An Assessment of No-Deforestation Commitments in the Brazilian Amazon: The case of soy and cattle in Mato Grosso

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Introduction

Changes to forest ecosystems due to commercial practices and land use change is recognized as one of the biggest contributors to climate change globally, and Brazil in particular. In 2015 alone, 46% of the country's carbon emissions were traced back to deforestation and degradation.[1] These changes occur not only to forest related crops, but also to agricultural commodities that convert forest lands for global food production.[2] As the world population is expected to reach 9.7 billion by 2050[3], a key challenge arises: how can the world's population be fed, without further depleting natural resources?

Owing to regulatory frameworks that have been criticized for inadequate enforcement, increasingly activists are turning to the private sector to take action. Companies face multiple intervention options ranging from certification schemes, group pledges, industry association self-regulation approaches, partnerships, roundtables, multi-stakeholder initiatives, and reporting frameworks. The most recent of these trends has focused on engaging companies to pledge to only purchase commodities whose production did not include deforestation.

As a result, there is now a fragment of approaches companies consider when tackling deforestation. This environment has been criticized for lacking coherence and creating confusion for firms considering their sustainability strategies.

The purpose of this paper is to understand the choices companies make in this environment, and the implications of these findings for fostering responsible sourcing, and climate friendly stewardship. While most current studies focus on a single aspect of this scenario, this paper takes a step back to analyze company level commitments from a broader perspective. This research is organized around the following questions: What are companies committing to in the first place? Do companies have a

[1] IMAZON. *Greenhouse Gas Emissions In the Land Use Sector*. September 2016.
[2] WWF. "Forests & Climate Change." Available at http://wwf.panda.org/about_our_earth/deforestation/climate_change_and_forest/. Accessed on 13 April 2017.
[3] United Nations Department of Economic and Social Affairs. "World population projected to reach 9.7 billion by 2050." 29 July 2015. Available at http://www.un.org/en/development/desa/news/population/2015-report.html. Accessed on 13 April 2017.

coherent sustainability strategy to deal with deforestation? Are the strategies contradictory or complementary?

Background and context

Brazil is one of the top providers of agricultural commodities worldwide. In the global ranking of commodities, Brazil places first when it comes to coffee, orange juice and sugar cane, and second in relation to cattle, soy and poultry. In 2015, Brazil's agriculture Gross Domestic Product (GDP) was 21%[4].

The Brazilian State of Mato Grosso plays a key part in this context. It has a population of about 3.265 million in 2015 (representing 1.6% of Brazil's total population), and an area of around 903.378,29 squared kilometers (the third largest in the country). Studies show that the state has 50.5% of agriculture GDP, and 37% of land coverage used for agriculture and ranching combined. The remaining land coverage is destined for indigenous lands (15%), conservation units (6%), and preserved areas (41%). Mato Grosso is also the largest agricultural commodity producer in the Amazon, producing around 28% of the soy and 19% of the beef in Brazil[5].

Mato Grosso is a biodiversity hotspot with areas including three of Brazil's main biomes: Amazon (tropical forest), Cerrado (tropical savanna) and Pantanal (wetland). Through the "Produce, Conserve, Include (PCI)" Strategy[6], the state government plans to expand agricultural production by enhancing efficiency, while conserving native vegetation, restoring lands, and promoting the socio-economic inclusion of family agriculture[7].

Studies by the Project for Monitoring Deforestation in the Legal Amazon (Prodes), from the Brazilian Space Research Institute (INPE), show that overall deforestation in the Amazon is increasing. From August 2015 to July 2016, 7,989km^2 were deforested, representing a 29% increase. This was the highest deforestation rate in the area since 2007. Even though Mato Grosso was one of the few states

[4] IMEA. "Agribusiness in Brazil and in Mato Grosso." Available at http://www.imea.com.br/upload/publicacoes/arquivos/18042017210304.pdf. Accessed on 11 May 2017.
[5] Ibid.
[6] The PCI plan was presented by Governor Pedro Taques at the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, December 2015. It aims to expand and increase efficiency in agricultural commodity and forestry production, conserve the native vegetation that covers 60% of the state, restore environmental liabilities, promote socioeconomic inclusion of family agriculture, reduce carbon emissions and increase carbon storage, by controlling deforestation and promoting the development of a low carbon economy. (PCI. "Mato Grosso's Strategy to Reduce Climate Change." Available at http://pci.mt.gov.br/. Accessed on 11 May 2017).
[7] PCI. "Mato Grosso's Strategy to Reduce Climate Change." Available at http://pci.mt.gov.br/. Accessed on 11 May 2017.

that had a reduction in deforestation rates (6%), in absolute numbers, it is still considered the state with the second largest deforested area (1,508km^2) in the country[8].

Deforestation is not only a grave problem for the world's climate and forest communities, but also for businesses that depend on natural resources to operate. According to the Intergovernmental Panel on Climate Change (IPCC), deforestation removes carbon sinks, affects agricultural productivity, human and animal health, economic activities like ecotourism, and increases land degradation and desertification by increasing soil erosion and reducing its nutrient cycle[9].

Deforestation can present not only sourcing risks for companies, but also legal and reputational risks. Conversely, firms seeking to protect forests and support local communities, can benefit from secure supply chains and preserve the necessary ecosystem functions for productive agriculture[10]. With this in mind, agricultural industries that seek to meet higher demand for land intensive products such as beef and soy, are increasingly aware and looking to avoid sourcing products from lands involved in deforestation[11].

Healthy forests are also pivotal in addressing climate change. The important role that forests play was recognized at United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 21, with its integration into the post-2015 sustainable development agenda. As the former UN Secretary General Ban Ki-Moon remarked, "to build a sustainable, climate-resilient future for all, we must invest in our world's forests. That will take political commitment of the highest levels, smart policies, effective law enforcement, innovative partnerships and funding"[12].

The adoption of the 17 Sustainable Development Goals (SDGs), made it clear that sustainable development will only be achieved in a comprehensive way. This includes sustainably managing forests and reversing land degradation (SDG 15), ensuring sustainable consumption and production patterns (SDG 12), achieving food security and promoting sustainable agriculture (SDG 2), ending poverty (SDG 1), and others[13].

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[8] ICV. *Analysis of deforestation in Mato Grosso* (Prodes/2016).
[9] UNFCCC. *Join Liaison Group of the Rio Conventions. Forests: Climate Change, Biodiversity and Land Degradation.*
[10] WRI. "Release: Partnership Launches to Increase Transparency and Traceability Across Supply Chains and Meet Zero-Deforestation Commitments." Available at http://www.wri.org/news/2017/01/release-partnership-launches-increase-transparency-and-traceability-across-supply. Accessed on 19 March 2017.
[11] KPMG. *Expect the unexpected: Building business value in a changing world.* p. 34.
[12] UNFF. "Forests Pivotal to New Post-2015 Development Agenda." 4 May 2015. Available at http://www.un.org/esa/forests/news/2015/05/forests-pivotal-to-new-post-2015-development-agenda/. Accessed on 11 May 2017.
[13] UN. "Sustainable Development Goals." Available at http://www.un.org/sustainabledevelopment/sustainable-development-goals/. Accessed on 11 May 2017.

Research Methods

This study starts with a literature review looking at the problem definition and the private sector governance and public policy scenarios. It then analyzes the intervention options that six companies that produce and/or source from the state Brazilian state of Mato Grosso face when tackling deforestation: Cargill, Bunge, JBS, Nestlé, Carrefour and Marfrig. These companies were selected by screening the Exame Magazine[14] consumer goods industry 2016 ranking, and adding others to the list that had major presence in the state. Between August 2016 and May 2017 a total of 14 interviews were conducted (see Annex 1). The second part of this study looks at the different strategies adopted to tackle deforestation and emerging patterns.

Reframing the problem definition: from degradation to deforestation

When taking a step back and thinking about the broader issues related to forestry in the Brazilian Amazon, it is possible to identify two main categories: deforestation and forest degradation. Deforestation is related to land use change, a decrease in the area covered by forest to expand a certain use of the land, e.g. subsistence agriculture, cash cropping, and ranching[15]. Forest degradation is a reduction in the quality of forest conditions and ecosystem components including vegetation, fauna, soil, etc[16]. The latter is typically related to forest practices such as selective logging, non-timber forest product extraction, and infrastructure development.

A recent report by Winrock International studied emissions from forest degradation across the tropics and found that in 74 countries carbon emission from forest degradation is equivalent to 4.3% of total global emissions (almost five times greater than emissions from the aviation industry). Results show that from overall forest degradation, timber harvest accounted for 53%; wood fuel 30% and forest fires 17%[17]. In terms of magnitude of total degradation, Brazil ranked second, with 225.2 million metric tons of annual emissions from forest degradation per year[18].

[14] Exame Magazine. "Ranking of the consumer goods industry in 2016." Available at http://mm.exame.abril.com.br/empresas/filtrar/2016/bens-de-consumo/Todos. Accessed on 11 May 2017.
[15] FAO. "Deforestation and Forest Degradation Factors." Available at http://www.fao.org/docrep/article/wfc/xii/ms12a-e.htm. Accessed on 22 April 2018.
[16] FAO. "Deforestation and Forest Degradation Factors." Ibid.
[17] Timothy R. H. Pearson et al. *Greenhouse Gas Emissions from Tropical Forest Degradation: An Underestimated Source*. Carbon Balance Manage. 2017. p. 5.
[18] Ibid, p. 7.

Even though forest degradation is one of the main global issues associated with forestry, it is still not as significant as deforestation, which is responsible for emitting around three times more carbon dioxide into the atmosphere[19].

Over the years there has been a clear shift in problem definition from forest degradation to deforestation. Around twenty years ago the main challenges the private sector and governments faced surrounded unsustainable forest practices that lead to forest degradation. As an example, market measures like the Forest Stewardship Council (FSC) were concerned about forest practices. While analyzing the forest certification standards scenario and the market for certified products in Brazil, Tasso Azevedo emphasizes forest management practices and requirements by the FSC in regards to the pulp and paper sector, and non-timber forest products[20].

In contrast, we see today that no-deforestation commitments and the different intervention mechanisms adopted by businesses are typically related to land use conversion and forest clearing for agriculture and ranching, as opposed to forest management. The fragmentation of forest policies and governance, and abundance of market mechanisms, has led to broader questions around landscape management and the landscape approach. This has important implications for on-the-ground practices by companies. Since the focus of the problem today is on deforestation, businesses can focus on where they can operate and extract natural resources, versus on how extractive they are.

Private sector governance and public policy

Brazil's Intended Nationally Determined Contribution (INDC) shows that the country committed to achieve zero illegal deforestation by strengthening policies and measures, as well as compensating for greenhouse gas emissions from legal suppression of vegetation by 2030[21].

Brazil has a strong regulatory framework to tackle deforestation. In 1988, Brazil's Constitution established the right to an ecologically balanced environment as a public common good essential to a healthy quality of life (Article 225). Public authorities and the collectivity have the duty to defend and preserve it for present and future generations.

[19] Ibid, p. 9.
[20] Tasso Rezende de Azevedo. "The Forest Stewardship Council: A Developing Country Perspective." In: Hard Choices, Soft Law. *Voluntary Standards in Global Trade, Environment and Social Governance*. Kirton, John; Trebilcock, Michael. University of Toronto, Canada. 2004. p. 64-92.
[21] Federative Republic of Brazil. *Intended Nationally Determined Contribution. Towards Achieving the Objective of the United Nations Framework Convention on Climate Change*, p. 3.

Within Brazil's legal system, one of the most important (and controversial) environmental laws is the New Forest Code, enacted in 2012, under the Federal Law 12,651. It established different types of protected areas, including Legal Reserves[22] and Permanent Protected Areas[23].

The Forest Code also created the Rural Environmental Registry (CAR), a national public electronic registry mandatory for all rural properties. It aims to integrate the environmental data from rural properties to build a database for environmental and economic monitoring and planning, as well as to fight deforestation[24].

Registry in the CAR allows producers to join the environmental regularization program (PRA), and is a requirement to obtain licenses or authorizations to use and manage the property. It is also predicted become a prerequisite to obtain agricultural credits and loans from 2018 onwards[25]. Considering that deforestation rates in the Amazon are rising, the importance of the CAR becomes even more clear. According to an assessment of the Forest Code by IPAM, it is fundamental to strengthen the CAR as a way of implementing the Forest Code and addressing deforestation[26].

Due to low compliance of the Forest Code by landowners and enforcement by the government, the private sector is taking action by committing to end deforestation in their supply chains. As an example, it is estimated that 91% of deforestation happening in private properties in the state of Mato Grosso is illegal[27]. However, these commitments made by companies that are producing and purchasing agricultural commodities presents a new challenge. Now, companies operating in the Brazilian Amazon must comply with the Forest Code (achieve zero illegal deforestation) and with their voluntary no-deforestation commitments simultaneously.

In this context, prior to looking into companies' strategies, it is important to consider how these mechanisms interact. According to a study by Proforest, complying with environmental laws can help achieve zero-deforestation, while zero-deforestation commitments can benefit from legal compliance.

[22] Legal Reserves ensure the sustainable economic use of natural resources, support the conservation and restoration of ecological processes, promote biodiversity conservation, as well as protection and refuge for wild fauna and native flora. In the Legal Amazon, the Forest Code requires that 80% of the property be preserved as a Legal Reserve, in the Cerrado, 35%, and in other biomes 20%. (Federal Law 12,651/2012, Article 3(III)). In 2011, studies suggested that there was a deficit of more than 40 million hectares of Legal Reserves in the country.
[23] Permanent Protected Areas preserve water resources, landscapes, geological stability, and biodiversity. It facilitates genetic connectivity of fauna and flora, protect the soil, and ensure the well-being of human population. They are located on riparian zones, around lakes, lagoons and springs, mountaintops, mangroves, and more. (Federal Law 12,651/2012, Article 3(II) and 4)).
[24] Federal Law 12,651/2012, Article 29.
[25] Federal Law 12,651/2012, Article 78-A.
[26] IPAM. *Brazil's Forest Code Assessment 2012-2016*.
[27] Paulo Moutinho, Raissa Guerra, and Claudia Azevedo-Ramos. "Achieving Zero Deforestation in the Brazilian Amazon: What Is Missing?" *Elementa.* Science of the Anthropocene. September 16, 2016. p. 6

They advocate for an integration of the mechanisms; by what they call a "twin-track" approach. In this sense, companies should act in two ways. One would be for producers to fully implement the Forest Code, and all other companies in the supply chain to only purchase commodities produced according to the Forest Code. The other approach consists in eliminating supply chain deforestation by 2020, identifying and addressing the existing gaps between legal requirements and private sector commitments. To do this, companies should use initiatives that are already in place, e.g. certifications, moratoriums, and jurisdictional approaches[28].

Even though both mechanisms can complement each other, companies have been criticized for not requiring Forest Code compliance as part of their commitments. Studies show that there is a tendency for companies to require registry in the CAR, but not full compliance with the law, which would require enforcement, potential environmental compensations and monitoring.

According to Andrea (IPAM), until there is a simple and easy system in place where legal compliance can be verified by checking the CAR receipt it is very unlikely that industries will require it. Producers will only change their behavior once they see that industries are asking for it or incentivizing in some way, e.g. prioritizing purchases from properties in compliance with the law[29]. In this way, retailers and industries have the opportunity to work alongside government to ensure legal compliance.

Achieving full implementation of the Forest Code, which is already a challenge in itself, will only end zero-illegal deforestation, and not all deforestation. However, legal compliance can be seen as a first step in the larger fight against deforestation. It is difficult to imagine how only one player in this scenario could win this fight alone. Cooperation and collaboration between different groups is needed to achieve supply chains free of both deforestation and illegality. In this way, it is crucial to achieve full implementation of the Forest Code, including registration in the CAR, and compliance with the Forest Code as a purchasing and financial criteria[30].

Private sector strategies

There is "sea" of intervention mechanisms available for companies to tackle commodity driven deforestation. Private sector strategies range from no-deforestation commitments, group pledges,

[28] Pedro Amaral and Isabella Vitali. *Legal Compliance and Eliminating Deforestation in Commodity Production in Brazil: Tools and Initiatives Useful for Supply Chains*. 2016. p. 4.
[29] Andrea Azevedo. Interview conducted 03 February 2017.
[30] Paulo Moutinho, Raissa Guerra, and Claudia Azevedo-Ramos. Ibid, p. 5.

certification schemes, industry associations, non-profit and government partnerships, multi-stakeholder initiatives, roundtables, and disclosing and reporting on progress.

It is challenging to understand what these initiatives mean together. Are they part of a comprehensive corporate sustainability plan for responsible sourcing and ending deforestation, or are they random initiatives coexisting in the corporate world?

No-Deforestation Commitments

According a report 2017 by Supply Change, a total of 447 companies, worth US$5.4 trillion in annual revenue, have publically committed to eliminate deforestation from their supply chains[31]. The report shows that companies active in palm oil, and timber and pulp commodities are more prone to commitment-making than those active in cattle and soy, including "indirect exposure" from the use of soy feed in the livestock sector[32]. This is particularly alarming if we consider that soy is estimated to cause ten times more deforestation than palm. This shows that the amount of attention a certain commodity is receiving is not necessarily related to the scope of its impact[33].

The six companies studied in this research have made some kind of no-deforestation[34] commitment. However, there is no standard term used. As seen in Table 1, the terms vary from "deforestation-free", "no-deforestation", "zero-net deforestation", and "zero-deforestation".

Table 1 – No-deforestation terms

Company	Deforestation-free	No-deforestation	Zero-net Deforestation	Zero-deforestation
Cargill	x			
Bunge		x		
JBS	x			
Nestlé	x		x	
Carrefour				x
Marfrig			x	

[31] Stephen Donofrio, Philip Rothrock, and Jonathan Leonard, "Supply Change: Tracking Corporate Commitments to Deforestation-free Supply Chains," 2017 (Washington, DC: Forest Trends, 2017). p. 8.
[32] Ibid, p. 8.
[33] Ben McCarthy. *Supply Change: Tracking Corporate Commitments to Deforestation-free Supply Chains, 2016*. Washington, DC: Forest Trends, 2016. p. 7
[34] Throughout this study, the term "no-deforestation" is used broadly to reference all types of commitments made to end deforestation in commodity supply chains.

In terms of the commitments, there are three different types of approaches companies use. The first, adopted by Cargill, Bunge, Carrefour and Marfrig, is to make a broad goal related to overall deforestation. A second approach is to make specific commitments referring directly to one or more commodities, e.g. JBS made a committed that 100% of soy would come from suppliers that signed the soy moratorium for the Amazon biome by 2014, and 100% of cattle products sourced directly from suppliers operating in the Amazon Biome would be deforestation-free. There are also those that follow both approaches. Nestlé committed to zero-deforestation, and 100% deforestation-free beef and soy by 2020.

There is no uniform definition to explain the meaning of such commitments. Bunge, JBS and Marfrig provide no explanation to the terms used and commitments made, while other companies adopt their own vocabulary. Cargill, which adopted a broad commitment ("100% of agricultural commodity supply chains are deforestation-free by 2030"), uses the term "policy on forest" instead.

Nestlé has a specific definition: "the clearing of forests for the expansion of agriculture or forest plantations". Their zero-deforestation commitment considers that operations should not lead to the loss of High Conservation Values (HCVs), following the definition provided by the HCV Resource Network[35]. They also commit to use national definitions of forests or those agreed through stakeholder processes, i.e. the Round Table on Responsible Soy (RTRS)[36].

Finally, Carrefour, specifically references the Consumer Goods Forum (CGF) definition of "zero-net deforestation". The CGF[37] adopted the World Wildlife Fund's (WWF) definition acknowledging that forest loss can be offset by forest restoration[38].

[35] The HCV Resource Network defines HCV as "(…) biological, ecological, social or cultural values which are considered outstandingly significant or critically important, at the national, regional or global level". (Available in https://www.hcvnetwork.org/about-hcvf. Accessed on 06 July 2016).
[36] The Round Table on Responsible Soy (RTRS**)** is a civil organization that promotes responsible production, processing and trading of soy on a global level, with members including the main representatives of the soy value chain and members of civil society from around the world. (Available in http://www.responsiblesoy.org/about-rtrs/about-us/?lang=en. Accessed on 06 July 2016).
[37] The Consumer Goods Forum. *Deforestation Resolution*.
[38] According to the CGF, Zero net deforestation is not synonymous with a total prohibition on forest clearing. Rather, it leaves room for change in the configuration of the land-use mosaic, provided the net quantity, quality and carbon density of forests is maintained. It recognizes that, in some circumstances, conversion of forests in one site may contribute to the sustainable development and conservation of the wider landscape (e.g. reducing livestock grazing in a protected area may require conversion of forest areas in the buffer zone to provide farmland to local communities). However, zero net deforestation is not achieved through the conversion of primary or natural forests into fast growing plantations. Such conversion would count as deforestation in assessing progress against the target. (WWF. *Zero Net Deforestation by 2020. A WWF Briefing Paper*).

Legality

The Forest Code assessment report by IPAM, explains that:

> the responsibility to demand the implementation of the Forest Code must be shared between private companies, society, and governments. On the one hand, it reduces the company's exposure to vulnerabilities in the application of governmental methods of command and control; On the other hand, it helps governments to effectively enforce the law[39]

From the six companies selected, some require the CAR, and compliance with the Forest Code. Cargill reports that it requires compliance with existing local land and forest use laws, prohibits production on illegally deforested land, and works with governments to strengthen existing forest laws and enforcement. They also have a 2020 Plan for sustainable soy in Brazil focusing on Forest Code implementation. They ensure legal compliance by checking if their suppliers are present on The Brazilian Institute for the Environment and Natural Resources' (Ibama) list of embargoes areas and the list of slave labor. They do this before signing the contract with the supplier, upon the signature, when they receive the product and when they pay the supplier. If they find something irregular, they have contractual mechanisms that allow them to suspend or refuse the purchase, or return the product[40].

Bunge also ensures that their suppliers are aligned with the Forest Code by maintaining a systematic record for all suppliers, and managers are informed if there are any incidents. They explain that their system automatically blocks commercial activities with producers embargoed by Ibama for deforestation violations[41].

JBS and Marfrig, on the other hand, are part of the G4 agreement[42] which emphasizes the avoidance of illegal deforestation but also goes beyond legality to prohibit any forest clearing, even if it is within

[39] IPAM. *Brazil's Forest Code Assessment 2012-2016*. p. 20.
[40] Yuri Feres. Interview conducted on 04 May 2017.
[41] Michel Santos. Interview conducted on 19 April 2017.
[42] The public commitment "Minimum Criteria for Beef Cattle and Product Operations on an Industrial Scale in the Brazilian Amazon" – also known as the G4 agreement – signed, in 2009, by the meat processing companies Bertin (later on bought by JBS) Marfrig and Minerva, with Greenpeace. The agreement requires that these companies only buy beef and leather from farms not involved in deforestation, based on the official lists issued by the Brazilian Space Research Institute (INPE), the Project for Monitoring Deforestation in the Legal Amazon (Prodes) and the Real-Time System for Detecting Deforestation in the Legal Amazon (Deter). In addition, the agreement stipulates that companies do not employ forced labor, according to the Ministry of Labor's list, or are located on indigenous lands, conservation units, and/or appear on the list of banned areas of the Brazilian Institute of the Environment and Renewable Resources (Ibama). (Marfrig. "For the Second Consecutive Year, An Independent Audit Has Reasserted Marfrig's Good Sustainability Practices In The Amazon Region." Available at http://www.marfrig.com.br/en/documentos?id=725. Accessed on 19 March 2017).

legal limits. JBS also created the "Programa Fornecedor Legal" to help the cattle supply chain to comply with Brazilian environmental law.[43]

Company choices

Table 2 – Company choices[44]

Company	No-Deforestation Commitment	Definition	Certification	Partnerships	Roundtables	Group Pledges	Industry Associations	Multi-stakeholder Initiatives	Reporting /Disclosure	Legality
Cargill	x			x	x	x	x	x	x	x
Bunge	x			x		x		x	x	x
JBS	x			x	x			x	x	x
Nestlé	x	x		x		x	x	x	x	x
Carrefour	x	x	x	x	x	x	x	x		
Marfrig	x		x	x	x			x	x	x
Total	6	2	2	6	4	4	3	6	5	5

It is possible to consider whether there are certain trends between company strategies and a correlation between a certain intervention method and making deforestation commitments. A high convergence point between company strategies is that all companies researched are involved in partnerships with other organizations, and are part of multi-stakeholder groups. These were the only two criteria, in addition to commitment-making, that was adopted by all the firms researched. This demonstrates that this is a complex issue that firms cannot tackle alone. Companies value opportunities for collaboration with different groups to advance sustainability in their supply chains. Partnering with expert organizations can also help them overcome the credibility factor in tackling deforestation.

Results show that there is relative convergence on roundtables, group pledges, reporting/disclosure and legality, with these criteria scoring four or five in the framework presented. Industry associations and group pledges like the CGF and the NYDF can particularly help companies establish the necessary infrastructure for their private sector stakeholders to make company-level commitments.[45] At least four out of the six companies researched made group pledges, and three were part of industry associations.

On the other hand, there are companies that do not take part in these groups, but still have company-level commitments. This is the case of JBS, that was specifically driven to make its zero-deforestation commitments after Greenpeace's Slaughtering the Amazon report[46]. In response to that investigation,

[43] Alexandre Kavati. Interviewed on 20 March 2017.
[44] For a complete list of companies' choices and initiatives please see Annex 2.
[45] Stephen Donofrio, Philip Rothrock, and Jonathan Leonard. Ibid, p. 14.
[46] Greenpeace. *Slaughtering the Amazon*. 1 June 2009.

they developed their deforestation policies based on the G4 agreement[47]. Now, after the cancellation of the agreement due to the Cold Meat scandal[48], it is uncertain what JBS's strategy will look like.

Reporting and disclosure are also a popular intervention method. A vast majority of the companies researched report to CDP (five out of six) on their climate, forests and/or supply chain programs. Transparency and disclosure of value chain information is the first step to measure and manage the risks and impacts associated with it. Doing this by following a standardized framework is a preferred method. It is also interesting to note, that so far only JBS reported to the recently established CDP supply chain program.

Results also show that including legal compliance as part of companies' strategies to end commodity-driven deforestation is a commonly adopted mechanism. Integrating legal requirements, especially in relation to the Forest Code, with no-deforestation commitments is a challenge companies are facing. Companies seem to be acknowledging this need and considering legal factors in their deforestation strategies.

There is even lower convergence when it comes to industry associations such as the CGF, with only three companies out of the six participating. While such associations might provide motivation for its member-companies to adopt deforestation targets, being part of one does not necessarily mean that companies are making commitments in the first place, following through with their commitments or creating the necessary impact on the ground.

Moreover, there is divergence between company strategies regarding commitment definition and certification schemes. Even though all the companies researched have some kind of no-deforestation commitment, only two mention what they understand by deforestation, and the commitment made. A possible reason for this is that there is no single universal definition for deforestation and no-deforestation commitments. Such concepts are highly dependent on the geography and context where these commodities are produced.

[47] Kavati, Alexandre. Ibid.
[48] Since March 17, 2017, JBS is undergoing an investigation by the Federal Police in Brazil, known as Weak Meat ("Carne Fraca"), and is being accused of selling meat unsuitable for human consumption by bribing inspectors, altering expiration dates, and chemically treating spoiled meat to sell rancid products across the country and abroad. After Weak Meat, Ibama started the Cold Meat ("Carne Fria") operation to investigate beef processing companies and rural properties in Brazil that are selling calves raised in embargoed areas for illegal deforestation in the state of Pará. As a result, Ibama fined JBS for purchasing cattle from embargoed farms, and Greenpeace suspended the public commitment with JBS. ((O)Eco. "Greenpeace Breaks Negotiation with JBS." Available at http://www.oeco.org.br/noticias/greenpeace-rompe-negociacao-com-a-jbs/. Accessed on 28 March 2017).

Finally, the adoption of certification schemes in the beef and soy supply chains in Brazil is also a divergence point, with only two companies adopting at least one type of certification. A reason for this can be that certification for both of these commodities are not as advanced as for palm oil and timber. According to the 2017 Supply Change Report, reporting on progress for palm and timber and pulp commitments is becoming an industry standard possibly due to the wide proliferation of certification schemes such as the Roundtable on Sustainable Palm Oil (RSPO) and the FSC[49]. In turn, this could mean that there is less commitment making and progress reporting on soy and cattle commodities due to the fact that their certification programs are not as widely implemented.

Conclusion

Considering the rate of population increase the world is experiencing today, and the increase in agricultural production that will be needed to feed a world with 9.1 billion people by 2050, it is necessary to decouple development from deforestation. With the increasing lack of trust in the government sector to deal with such issues, the private sector is now at the center of strategies to tackle deforestation and advance the global climate agenda. Only comprehensive corporate sustainability strategies and efforts to achieve sustainable supply chains will be able to ensure the necessary intensification of agricultural production to meet future demands, while ending commodity-driven deforestation.

This paper has looked at consumer goods companies' strategies to tackling deforestation along their supply chains, in the hopes of providing some coherence in relation to the fragmented and confusing context in which they operate.

We have stressed that there has been a change in problem definition moving from forest degradation to deforestation. Current sustainability strategies' focus has shifted from forest degradation to deforestation, with the private sector moving from a forest management concern to dealing with land use conversion at the landscape level. This has led to a proliferation on no-deforestation pledges and commitment-making by companies operating in this space.

Given the Brazilian context, the two main challenges described pertain to legal compliance with the Forest Code, and the lack of a uniform definition and terms. The responsibility to implement the Forest Code is not only governmental, but also shared by companies and society. Requiring full implementation of the Forest Code, registration in the CAR, and legal compliance as a purchasing

[49] Stephen Donofrio, Philip Rothrock, and Jonathan Leonard. Ibid, p. 13.

criteria, can be a first step to achieve on-the-ground zero-deforestation. The lack of standard terms and definitions to describe what companies mean by “deforestation” and their commitments adds to the confusion and uncertainty found in this scenario.

Preliminary results from this study show that there are convergence and divergence points when it comes to company-level strategies. Commitment-making, partnerships with non-profits, civil society organizations, and the government, as well as participating in multi-stakeholder groups are popular intervention methods adopted by all six companies. This shows that businesses realize the importance of collaboration and cooperation between different sectors to end commodity driven deforestation. Making group pledges, participating in industry associations, reporting and disclosing information and legal compliance are relatively popular strategies, with half or more of the companies opting for such methods. Finally, adopting certification schemes in the beef and soy supply chain is the least popular method, which reinforces the idea that companies are now focusing on deforestation at the landscape level, as opposed to forest management practices.

Overall, even though companies are operating in an incoherent and confusing environment, there are certain strategies that seem to be trending when it comes to ending deforestation along supply chains. Further studies should be conducted in tracking a larger number of companies to confirm these results and achieve a broader understanding of the implications such trends.

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Annex 1 – Interviews

Name	Title	Organization
Andrea Azevedo	Director of Institutional Development	Fundação Renova (former Associate Director at IPAM – Amazon Environmental research Institute)
Mauro Armelin	Executive Director	Amigos da Terra
Beatriz Domeniconi	Executive Coordinator	GTPS
Yuri Feres	Sustainability Manager	Cargill
Simon Hall	Manager, Tropical Forests & Agriculture	National Wildlife Federation
Glenn Hurowitz	CEO	Mighty Earth
Alexandre Kavati	Sustainability Specialist	JBS
Skip Krasny	Manager – Sustainable Forestry Programs/ Chair of the Paper Working Group	Kimberly Clark/ CGF
Daniela Mariuzzo	Senior Landscape Convener, Brazil	IDH Sustainable Trade Initiative
Chris Meyer	Senior Manager, Amazon Forest Policy	Environmental Defense Fund
Fernando Sampaio	Executive Director	Produce, Conserve, Include Strategy State Committee
Michel Santos	Director, Global Sustainability	Bunge
Alice Thuault	Deputy Director	Instituto Centro Vida
Isabella Freire Vitali	Brazil Country Director	Proforest

Annex 2 – Company choices

Cargill	**Trader Processor**	Soy	1. Halve deforestation in supply chains by 2020 2. 100% of agricultural commodity supply chains are deforestation-free by 2030	Cargill uses the term "Policy on Forest" and not "zero-deforestation". They address the issue broadly.	No (based on current research)	WRI TNC Abiove	GRSB	Soy Moratorium NYDF	CGF	TFA 2020 Brazilian Coalition on Climate, Forests and Agriculture	CDP Forests	Cargill commits to require compliance with existing local land and forest use laws, prohibits production on illegally deforested land, and works with governments to strengthen existing forest laws and enforcement. Cargill's 2020 Plan for sustainable soy in Brazil focus on the Forest Code implementation Cargill is requesting producers to provide documentation to demonstrate they are in compliance with the CAR. Signing a Cooperation Agreement with the Brazilian Ministry of the Environment to further demonstrate our support of the CAR.	Information from Cargill's 2016 Annual Report, Cargill Policy on Forests, Cargill Forest Protection Action Plans and Cargill Report on Forests 2017.
Bunge	**Trader**	Soy	Eliminate deforestation from our agricultural supply chains worldwide, employing tested methodologies that incorporate carbon and biodiversity protections Respect local and indigenous community rights and apply free, prior and informed consent for land purchases and use Enhance the traceability and transparency of key supply chains over time Publicly disclose progress on our efforts.	No (based on current research)	No (based on current research)	TNC	No (based on current research)	Soy Moratorium	No (based on current research)	Soy Working Group in Brazil Soja Plus	CDP Climate CDP Forests	Ensure that suppliers are aligned with Forest Code. Company maintains systematic records for all suppliers, and managers are informed if there are any incidents. Automatically blocks comercial activities with producers embargoed by Ibama for deforestation violations.	Information from Bunge 2016 Global Sustainability Report, Bunge 2016 Sustainability Report Brazil, and Bunge No-Deforestation Policy.
JBS	**Processor**	Soy, cattle	100% of soy will come from suppliers that signed the soy moratorium for the Amazon Biome by 2014. 100% of cattle products sources from direct suppliers operating in the Amazon Biome will be deforestation-free.	No (based on current research)	No (based on current research)	G4 Cattle Agreement in October 2009, between Greenpeace, Marfrig, Minerva, and Bertin. Signed legally binding TAC agreements (Terms of Adjustment of Conduct) with the MPF (Federal Prosecutor's Office) in July 2009 to avoid purchases from properties with illegal deforestation. Novo Campo Program - partnership to disseminate best practices of beef production in the Amazonia Legal. Progam lead by ICV.	GRSB GTPS	No (based on current research)	No (based on current research)	Brazilian Coalition on Climate, Forests and Agriculture	CDP Climate, Forests, Water, Supply Chain Forests (começou esse ano)	The MPF-TAC agreements emphasize avoiding illegal deforestation, as defined by the Brazilian Forest Code, which stipulates minimum reserve areas on properties that must remain forested. The G4 Agreement goes beyond legality and prohibits any forest clearing, even if it is within the legal limit. "Programa Fornecedor Legal" - created by JBS to help the cattle supply chain to comply with Brazilian environmental law.	Information from the JBS Annual and Sustainability Report 2015, Sustainability JBS, and A Path Towards Zero Deforestation Cattle (available at http://www.zerodeforestationcattle.org/#home)

Nestlé	**Retailer/Consumer Company**	soy, cattle	Zero net deforestation by 2020 100% of beef is deforestation free by 2020 100% of soy is deforestation-free by 2020	Deforestation = the clearing of forests for the expansion of agriculture or forest plantations. It will complement this with a commitment that its operations also do not lead to the loss of "High Conservation Values" (HCVs). In implementing this commitment through its suppliers, Nestlé will use national definitions of forests, or those agreed through stakeholder processes (e.g. RTRS) to help guide implementation. It will follow the definitions of HCVs provided by the HCV Resource Network.	No (based on current research)	Sit on the Program Coordination Board of IDH's Sustainable Trade Initiative for Sustainable Landscapes	No (based on current research)	NYDF	CGF	TFA2020	CDP Supply Chain CDP Forests	Requires that all suppliers (including all subsuppliers back to the primary production stage) comply with all applicable laws and regulations.	Information from the Nestle Responsible Sourcing Guideline, Nestle Commitment on Deforestation and Forest Stewardship, and Nestle in Society Creating Shared Value and Meeting our Commitments 2015.
Carrefour	**Retailer/Consumer Company**	soy, cattle	Zero-deforestation by 2020 Work with all suppliers to encourage the sustainable beef supply in Brazil	CGF	Pro-Terra Rainforest Alliance Certified Beef since 2013	Partnership with WWF since 1998. Partnership with WRI's GFW to monitor deforestation in supply chain announced at the World Economic Forum in Davos 2017.	RTRS GTPS	Soy Moratorium	CGF	Brazilian Coalition on Climate, Forests and Agriculture	No (based on current research)	No (based on current research)	Information from Carrefour's 2015 Annual Financial Report and Carrefour Commitments.
Marfrig	**Processor**	cattle	Zero-net deforestation by 2020	No (based on current research)	Rainforest Alliance Certified Beef since 2012	Partnership with Carrefour to sell certified beef from RA Public commitment with Greenpeace: "Minimum Criteria for Industrial Scale Cattle Operations in the Brazilian Amazon Biome" TNC, Marfrig and Walmart developed initiatives for the environmental regularization and responsible production in São Félix do Xingu and Tucumã, in Pará.	GRSB	No (based on current research)	No (based on current research)	TFA 2020	CDP Forests CDP Climate Change	3rd party auditing checks if cattle purchase is from properties incluses in the lists of slave labor of the Ministry of Labor; situated in areas embargoed by IBAMA, or in disagreement with the criteria of the geospatial monitoring. Procurement system automatically blocks any attempt to acquire cattle from banned farms to ensure the origin of the cattle.	Information in the Marfrig 2015 Sustainability Report and its Audit Report from June 2016.