring was particularly important in the case of the SoyM and seemed to contribute to reduced deforestation. Given these successes, SoyM represents a case in which a diverse collective of stakeholders successfully traversed the direct access pathway to contribute to a curb of deforestation in the Brazilian Amazon.

### *International rules pathway*

The international rules pathway involves the use of international laws to influence domestic outcomes. Most international treaties require countries to enact legislation or policies that enable their compliance with the terms of the agreement. This pathway may undermine sovereignty if the international obligation challenges domestic policy-making processes; nevertheless, this pathway has the potential to produce durable policies if states actually implement and enforce the international agreements. There is a global movement to reduce deforestation, which has encouraged the private sector, NGOs, and governments to announce commitments to eliminate deforestation from their supply chains. Most of the agreements aim to influence domestic policies and count on domestic actors' participation. However, the vast majority of these commitments are still voluntary, rather than mandatory treaties.

As a promising international regulation, the Paris Agreement set the goal of achieving net-zero emissions in the second half of this century and finally enshrined Reducing Emissions from Deforestation and Forest Degradation (REDD+). As a result, tropical countries expect new and long-term investments from developed countries as well as from private sector actors through zero-deforestation policies and markets. Countries are also encouraged to measure forest conservation and establish incentives and regulations to support deforestation-free supply chains (Harris & Stolle 2016). The Agreement provided a political signal to mobilize action regarding forests and may result in an international binding commitment that promotes more durable outcomes in national settings (including that of Brazil).

### **External constraints and drivers that affected and affect the SoyM**

In evaluating the impact of the SoyM, it is critical to understand the internal and external constraints and incentives surrounding the agreement and as-

sess how it has interacted with other policies. Separate measures and conditions have also contributed to the decline of agricultural expansion into forestlands, such as public investments in law enforcement and the monitoring of deforestation, the creation of new protected areas, as well as changes in market conditions. The effectiveness of the SoyM alone is therefore unclear.

### *Corporate sustainability*

The year 2014 was remarkable for the increase of corporate environmental responsibility. The following facts illustrate this trend: i) the green bonds market tripled in size (Urs 2014); ii) the New York Climate Summit established targets that build on corporate leadership and regional government initiatives (Urs 2014); and iii) the 400 members of Consumer Goods Forum announced zero-net-deforestation goals by 2020.

A rising sentiment of corporate citizenship, as well as recent technological advances in land use change analysis has encouraged the adoption of sustainable production and sourcing (SPS) practices (Urs 2014). The implementation of SPS has inspired a continuous dialog among the private sector, NGOs, and policy makers, and has stimulated the development of monitoring and verification systems (Urs 2014). SPS opportunities also include market differentiation, brand loyalty, and risk management (CDP 2014). However, while these commitments may leverage broader sustainability outcomes, their impact on the production of agricultural commodities is unclear.

### *International market trends*

International trade and consumption have significantly driven deforestation and have notably contributed to global CO<sub>2</sub> emissions. Approximately 30% of the carbon emissions associated with deforestation was exported from Brazil in the last decade, of which 29% was due to soybean production. The share exported to emerging markets is growing, especially to China. The Asian market now has a

larger share of soybean emissions than the European market, and China alone is responsible for 22% of all emissions linked to soybeans in 2010 (up from 7% in 2000) (Karstensen et al. 2013).

Evidently, deforestation in Brazil is closely linked with the global chain of agricultural commodities. From the late 1990s through 2004, deforestation became more responsive to global influences as commodity markets and technological advances encouraged the expansion of soy and other mechanized monocultures into the Amazon (Nepstad et al. 2015).

Global consumers create demand for the production, international trade, and sustainability requirements of goods and services (Karstensen, Peters and Andrew 2013). As market dynamics shift with the growing influence of China, requirements for sustainability, which have been relatively strict across European markets, may change and affect the motivation to comply with the SoyM.

#### *Environmental policies*

Brazilian environmental policies have been very effective in curbing forest clearings. Simulations indicate that conservation policies collectively avoided 62,100 km<sup>2</sup> of deforestation from 2005 to 2009, around half of the forest area that would have been cleared had the policies not been passed (Assunção & Gandour 2013). Deforestation rates also vary with commodities pricing, but analyses that control for different sources of variations in prices showed that environmental policies were still responsible for avoiding considerable forest clearings in comparison with decreases in prices. (Assunção & Gandour 2013). In 2005, for example, soybean prices fell by more than 25%, but municipalities in the central agricultural zone of Mato Grosso (a state in mid-western Brazil and the largest soybean producer in the country) still maintained a similar rate of deforestation (Brown et al. 2005).

Preliminary analyses of the successful SoyM's impacts may have overestimated the actual results of the agreement, since policies have proved to

play a fundamental role in decreasing deforestation. The victories of the SoyM may be an example of how the "claims of success of market mechanisms tend to be exaggerated, and based on partial data ..." (Balletti 2014). The effectiveness, challenges, and opportunities that deforestation-free agreements present require further assessment. However, it is a challenge to isolate different variables when determining drivers of deforestation and reasons for decreases in forest clearings. Furthermore, unless effective forest governance is in place, broader efforts to curb deforestation may achieve temporary success but will keep facing numerous challenges (Lawson 2014). Some of the policies that directly affected deforestation rates in the Amazon in the last decade are described below:

*Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAM).* – The launch of the PPCDAM in 2004 introduced a new mechanism for combating deforestation in the Amazon. Conservation efforts, previously restricted to the Ministry of the Environment (MMA) and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), were opened to integrated action and the participation of numerous ministries (IPAM 2009). Cooperation between different levels of government and the implementation of the Real Time System for Detection of Deforestation (DETER) provided support for the practice of stricter monitoring in the Legal Amazon. PPCDAM focused on three main areas: (i) territorial management and land use; (ii) law enforcement; and (iii) promotion of sustainable practices (Casa Civil 2004; May et al. 2011). PPCDAM regulated legal instruments for the punishment of environmental crimes, which increased the number of fines applied, embargoes, confiscation of goods, and prosecution (Assunção et al. 2013). Assunção et al. (2013) estimated that PPCDAM preserved more than 122,700 km<sup>2</sup> of forested area.

*Resolution 3545/2008: Restrictions on rural credit in the Brazilian Amazon biome.* – Introduced in 2008,



this regulation redirected the rural credit system in the Brazilian Amazon and required borrowers to present proof of compliance with environmental regulation. Credit is an important source of financing for rural producers in Brazil, and this system led to a substantial reduction in rural credit borrowed throughout the region. Assunção and Gandour (2013) estimate that approximately USD 1.4 billion in rural credit was not contracted between 2008 and 2011 due to restrictions imposed by the Resolution, a decline that prevented over 2,700 km<sup>2</sup> of deforestation, or a 15% decrease in the typical deforestation rate over that time period.

*Public list of illegally deforested areas.*—A Decree in 2007 established the legal basis for distinguishing municipalities with very high deforestation rates. In January 2008, the Ministry of the Environment published a list (“black list”) of thirty-six municipalities in need of action to combat illegal deforestation. The list was based on the following three criteria: (i) total deforested area; (ii) total deforested area in the past three years; and (iii) increase in the deforestation rate in at least three of the past five years (Assunção & Rocha 2011). After the publication, all illegally deforested areas on the list were embargoed, and landowners encountered tighter standards when trying to take out agricultural loans (Tollefson 2015). In response to this policy, 11 counties drastically reduced reforestation and the State of Pará launched the “Green Municipalities Program” to help blacklisted counties reduce their deforestation rates and reestablish access to rural credit (Nepstad et al. 2015).

*Creation of protected areas.*—Protected areas are effective instruments for safeguarding the integrity of ecosystems, biodiversity, and the associated environmental services (e.g., soil conservation, watershed protection, pollination, nutrient recycling, and climate regulation) (Veríssimo et al. 2011). Protected areas are also potentially important for protecting the rights of permanence and the culture of local traditional populations and indige-

nous peoples (Veríssimo et al. 2011). Some of the success in reducing deforestation in Brazil comes from the development of a network of indigenous lands and protected areas across the Amazon (Assunção & Rocha 2011). In addition to that, Barber et al. (2014) concluded that protected areas have a strong mitigating effect on the risk of deforestation due to the proximity to transportation networks. The establishment of protected areas gained momentum from 2003–2006, when approximately 500,000 km<sup>2</sup> of rainforest were set aside (Veríssimo et al. 2011). Significant progress was simultaneously made in the official recognition of indigenous lands (Assunção & Rocha 2011). The increase of the area officially protected in the Amazon may have potentially contributed to the drop in deforestation rates.

*Brazilian Forest Code.*—Global pressure on Brazilian agriculture to increase production (Nepstad et al. 2015) combined with recent changes to the Forest Code (Law n. 2651/2012) (Tollefson 2012) indicate that deforestation rates may be unlikely to decrease moving forward. The latest changes in the Forest Code concluded in 2012 have been controversial and added an extra layer of complexity to the issue of deforestation.

One of the most contentious changes was the suspension of federal administrative penalties imposed for illegal deforestation conducted before July 22nd, 2008, conditioned upon the adherence to an Environmental Regularization Program (Programa de Regularização Ambiental, PRA) (Malin-greau et al. 2012). Furthermore, full compliance with the revised Forest Code can be achieved while still legally clearing 85 million hectares of forests (Nepstad et al. 2015). This means that the current rate of deforestation could double for four decades (Nepstad et al. 2015).

The incompatibility between the SoyM, which aims for zero-deforestation, and the Forest Code sparked a debate around the renewal of the SoyM (which was ultimately renewed in May of 2016 until it is no longer necessary). Yet the Forest Code

also established the Rural Environmental Registry (CAR), a public registry system in which landowners of rural properties declare their land boundaries and uses and must certify the intent to comply with environmental regulations. This system is supposed to improve law enforcement capacity at a property level and may inhibit deforestation when fully implemented. However, the deadline for the national completion of CAR has been extended to 2017 (after two previous extensions) so the effects of this policy will not be felt until that time.

*The Climate Change Law and Support from Norway.* – In 2009, Brazil enacted the Climate Change Law with the aim to reduce overall emissions by 36.1–38.9% relative to business-as-usual by the year 2020. In 2008, Norway promised to pay up to \$1 billion for the Brazil's Amazon Fund on the condition of deforestation reductions. The fund “pays for performance”, which means that the money will be invested only if the goal of reducing deforestation is met (Boucher 2014). In September of 2015, Norway made the final USD 100 million payment to Brazil to reward a slowdown in forest loss in the Amazon basin (Reuters 2015). However, with no more payments in the pipeline, there's no guarantee that the accomplishments will remain stable, although the Paris Agreement is expected to encourage international investments in tropical countries to reduce forest loss and GHG emissions. When aligned with financial incentives, domestic and international emissions reduction targets can considerably motivate agents to both reduce deforestation and monitor its major drivers.

### **The Soy Moratorium's effects on deforestation rates**

In general, deforestation declined from 19,500 km<sup>2</sup> in 2005 to 5,843 km<sup>2</sup> in 2013, a 70% reduction (Nepstad et al. 2015). Two years before the establishment of the SoyM, nearly 30% of soy expansion was realized through deforestation (Gibbs et al. 2015). After the agreement in 2014, that num-

ber decreased dramatically to about 1% (Gibbs et al. 2015), yet the soy production continued to grow (Nepstad et al. 2015). Nevertheless, in the Cerrado biome, which is outside of the Amazon and thus beyond the jurisdiction of the SoyM, the annual rate of soy expansion into native vegetation remained substantial, varying from 11 to 23% during 2007–2013 (Gibbs et al. 2015). The eastern Cerrado region, Mapitoba, is the most recent hotspot for Brazilian agriculture and nearly 40% of total soy production (2007–2013) expanded into native vegetation (Gibbs et al. 2015).

There is a debate about whether the SoyM has encouraged deforestation in other biomes while limiting deforestation in the Amazon. It can be argued that lower rates in the Amazon, which receives more international attention than other national biomes, distracts attention from deforestation challenges in other regions. Thus, auxiliary studies are needed to assess the potential mal-effects of the SoyM in the Cerrado. As mentioned above, deforestation rates cannot be exclusively attributed to the SoyM; the annual expansion of soy in the Cerrado may have been inevitable, resulting from regional conditions and incentives rather than from implementation of the SoyM. Other factors such as fluctuations in soy prices and restrictions on rural credit have also impacted outcomes and should be taken into consideration when examining the hypothesis of “leakage” to the Cerrado.

Furthermore, it is imperative to recognize that the dynamic of deforestation in the Amazon is fairly complex (Barona et al. 2010). Recent analyses suggest that deforestation is mostly driven by the expansion of cattle ranching (Walker, Bramble, and Patel 2010). However, Barona et al. (2010) support the hypothesis that an increase of soy production in Mato Grosso has displaced pasture from the Cerrado and spurred deforestation in the Amazon. When soy eventually advances into the Amazon, it occupies areas previously opened by cattle ranching, which indicates that soy might not have been the first land use after clearing, but has indirectly caused deforestation in the region. Barona et

al. (2010)'s findings suggest that potential causal links between soy, cattle ranching, and deforestation need further exploration to explain the results of the SoyM. The GTS monitoring methodology has so far been unable to identify this pattern.

#### *Other results of the Soy Moratorium*

Besides complementary contribution to the deforestation decrease in the last years, the SoyM also yielded other positive results. The SoyM: i) increased transparency and accountability in the soy industry; ii) revealed the influence of international markets in domestic environmental and social settings; iii) developed a monitoring and enforcement system to ensure compliance; iii) elucidated the dynamics of soy production and expansion in the Amazon; iv) increased the dialogue and exchange of knowledge among NGOs, soy traders and the government; v) encompasses more than 92% of the total soy produced in the Amazon (Greenpeace 2014); and vi) is the first agreement of its kind and now functions as a reference for lessons learned and for other related moratoria.<sup>8</sup>

Monitoring is crucial to track advances and ensure the commitment is upheld. In fact, monitoring and compliance mechanisms established by the SoyM offer a model for expanding supply-chain governance to other soy-sourcing regions and potentially to other commodities. ABIOVE hired a consulting firm to monitor deforestation and law compliance in farms with which they have soy purchasing contracts. The results are annually published. Greenpeace executes another monitoring process, which included overflights in the first years, and compares both results (ABIOVE's and Greenpeace's) in order to guarantee accuracy and transparency in the process.<sup>9</sup> At the beginning of the agreement, NGOs were also critical in creating a protocol and a reporting framework to guide the monitoring process and establish meaningful indicators. However, Balleti (2014) argues that a

satellite-imaging system capable of detecting deforestation on individual farms was only available six years ago. As such, claims of success by the GTS cannot be truly substantiated.

Farms that violate the SoyM are blocked from selling to SoyM signatories. This policy encourages compliance within the sector. The limited number of traders that exercise considerable control over the supply chain also facilitated the monitoring of the SoyM strategy. Participation in the collection, assessment, and interpretation of information increases stakeholders' credibility, salience, and legitimacy, and motivates engagement (Cash et al. 2012). Independent NGO monitoring increases transparency and avoids false allegations in general. Continued stakeholder engagement is also essential for ensuring compliance and tracking behavior change in the supply chain (Eyes on the Forest 2014).

#### *Factors of success of the Soy Moratorium*

The Soy Moratorium's results have been recognized (GCP 2016) and the commitment has become a case in how industry, governments, NGOs and consumers can drive and implement solutions to reduce deforestation linked to commodities (Greenpeace 2014). The following factors have led to the success of the SoyM:

- The limited number of traders that exercise considerable control over the supply chain has facilitated the implementation and traceability of the SoyM strategy.
- The synergy between private sector leadership, civil society know-how, and public sector policies can be crucial guaranteeing that goals are met and sustained over time. The collective action that resulted from this synergy in the SoyM case orchestrate different perspectives, roles and expertise that together generated collaboration and innova-

<sup>8</sup>Personal communication with Greenpeace in Sao Paulo/SP, May 20th 2015.

<sup>9</sup>Personal communication with IMAFLORA in through Skype, June 9th 2015.

tion, and built traction and credibility among the participants, and towards the enforcement of the agreement.

- Clear goals (zero deforestation and zero forced labor) and the establishment of a monitoring component were crucial to ensure adherence.
- Technology advances along with the implementation of the SoyM allowed for more accurate and refined analyses, amplified the geography under monitoring, reduced the monitoring costs, and eliminated the need for aerial surveys to identify soybean planting. The availability of satellite images also allowed for more transparency and pressure for compliance.
- A package of actions/conditions strengthened the SoyM: more governance and law enforcement in the region, loan programs tied to jurisdictional performance and compliance with environmental law, some favorable movements of commodities prices at ideal times, and a global effort led by responsible corporations pushing for supply chains free from deforestation.
- The availability of open and suitable land for soy expansion in the Amazon reduced the pressure on the forest and enabled the increase of soy production in already cleared areas without increasing deforestation rates directly linked to this monoculture.
- ABIOVE and ANEC control 92% of Brazilian soy production (Greenpeace 2014) and represent the most important soy traders operating in Brazil. The concentration of market power and the collaborative action among the ABIOVE members reduce the costs of the SoyM implementation, which became more cost-effective than any other type of certification or market-based mechanism that aims to verify sustainably produced crops.

*The other side of the agreement: limitations and concerns*

In spite of significant impacts, the SoyM reveals limitations in terms of deforestation reduction, behavior change in the soy industry and appropriateness of the agreement with the establishment of new policies and market trends. Some important points to reflect on and take into consideration while preconceiving strategies to strengthen and amplify the scope and impacts of the SoyM include the following:

- There are soy traders operating within the Amazon boundaries that are neither part of the ABIOVE nor part of the ANEC and therefore do not pursue zero-deforestation targets. Interviews with these producers showed that the SoyM did not impose any kind of pressure to change deforestation patterns, nor did it impact sales or revenues from the production of soy.
- China is currently the main destination of the soy produced in Brazil and plans to increase its imports by 50% by 2020 (GCP 2016). According to the Forest 500 rankings (GCP 2016), companies in China are performing poorly in terms of sustainable practices and have no commitments to ensure their soy is deforestation-free. If the Chinese standards do not improve and the Forest Code takes too long to be fully implemented, the market pressure for more soy may result in greater deforestation rates in the next years.
- The monitoring system has flaws. Although satellite images and deforestation analyses show a decrease in the soy expansion into forested areas, soy is often an indirect driver of forest clearing. The advance of soy is marked by the displacement of cattle ranches that previously cleared the forest. The increasing demand for soy plantations push cattle ranching deeper into the Amazon,

which is not captured by the current system that only monitors the first driver of deforestation in the year of clearing. The analysis does not scrutinize the deforestation dynamics and the linkage between soy and cattle ranching expansion. This approach also allows for ‘on-property leakage’ (Forest Trends 2016) when the same farm produces both cattle and soy. The monitoring system also does not recognize when soy is produced in an irregular property but is transported to a regular farm before the soy trader buys the production.<sup>10</sup>

- The soy quantity produced in the Amazon represents a relatively low percentage of the total produced in the Cerrado biome, where the production keeps growing. In fact, deforestation caused by soy production continues in other geographic areas.
- Although ABIOVE represents the Brazilian vegetable oil industry, the perception and endorsement of the SoyM varies among its members. There is a continuous debate about the zero-deforestation target. Some producers complain that the moratorium goes beyond the Forest Code and they believe that it constrains the growth of the sector since it could still clear areas according to the federal law and therefore expand production in the biome. As mentioned before, full compliance with the revised Forest Code can still legally clear 85 million hectares (Nepstad et al. 2015).
- Some producers rent other farms to expand their plantations, but the property duties are still under the landowner’s responsibility and not under the producer’s. Therefore, if a farm is blacklisted because of deforestation, the property owner is considered the offender. However, for the purpose of soy

sales, the purchase receipt by the soy traders requires the documents of the producer, who is not legally linked to the property tenure and therefore not linked to the infraction. Thus an embargoed area can thus still provide soy to the SoyM signatories with no restrictions.<sup>11</sup>

In conclusion, it is clear that more needs to be done to ensure compliance and prevent soy production from threatening valuable ecosystems.

### Looking ahead: what comes next?

#### *The Forest Code is not enough*

Soy traders recently extended the SoyM indefinitely until it is no longer needed—that is, when the Forest Code is fully enforced. However, given the lesser priority of environmental issues among other governmental tasks and the lag time for policy implementation in Brazil, the full compliance and enforcement of this regulation will likely take several more years. Additionally, government monitoring and control of embargoed areas is still limited. Gibbs et al. (2015) state that soy farmers are about five times more likely to violate the Forest Code than the SoyM because of the lack of law enforcement in Brazil. Furthermore, uncertainties of the new Forest Code may be spurring an increase in deforestation (Rowling 2014). Therefore, a system that combines elements of the SoyM and the Forest Code monitoring systems could be more successful and keep deforestation under control.

#### *Other challenges for the SoyM durability*

International interventions tend to be more durable if they are perceived as reinforcing national authority and existing domestic rules. Top-down approaches that conflict with national legislation and institutional frameworks have previously failed (Bueno & Cashore 2013). The SoyM tends to lose traction because it challenges domestic policies and sets a higher standard than the current Forest

<sup>10</sup>Personal communication with IBAMA, June 2015.

<sup>11</sup>Personal communication with IBAMA officials, July 2015.

Code. Full compliance with Brazil's revised Forest Code could be achieved while still legally clearing 85 million ha of forests (Nepstad et al. 2015), which does not align with the SoyM pledge for zero-deforestation in the Amazon. In addition, public subsidies that support the expansion of soy, such as the massive efforts to increase production in the Matopiba region, may conflict with conservation initiatives. The coordination among public policies and ministries is crucial for the incorporation and durability of zero-deforestation agreements.

The voluntary nature of SoyM may also impact its adoption. The agreement represents just about 90% of the soy produced in the Amazon region because there are still traders who have not yet committed. Although this represents a considerable percentage of the total soy production, policy incentives could attract more members.

Even though the market pathway is extremely important for the implementation of a zero-deforestation agreement, it is important to recall that markets are constantly changing. China is increasingly importing soy produced in Brazil, and the previous standards established by Europe are no longer solely relevant for soy production and exports. For this reason, it is imperative that the market pathway be combined with the other pathways and with national policies.

#### *Replicability across other countries and supply chains*

Given the pioneer approach and acclaimed success of the SoyM, scientists and practitioners have reflected on how the lessons from the agreement could be repeated across regions and across commodities. In fact, the SoyM has already inspired a deforestation-free cattle ranching agreement in the Amazon. However, replication cannot merely be a repetition of the SoyM steps; it should account for the local context and supply chain specificities. The SoyM has unique aspects that should be considered when trying to identify relevant lessons and conditions that should be in place for the reproduction of this model. Some important and par-

ticular aspects of the SoyM that would facilitate the implementation of a similar agreement in other regions include: monitoring technology, available public data on deforestation and land use, political will, environmental policies, international commitments to reduce GHG emissions, collective action, law enforcement, global and increasing demand for soy, and a limited number of major traders in the supply chain.

### **Conclusions and Recommendations**

Corporate commitments alone are insufficient to reduce or prevent deforestation. Rather, they must be understood in relation to a broader range of policy initiatives. In this light, this paper reviewed the importance of incentives and sanctions to motivate the implementation of the SoyM, and the power of market and NGOs pressure and government rules to expand the on-the-ground impacts of this type of initiative. In order to reinforce the SoyM (and deforestation-free agreements in general) and ensure more durability of such a promising strategy, some key considerations are listed below:

#### *Maintaining pressure*

Environmental campaigns are not likely to endure after international and market pressures diminish and disappear. Environmental stakeholders need to hold governments and companies accountable to their commitments. Therefore, maintaining pressure for change is important and can be achieved by closely monitoring the implementation of the agreement, staying actively involved in the GTS (or by creating working groups or committees), and publicizing results.

#### *Traceability and reporting*

Traceability is widely recognized as a foundation for zero-deforestation agreements, but it is still costly. Partnerships between universities, NGOs, government, and soy traders could focus on developing accessible and affordable traceability systems and improving the current monitoring system.

Standardization of reporting is also important to monitor compliance and compare performance of different companies and sectors. Transparency and information sharing are critical for deforestation-free agreements in general.

#### *Certification*

Certification schemes for environmental best practices offer “carrots” to the private sector and augment existing efforts to reduce illegal deforestation. However, certification outcomes are limited by the effectiveness of the scheme and the independence of the auditors (Forest Trends 2016).

#### *Capacity building and stakeholder engagement*

Capacity building and education for the SoyM members and those across the value chain, as well as extensive involvement of stakeholders, are important for effective implementation. Raising awareness among suppliers and providing training on sustainable farming practices (including how to increase yields without clearing forest area) proves critical. Engagement and participation are also key. If all players have their seat at the negotiating table, capacity building will work to leverage everyone’s participation.

#### *Policy incentives*

Since the demand for soy is continuously increasing, incentives for the intensified use of unproductive pastures or other existing cleared lands will be essential for reconciling soybean production and ecosystem protection. Incentives could reward farmers that meet key outcomes towards sustainable production. This approach includes access to low-interest loans and payment for ecosystem services (Nepstad et al. 2014).

#### *Enforce beef moratorium*

The SoyM incentivizes soy expansion into already-cleared areas, which may displace pastures and could indirectly lead to more deforestation. Effective zero-deforestation agreements in the cattle sec-

tor may decrease the risk of this indirect deforestation. Furthermore, the beef and soy moratorium could be more officially connected under a jurisdictional approach, such as REDD+ programs where governments develop sustainable land-use policies and offer private actors an opportunity to collaborate in implementing supply chain commitments (Streck and Lee 2016).

#### *Moratorium expansion to the Cerrado*

While soy-linked deforestation diminished in the Amazon biome, 20% of new soy areas created in the Cerrado led to deforestation between 2007 and 2013 (Gibbs et al. 2015). The SoyM should include the Cerrado and other regions potentially at risk in order to reduce conversion of remaining native vegetation.

#### *Public-private partnerships (PPPs)*

Combining private commitments and government regulation and incentives will foster large-scale results and good governance. Potential for PPPs also lies in integrating zero-deforestation in jurisdictional REDD+ initiatives (Streck and Lee 2016).

#### *Law enforcement*

Brazil’s notable decline in deforestation provides valuable lessons on the importance of public policies and law enforcement. Decreases in deforestation rates are more likely to last if law enforcement (and the Forest Code’s in particular) is put in place.

Market mechanisms can gain traction relatively easily, but they are temporary and do not necessarily solve the deforestation problem. Government policies can also be less effective due to a lack of law enforcement capacity or effectiveness. Therefore, the options presented here would likely be more effective if used in combination, since each one of the options can strengthen the others. Strategies should be designed to reinforce sovereignty, create synergies, and implement more pervasive actions.

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