# J.P.Morgan CAZENOVE

# Grow, Forest, Grow

## A toolkit for investors concerned about deforestation – Focus on Brazil and the Protein industry

This reports explores the **sustainability impacts** and the **financial risks related to deforestation and forest degradation**, using Brazil as our key example. Based on the takeaways from JPM LatAm ESG "Protein" seminars, we discuss the key commitments taken by **JBS**, **Marfrig**, **Minerva** and **BRF**, and outline where we see areas for improvement and opportunities related to **regenerative agriculture.**

- **Deforestation is an emerging theme for ESG investors**. To date, investors that include deforestation in their ESG approach are mostly driven by the "sustainable materiality" of the theme' (climate & biodiversity). As ESG AUMs keep growing, we believe that a company which has significant exposure to FRCs and ignores related risks could suffer from a proportionate discount in valuation. We see this as stemming from several different ESG strategies: 1) **Discount**; 2) **Outflows** and 3) **Missed opportunities.** Over the long term, these strategies are likely to impact valuations, resulting in a material discount vs. a company's historical average.

- For countries such as **Brazil**, which holds **12% of the world's total forests**, deforestation represents a major issue, which has gained notoriety since 2019. Beyond its environmental impact, the issue has a geopolitical and economic dimension, as it can threaten trade deals and may result in economic sanctions that would be detrimental to key sectors. Latest numbers indicate an increase in deforestation in key biomes. We explore both positive and more controversial legal developments around deforestation, as well as issues linked to oversight. We stress that there is little hope to diminish the deforestation rate in the Amazon without finding an economically viable activity for the population that inhabits the area.

- **Cattle ranching is a major driver of deforestation in Brazil.** According to the Imazon institute, 88% of the amazon biome deforestation between 2010 and 2015 occurred in areas of potential cattle acquisition. In our view, increased efficiency in production would represent a significant lever to activate change, allowing for a decrease in deforestation, while tripling production. Meatpackers have been under strong pressure from shareholders and NGOs to take action. Yet, **none of the producers have yet found a solution to fully trace indirect suppliers**, albeit initiatives are ongoing, with **JBS** and **Marfrig** being most advanced on the issue. Broadening the perspective, we found that companies lack clear GHG reduction targets. However, we find the "carbon neutral" beef initiative interesting, and discuss the opportunity behind regenerative agriculture and how this may be applied in a Brazilian context.

- The final part of this report constitutes a toolkit for investors willing to examine deforestation further. This toolkit is divided into three main tools: 1) a JPM "Engagement questionnaire", which highlights the key points investors need to pay attention to when reviewing companies' commitments; 2) a mapping of sustainability certification for "forest risk commodities" (FRC); and 3) a list of databases which we think can be leveraged to roll out a deforestation screen for a larger universe of stocks.

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**See page 59 for analyst certification and important disclosures, including non-US analyst disclosures.**

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# Executive Summary

In this report, we explore the sustainability impacts and the financial risks related to deforestation and forest degradation. We use Brazil and its protein industry as our key example.

In the first part of our report, we highlight why deforestation matters to investors. We decipher the drivers behind the increase of both its sustainable and financial materiality. For now, we believe that regulations are a limited driver of financial materiality. However, as deforestation plays a key role in the materialization of two sustainability risks, namely climate change and biodiversity loss, we expect investor concerns to drive an increase in financial materiality. Ultimately, at the company level, the mismanagement of deforestation-related risk could trigger a stock's derating, owing to three ESG investment strategies: "Discount", "Outflows" and "Missed opportunities".

In the second part of our report, we take a deep dive into deforestation in Brazil, discussing the latest figures available, and the currently applicable regulatory framework. We highlight the increase in deforestation and fires and provide an overview of the regulatory context, recent environmental policy developments and the state of oversight by both public and private institutions. This concern, however, is interconnected with the need to create better social-economic conditions for the 30 million inhabitants that today live in the Amazon area.

In the latter part of our report, we take a deep-dive into deforestation risks associated with the meat industry in Brazil. Based on the takeaways from the JPM "Protein" ESG seminars, we discuss the initiatives put in place by meatpackers (**JBS**, **Marfrig**, **Minerva**, and **BRF**) and highlight where we see opportunities for improvement in the announced strategies. Reflecting on Marfrig's launch of a "carbon neutral" beef brand, we discuss the potential and challenges of regenerative agricultural practices for the beef industry.

Finally, we open the discussion on tools and data available to investors to assess companies' exposure and risk management associated with Forest Risk Commodities (FRCs), and propose an engagement framework to help investors fill in the gaps in current company disclosure.

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## Why deforestation matters to ESG & mainstream investors

Deforestation is an emerging theme for ESG investors. To date, investors that include deforestation in their ESG approach are mostly driven by the "sustainable materiality" of the theme', i.e. that it reflects a negative market externality. However, in this report we outline some of the channels that could make the issue increasingly financially material for many companies and, as a result, for many (if not all) investors.

### Losing 1,000 football fields every hour since 1990

Forests cover over 30% of the global land area, with more than half of the world's forests concentrated in just five countries. Deforestation and forest degradation represent the biggest threats to forests worldwide. The FAO estimates that forest area as a proportion of total land area has decreased from 32.5% in 1990 to 30.8% in 2020, representing a net loss of 178 million hectares of forest. The World Bank brings this point home when it says "since 1990, we've lost 1,000 football fields every hour". However, the average rate of net forest loss globally has declined from 7.84 million hectares per year in 1990-2000 to 4.74 million hectares per year in 2010-2020, resulting from a reduced forest area loss in some countries and forest gain in others. Importantly, there are substantial regional differences, with deforestation most severely affecting tropical and sub-tropical regions. Agricultural expansion represents 73% of deforestation worldwide, putting the food sector and its value chain under the spotlight. Yet, the contribution of "local / subsistence" agriculture also remains substantial, highlighting the profound interconnectedness between deforestation and social issues.

### Forest risk commodities as a screening tool

Although what drives deforestation may differ slightly across regions, agricultural expansion for the production of key commodities continues to be the most prevalent. **To track companies' exposure to deforestation risk, we believe the best metric is their exposure to sensitive raw materials or "forest risk commodities"** (FRC). While the production of FRCs does not necessarily cause deforestation or forest degradation directly, there is a correlation. Out of the seven main FRCs– which include **rubber**, **maize**, **cocoa,** c**offee**, **beef**, **soy** and **palm oil** – the latter three are identified as the main contributors to deforestation. As these commodities are predominantly produced in tropical countries, the forests in these regions are the most severely affected.

### Sustainable materiality: Forests have a crucial role to play in limiting climate change and biodiversity loss

We believe that deforestation represents a material theme for ESG investors, as it directly contributes to two major sustainability challenges: climate change and biodiversity. From a climate perspective, forests can act as a carbon sink. Over the last 40 years, they have absorbed ¼th of anthropogenic emissions. Deforestation avoidance, reforestation / afforestation and natural forest management could represent a significant additional capture (approximately 15GtCO2e/y by 2050). Yet, further deforestation and forest degradation, accelerated by climate change, could lead to forests becoming a net carbon source. From a biodiversity perspective, several forests (especially mountain forests) are of high biodiversity significance. It is estimated that 35% of humanity is dependent on forests. This means forests perform high value ecosystem services within biodiversity conservation and the carbon cycle. The value of these ecosystem services is not yet fully understood or quantified. Hence, forest protection and restoration are sub-components of several

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United Nations Sustainable Development Goals (in particular SDGS 15, 6, 12, 13, and 14)

**Financial materiality: Investors are driving the theme**
We look at the financial materiality of deforestation through our "Four Agents of Change" framework (see our ESG Primer), i.e. we take into account that the financial materiality of an ESG factor is dynamic and can be modified by regulators, consumers, investors and corporates themselves.

To date, regulations on forest protection stem from a mix of international treaties (including CBD; Nagoya Protocol; Bonn Challenge for Biodiversity; UNFCCC; and Paris Agreement for Climate), which are not related to specific compliance mechanisms and therefore rely on national strategies for implementation. At the national level, the regulatory frameworks are a mix of supply-side and demand-side trade regulations. Timber-related regulation seems to be the most advanced. Yet, when we looked at fines related to deforestation, we were unable to identify any cases where these fines reached what we would consider to be financially material levels for the companies in question. It is unclear whether this is likely to change in the future. However, we think it is fair to expect further regulation on the "demand side" (i.e. in geographies importing FRC). This may impose new compliance obligations on companies that are importing and / or distributing FRC-related products, such as mandatory labelling, voluntary commitments, verification schemes, etc. The EU is expected to design legislative proposals in this direction as part of its Farm to Fork & Biodiversity 2030 strategy.

We believe increased societal awareness of the issues surrounding deforestation, which is also linked to strong stakeholder activism (in particular, NGO campaigns, targeting companies and financial institutions), will strengthen the implementation of new regulatory obligations. In this report, we look at a number of deforestation controversies to which companies (e.g. retailers Tesco and Carrefour and meatpacker JBS) were exposed. For both Tesco and Carrefour, the financial impact appears to have been limited. For JBS, we found that the deforestation controversy when added to previous controversies (even if these were not directly related to deforestation) is likely to have contributed to the divestment in the company by large asset managers, thereby forcing the company to take action.

**We think that investors themselves are the driving force behind the financial materiality of deforestation.** We are currently witnessing an "ESG megatrend" and in particular the growth of "impact driven" investment strategies. Investment funds, in addition to targeting returns on investment, are also aiming to deliver measurable real world outcomes, by contributing to one or several Sustainability Development Goals. From this perspective, we believe that the COVID-19 pandemic has acted as a wake-up call. In particular, it has contributed to a strong acceleration in ESG adoption, with the universe of funds (which can be tracked via Bloomberg) doubling over 2020. Looking at 2021, we think investors are now likely to price-in and mitigate drivers of biodiversity loss proactively, in order to avoid future financial losses associated with more frequent, costly and deadly pandemics, which could result from inaction, as recently highlighted by the IPBES (see our report ESG Wire – Will 2021 be the year of biodiversity? Results from an AI Powered trend & Sentiment analysis. This process is clearly being led by investors, as seen in the results of our AI-powered search engine. A growing group of investors have been identified as "early movers", i.e. those who initiate calls for action and make commitments – for example, as witnessed after the devastating fires in the Amazon

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in September 2019 under the umbrella of PRI and CERES. The majority of investor initiatives are focused on companies, but there are also a few aimed at policymakers and governments. We believe that these initiatives will become increasingly common, helped by the EU regulatory package on Sustainable Finance, and in particular the EU Taxonomy Regulation, which lists the protection and restoration of biodiversity and ecosystems as one of the six environmental objectives under which the "sustainability" of an economic activity must be measured, as well as the EU Sustainable Finance Disclosure Regulation and its upcoming  Regulatory Technical Standards (RTS), which will list the 'adverse impacts' which financial market participants must report and mitigate.

However, we also note that despite pledges to take action, investors are also subject to deforestation-related reputational risk. Indeed, NGOs do not deem investors' stated commitments to be sufficient or even measurable. In particular, Global Canopy has highlighted recently that the majority of investors who have signed deforestation statements calling for company action do not even have specific deforestation policies in place. In our view, reputational risk will only be heightened with the emergence of new "big data" powered tools such as "Trase Finance" (see later in this report the tools to spot deforestation related risks), which can identify specifically the trade of global commodities driving deforestation with financial markets worldwide.

As a result, we believe deforestation-related concerns will no longer be seen by companies as having a limited financial impact. As ESG AuMs keep growing, we believe that a company which has significant exposure to FRCs and ignores related risks could suffer from a proportionate discount in valuation. We see this as stemming from several different ESG strategies: 1) **Discount**: Investors proactively applying a discount on the fair value of a company seen as mismanaging deforestation; 2) **Outflows**: Investors divesting from companies exposed to deforestation-related controversies and which do not have convincing risk management systems in place; and 3) **Missed opportunities**: ESG fund flows avoiding those companies which are seen as not managing these risks well. Over the long term, these strategies are likely to impact valuations, resulting in a material discount vs. a company's historical average. From a broader perspective, this risk constitutes a sub-component of the current debate on "the future of food" (see our report The Long-view: Are we going through peak meat?), which introduces a "2°C compatibility" debate in the food sector.

As a result of the trends discussed above, we note that companies have started to take action. Specifically, we take a closer look at Brazil in collaboration with our LatAm Strategy, Food & Beverages and Agribusiness teams. Based on the newly announced targets from Brazilian meatpackers, we detail our "ideal" engagement framework on deforestation and outline further tools available to investors to screen their portfolio against a larger universe of stocks.

## Brazil as a "case study" – highlighting the complexity of deforestation as a multifaceted ESG issue

**Deforestation in Brazil**
Brazil comprises 12% of the total world forests with coverage that is second only to Russia. Brazil is also considered the most biodiverse country in the world. Over 65% of Brazil's area is covered by forest, the vast majority of which is concentrated in two main biomes: Amazon and Cerrado. The Amazon forest has gained notoriety since 2019, when a rising number of forest fires became a trending topic in social

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media, at the same time that deforestation and forest fires increased. This led to deforestation becoming a geopolitical issue, threatening trade deals (EU-Mercosul) and leading to countries suspend funding for conservation efforts (France, Norway). Moreover, the advent of ESG investing has increased scrutiny vis-à-vis Brazil's environmental practices, leading to governance on that area to be a mirror for other aspects of the country.

The National Institute of Space Research INPE provides data to monitor deforestation (DETER and PRODES) and fire trends (foco) in Brazil. The latest data shows that deforestation in the Amazon increased 9.9% y/y in 2020 (Aug 2019 to Jul 2020). In 2019, it rose by 43.4% y/y inside conservation units, and stabilised in 2020. In Cerrado, deforestation increased 12%y/y in the biome and 13%y/y inside conservation units. Brazil hadn't registered high deforestation numbers in the Cerrado preservation areas until 2016, when it started to rise back again.

It is estimated that about 17% of the Amazon Forests has already been degraded. According to scientists, if this level of degradation is to surpass 20% or 25% (which could be achieved in a decade), there is a high possibility that the forest reaches a tipping point. That is to say 60% to 70% of the forest will lose its characteristics and will become a sort of degraded savannah, with all the climate and biodiversity impacts for the rest of the world that this involves.

**Deforestation drivers in Brazil**
Looking at the drivers of deforestation, cattle ranching stands out to be the main cause in the Amazon (responsible for between 50% and 70% of Amazon Forest deforestation) along with agribusiness in the Cerrado. Beyond that, there are important indirect drivers that also contribute to the biome's degradation, such as land grabbing, corruption, and poor law enforcement. It is a point of consensus among researchers, NGOs and the corporate sector that there is little hope to diminish the deforestation rate in the Amazon without finding an economically viable activity for the population that inhabits the area. This in our view highlights the extremely interconnected nature with other social issues and SDGs (such as SDG 3: Fighting poverty), making Deforestation a multifaceted and complex sustainability issue with E, S and G components. We believe the use of offset credits, as a source of revenues for communities, should be further explored.

**The Regulatory Context**
Over the past decades, Brazil has implemented laws and created several institutions focused on environmental protection. The latest Forest Code (2012 version) demands that all rural properties must protect and preserve a minimum percentage of their land; in the Amazon the minimum required is 80% and 20% in the other biomes. Among the recent government initiatives, in December 2019 the Brazilian Congress approved a target to reduce deforestation and illegal fires by 90% until 2023 through the implementation of policies and initiatives encompassing several ministries. In 2020 the government did take a few other measures to combat deforestation and better integrate it into government actions, but on the downside it also slashed the 2021 budget for the country's two environmental oversight bodies: the IBAMA and the ICMBio, while a controversial law (environmental licensing law) is in the making, which could end up rewarding with land ownership certificates to those who invaded public land, using it for illegal activities

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## Brazilian companies are starting to take action

**Brazil's beef industry**

The cattle herd in the Amazon biome has been growing faster than Brazil's total possibly due to cheaper land and improving logistics. According to the Imazon institute, 88% of the amazon biome deforestation between 2010 and 2015 has occurred in areas of potential cattle acquisition.

However, the average cattle raising productivity in Brazil is poor with 115mn hectares of pasture area using just 32-34% of the production capacity. Low technology intensity and real estate speculation are among the reasons for the low productivity. The current animal units produced per hectare in Brazil is close to 1, compared with 2.5-4 in most parts of the country. Hence, increased efficiency in production would represent a significant lever to activate change, which would allow for a decrease in deforestation, while tripling production.

**The challenge of monitoring indirect suppliers**

Each animal passes through several different properties specializing in different stages of the breeding process before reaching the meatpackers. The connection between this production links is made via a document called GTA ("Guia de Trânsito Animal" or animal transit document) which gathers information of the origin of the animal and the producer in the previous link, as well as other information such as vaccination, health exams and others. This digital document gathered by the states is protected by law and not accessible to third parties, meaning meatpackers do not have access to the information. Even though meatpackers have been significantly investing cattle origin traceability, the fragmentation and the long integration of the cattle supply chain in Brazil creates several blind spots in the tracing systems.

**Brazilian meatpackers taking action**

In recent times, Brazil's major meatpackers have increased their commitments to tackling deforestation in their supply chains. Out of all meat producers under our coverage, **Minerva** is the only one to monitor 100% of their suppliers using satellite imaging to crosscheck with deforested areas. **Marfrig** was aiming to achieve this by the end of 2020 and we have no firm deadlines for **JBS** or **BRF** yet. All producers have third-party verification of the monitoring data. **None of the producers have yet found a solution to fully trace indirect suppliers**, but **JBS** seems, in our view, to have the most ambitious plan using blockchain. **Marfrig** also has firm deadlines in place to tackle the issue. In our view, the companies lack specific targets for zero deforestation that would be comprehensive in scope (i.e. encompassing all relevant geographies), as the discussion is more centered on the Amazon biome. Finally, in terms of greenhouse gas emissions, the companies have no tracking of their emission footprints and lack clear reduction targets.

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**Table 1: Deforestation-related commitments of Brazilian meatpackers**

| Company | Commitments |
|---|---|
| JBS | **1) Direct suppliers:** Currently monitors 100% of its direct suppliers in the Amazon. No such monitoring in Cerrado and other biomes.<br>**2) Indirect suppliers:** 2025 commitment to have 100% direct suppliers within Amazon biome registered with JBS plataforma verde (green platform) to identify and analyze direct and indirect cattle suppliers for deforestation risks through block chain.<br>**3) Investment:** Raise R$1bn in donation towards "Fundo pela Amazonia" by 2030 with JBS committed to invest a minimum of R$250mn |
| Marfrig | **1) Direct suppliers:** Already monitors all direct suppliers in the Amazon. Had a commitment to monitor 100% of direct suppliers by the end of 2020.<br>**2) Indirect suppliers:** Target of achieving full traceability of supply chain in the Amazon by 2025 and Cerrado and other biomes by 2030.<br>**3) Investment:** The company has implemented a 10-year program to act on its sustainability targets with investments estimated at R$500mn. In August 2020, the company launched a "carbon neutral" beef* brand, marketed under its Viva brand. The initiative was developed in partnership with the Brazilian state-run agricultural research agency Embrapa. Overall, the company has invested USD 1.78m into the launch of this new Viva Brand, including on research, farm certification and brand building. |
| Minerva | **1) Direct suppliers:** Only company to monitor 100% of their direct cattle suppliers using satellite imaging in all Brazil biomes.<br>**2) Indirect suppliers:** Working to implement VISIPEC software to monitor indirect suppliers. |
| BRF | **1) Direct suppliers:** Commitment to ensure 100% traceability of grain (material FRC to which BRF is exposed) acquired from the Amazon and Cerrado by 2025. |

Source: Company reports;

## Is "carbon neutral" beef really possible?

In our view, further academic research is required to establish whether "carbon neutral" beef is feasible and scalable at the industry level and in all geographies. Findings from product life cycle analysis (LCA) conducted by Quantis suggest that carbon neutral beef *is* feasible by leveraging regenerative agriculture practices. However, in a Brazilian context, this would require having more details on the boundaries used in the calculation of the GHG footprint, and in particular the integration of Land-use, Land Use Change and Forestry (LULUCF) emissions.

## Broadening the discussion: our toolkit for Engagement

The final part of this report constitutes a toolkit for investors willing to examine deforestation further. These toolkit is divided into three main tools:

**1) A JPM's "engagement questionnaire"** detailing the questions and points of attention that investors should have in mind when analyzing the disclosure and commitments made by companies on deforestation. We believe this tool can be useful to Stewardship teams and ESG analysts, both for designing a deforestation-related policy, but also for helping to prepare meetings with companies exposed to FRCs.

2**) A mapping of existing certifications and offset schemes for specific FRCs,** to which company tend to refer in their commodity-specific "sustainable sourcing" commitments. This mapping has been built based on the data we collected as part of our "Mapping "exercise, where we reviewed the ESG disclosure of European companies in the Consumer Staples sector. We also briefly touch upon the carbon and biodiversity offsets. That said, we believe that both certifications and accounting methodologies for an offset would require more detailed and discussed in a fair and balanced manner.

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**3) A list of online platforms and databases than can be accessed by investors.**
We briefly touched upon tools which are primarily used by companies to map their
own supply chains, as this may be useful to investors willing to develop granular
research projects. We would however highlight three databases: TRASE (an online
data visualization platforms looking at trade flows), Global Canopy Forests 500
project, which makes company specific "deforestation scores" available for
download, and the CDP Forests database. All of these are databases that can be easily
leveraged to assess companies' exposure and risk management practices.

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# Losing 1,000 football fields every hour

## Forests represent 30% of global land area, with 66% of it in 10 countries

Globally forests[1] cover 4.06 billion hectares, i.e. **30.8% of the global land area**. They are not equally distributed around the globe: More than **half of the world's forests are found in only five countries** (**Brazil**, **Canada**, **Russian Federation**, **United States of America** and **China**) and two-thirds (66 percent) of forests are found in ten countries.

**Figure 1: Global distribution of forests**
Million hectares and % of world's forest
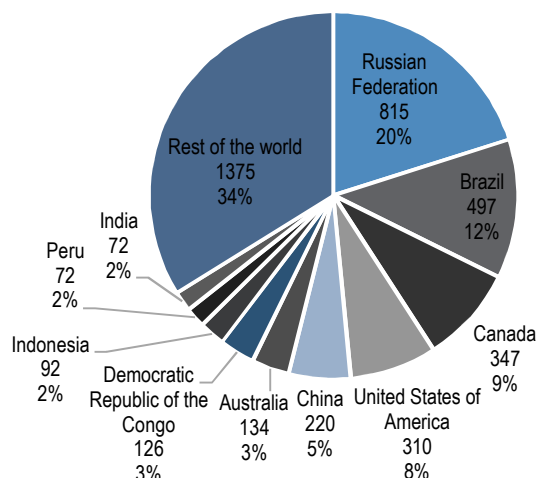


Source: J.P. Morgan, FAO 2020

Because of the lack of an operational definition and consistent, easy-to-map indicators, the measurement of forested areas and the subsequent change in them over time poses a number of quantification issues resulting in inconsistencies and bias in the current reporting on forest areas and deforestation. The United Nations Food and Agricultural Organization (FAO) defines forest as *"Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy[2] cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use"*. However, the definition of forest varies across different initiatives depending on the consideration of land use. Unlike FAO, some definitions of forests include lands in agricultural production systems (such as palms, tree orchards and coffee plantations) and those in urban settings that meet the criteria for area, height and canopy cover and exclude areas of forest where the tree cover has been temporarily removed as part of a forest management scheme or temporarily lost through natural disturbances.

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[1] According to the FAO definition (see above);

[2] The cover formed by the leafy upper branches of the trees in a forest.

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## Deforestation and forest degradation are the biggest threats to forests worldwide

Deforestation and forest degradation are the biggest threats to forests worldwide. These two issues are related to each other, but represent distinct phenomena.

**Deforestation** is described as *"the forest losses due to conversion to other land uses or the permanent reduction of canopy cover below the minimum 10 percent threshold that defines forest"* (FAO). It's worth noting that deforestation can be either legal or illegal, depending on whether forest clearing activities are done in compliance with the local laws / forest codes, and / or whether these are performed outside of the applicable regulatory framework. However, as transparency on deforestation data is limited, and pertinent legislation little understood or poorly applied, tracking legal vs. illegal deforestation is challenging. The commitments toward tackling deforestation can be divided into two major types: (1) Zero deforestation and (2) Net Zero deforestation. Zero deforestation means no change in land use in existing forests whereas Net Zero deforestation allows for compensation of change in land use in existing forests by planting trees somewhere else, and / or financing such actions through offsets[3].

**Forest degradation** represents another significant threat to forest worldwide. Forest degradation is defined by the FAO (2002) as "*the reduction of the capacity of a forest to provide goods and services*". In a general sense, entails a reduction or loss of the biological or economic productivity and complexity of forest ecosystems resulting in the long-term reduction of the overall supply of benefits from forest, which includes wood, biodiversity and other products or services.

In some cases, deforestation is a term used to cover forest degradation as well as deforestation, to reflect a process **of "forest transition",** where human activities transform (old growth) forest into logged-over and secondary forest, cropland or grassland. This process is however not "the rule", and "old growth" forests are sometimes directly converted into other land use, such as agriculture or timber plantations.

**Figure 2: In practice, forest transition can be a mix of deforestation and degradation**
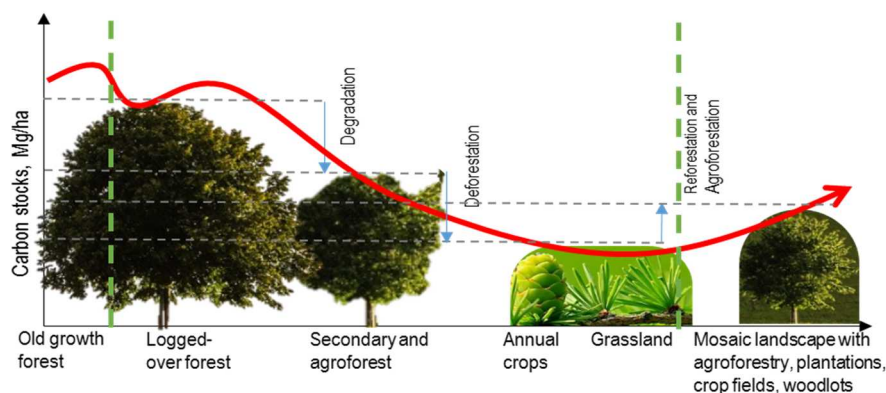


Source: J.P. Morgan based on EU 2018, based on CIFOR 2011

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[3] According to the World Wildlife Fund definition:  Zero Net Deforestation "acknowledges that some forest loss could be offset by forest restoration and afforestation on degraded land." This can be achieved through direct restoration or the purchase of forest carbon offsets, biodiversity offsets, or other environmental currencies.

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# Forest area is decreasing at an alarming rate, in spite of recent improvements at a global level

The world's forest area is decreasing at an alarming rate but the rate of deforestation has decreased over the past three decades.

The FAO estimates that forest area as a proportion of total land area has decreased from **32.5 percent in 1990 to 30.8 percent in 2020**, representing a net loss of **178 million hectares of forest, i.e. an area of approx. the size of Iran (164.8 m ha).** Another way of thinking about it: since 1990, we've lost the equivalent of 1,000 football fields of forests every hour.

**Figure 3: Forests area (% of land)**
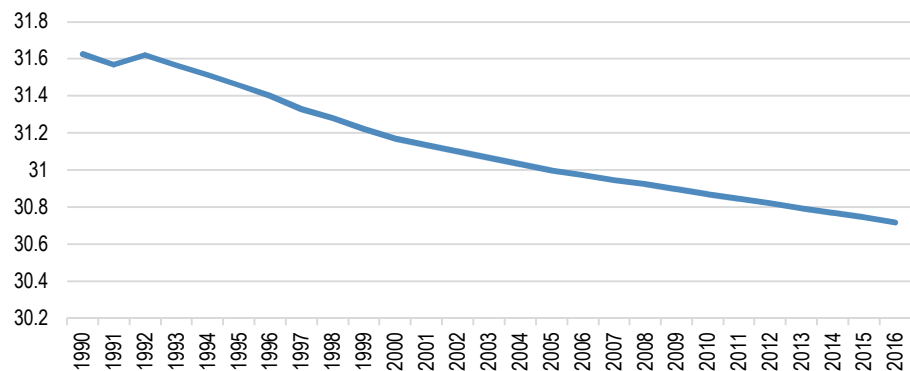


Source: J.P. Morgan based on World Bank

However, the average rate of net forest loss globally has declined from 7.84 million hectares per year in 1990-2000 to 4.74 million hectares per year in 2010-2020, resulting from a reduced forest area loss in some countries and forest gain in others. As shown below, Africa and South America are the two most affected regions worldwide. Africa had the highest net loss of forest area in 2010–2020, with a loss of 3.94 million hectares per year, followed by South America with a loss of 2.60 million hectares per year. Asia and Europe reported net gain in forest area for the period.

However, as noted by the EU in a feasibility study on options to step up its actions against deforestation: **there are substantial regional differences, with deforestation at its highest in tropical and sub-tropical regions**, particularly in the three major forest basins of the **Amazon** (South America), **Congo** (Central Africa) and **Southeast Asia**. (Ecofys et al. 2018).

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**Figure 4: South America & Africa are the most affected regions worldwide. However, South East Asia is also impacted**

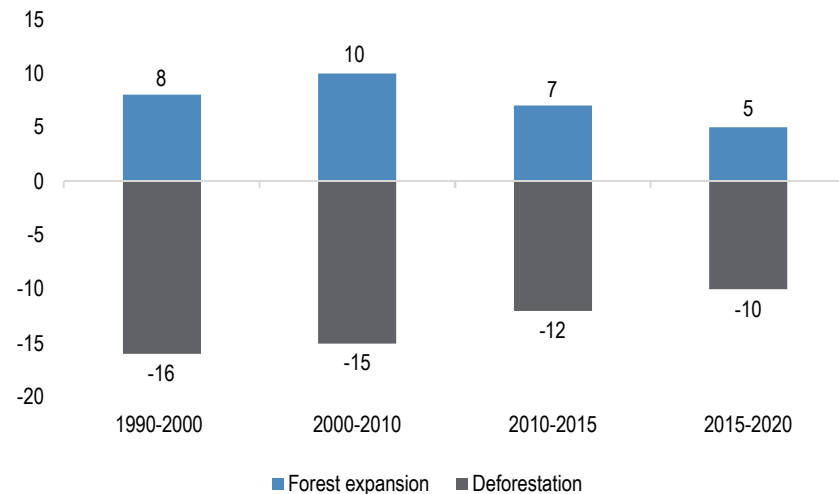Net forest area change by region, 1990-2020, million hectares per year
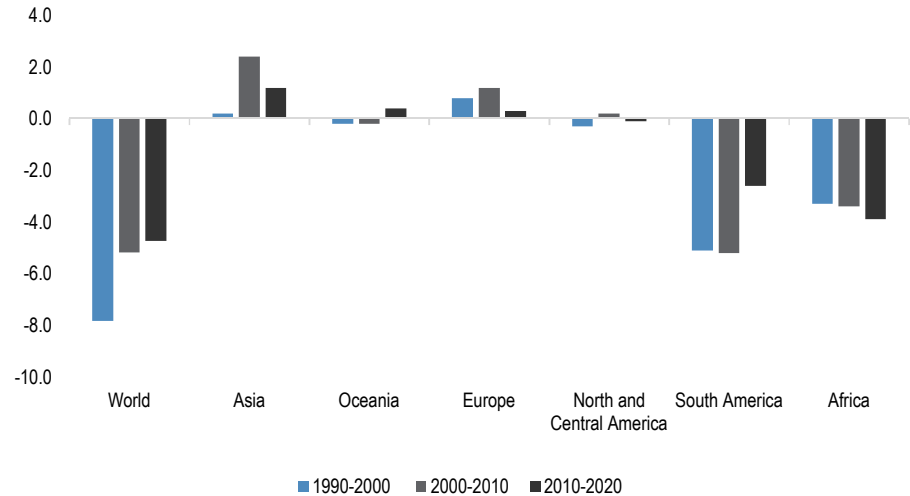


Source: J.P. Morgan, FAO 2020

It is worth highlighting the distinction between the rate of deforestation and the net change in forest area, which is a result of the combination of deforestation and forest expansion. Since 1990, an estimated 420 million hectares of forest have been lost through deforestation, i.e. conversion to other land use. The rate of deforestation has decreased substantially since the 1990s, but so has the rate of forest expansion since the period of 2000-2010. Between 2015 and 2020, the rate of deforestation is estimated at 10 million hectares per year, down from 16 million hectares per year in 1990-2000.

**Figure 5: Global forest expansion and deforestation, 1990-2020**

million hectares per year
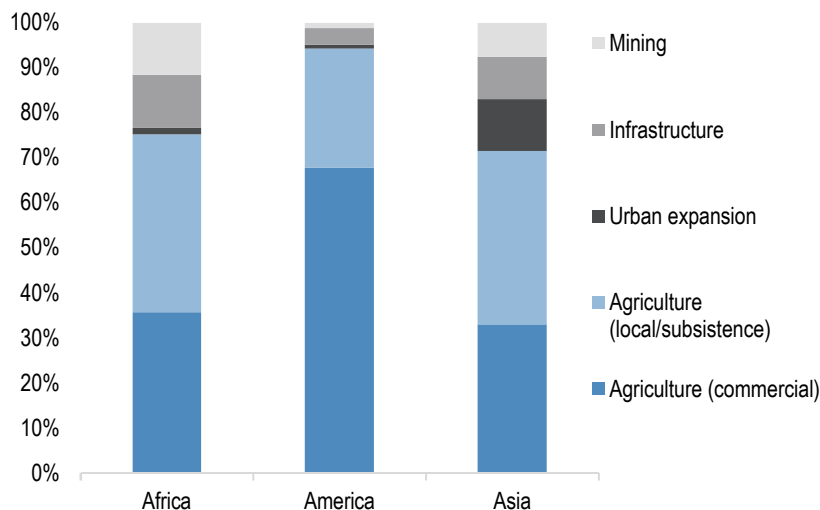


Source: J.P. Morgan, FAO 2020

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**Agricultural expansion represents 73% of deforestation worldwide**

Although the drivers of deforestation differ significantly across regions and countries, agricultural expansion for the production of a number of key commodities continues to be the most prevalent of them, reflecting around 73% of deforestation worldwide (Hosonuma et al., 2012). **Large-scale commercial agriculture** (primarily **cattle ranching** and cultivation of **soya bean and oil palm**) is estimated to account for 40% of deforestation between 2000 and 2010 followed by **local subsistence agriculture accounting for an estimated 33% of deforestation**. Urban expansion (10%), infrastructure (10%) and mining (7%) are the other main drivers.

Within agriculture, the importance of commercial versus subsistence agriculture differs across geographies. Commercial agriculture is the most important driver in Latin America (68%), while in Africa and Asia it contributes to around 35% of deforestation. Local and subsistence agriculture is quite equally distributed among the continents (27–40%). **This, in our view, highlights, esp. for Asia and Africa, the importance of the social challenges associated with the fight against deforestation.**

**Figure 6: Continental-level estimates of proportion of deforestation drivers, 2000-2010**



Source: J.P. Morgan, Hosonuma et al, 2012.

These sectors are not only responsible for deforestation, but also for forest degradation, as shown below.

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**Table 2: Simplified overview of key causalities of deforestation and of degradation**

| Causalities | Deforestation | Forest degradation |
|---|---|---|
| Agricultural expansion | Dominant | Only indirectly through subsistence and small-scale farming or shifting cultivation |
| Forest products extraction | Yes, mainly linked to (commercial) timber extraction and subsequent land use change | Dominant |
| Infrastructure | Yes, <10% | Only indirectly, e.g. through expanding transportation networks (road, rail, etc.), thus making forest areas accessible to harvesting |
| Urban sprawl | Yes, <10% | Only indirectly, e.g. by harvest in forest by urban dwellers |
| Mining | Yes, <10% | Only indirectly, e.g. by release of pollutants |
| Natural causes (forest fires, climate change, pests & diseases) | Only indirectly | Yes |

Source: J.P. Morgan based on Ecofys, EU (2018).

https://ec.europa.eu/environment/forests/pdf/feasibility_study_deforestation_kh0418199enn_main_report.pdf

**Beef, Soy and Palm Oil are the most impactful raw materials:**
To track company exposure to the risk of deforestation, the best metric remains to understand its exposure to sensitive raw materials or "**Forest Risk Commodity**" (FRC) which is defined by Ecofys (2018) as "*globally traded goods and raw materials that originate from tropical forest ecosystems, either directly from within forest areas, or from areas previously under forest cover, whose extraction or production contributes significantly to global tropical deforestation and degradation*". While production of FRCs does not necessarily cause deforestation or forest degradation, it is often correlated.

There are seven main Forest Risk Commodities: beef, soy, palm oil, rubber, maize, cocoa, and coffee (see next page for details).

**However, other studies suggest than among these 7 commodities, beef, soy and palm oil are the main contributors to deforestation**. Yet, beef is more likely to be consumed in its country of origin, than palm oil and soy, which are more extensively exported. These commodities are predominantly produced in tropical countries. As a result, deforestation issues are particularly affecting tropical forests and forest ecosystems.

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**Table 3: Forest Risk Commodities and their main environmental impacts**

| Commodity | Main markets of origin | Main environmental impacts |
|---|---|---|
| Beef | Brazil | Cattle ranching requires large portions of land to raise herds of animals and livestock crops for consumer needs. Forest lands are cleared (through slash-and-burn agriculture) and converted to pastures, which in just five to ten years turn into eroded wasteland due to overgrazing and nutrient loss. The ranchers then clear more forest land to sustain or expand production to meet the commercial demand. Beyond forest conversion, cattle ranching has a range of other environmental impacts. The carbon dioxide emissions from the clearing and burning of forests and methane emissions from cattle during digestion contributes significantly to climate change. Cattle ranching also leads to a loss in biodiversity either through deforestation or through monoculture pastures creating an inhospitable environment for many species of birds and invertebrates that require diverse habitats. Pastures increase the risk of fire and are a significant degrader of ecosystem, causing soil erosion, water pollution, river siltation and contamination with organic matter. |
| Soy | Brazil, Paraguay, Argentina, US | Soy is the second-largest agricultural driver of deforestation worldwide, according to WWF. Soybeans are used for human consumption in the form of tofu, soy sauce, soybean oil and meat substitutes, while the most significant use of soybean is for animal feed (approximately 80% of the global soy production), and therefore, directly linked to cattle farming. Soybean cultivation is rapidly expanding into the natural habitats along with the growing demand for meat, leading to widespread deforestation. |
| Palm Oil | Indonesia, Malaysia, Nigeria, Thailand and Ghana | The expansion of the palm oil industry and increased demand is another agricultural driver of deforestation. Palm oil is an extremely versatile oil and is used as biofuel for power and heat and as an edible oil in food, animal feed, cosmetics products etc. Palm oil has been and continues to be a major driver of deforestation of some of the world's most biodiverse forests. This forest loss coupled with conversion of carbon rich peat soils leads to the release of large amount of greenhouse gases into the atmosphere, contributing to climate change. |
| Rubber | Indonesia, Thailand | Forests in Asian countries are cleared to make room for growing rubber trees. White liquid obtained from the rubber trees, called rubber latex, is used as a raw material for five intermediate forms of the rubber before they are used in downstream rubber production industries (e.g. tires, medical gloves, etc.). Other environmental problems related to natural rubber production include air, water and odor pollutions. |
| Maize | Brazil, Tanzania, Zimbabwe, Indonesia, Mexico, Paraguay, China and India. | Maize is mainly used for animal feed, feedstock and for human food consumption. It is often double-cropped with soy and hence links between soy and past deforestation involve corn as well. In Brazil, corn and other crops are also responsible for displacing pastures for livestock, pushing pastureland into the Amazon causing further deforestation. Maize production also cause other environmental impacts like soil erosion, water depletion, or chemical contamination. |
| Cocoa | Ivory Coast, Ghana, Nigeria, Cameroon and Indonesia | Cocoa bean is grown, traded, and consumed around the world as chocolate. As demand for chocolate increases, cocoa growers are accelerating production. Cocoa has long been grown in the shaded understory of tropical forests. However, higher yields in full sun exposure have led to many farmers changing to systems without shade, in some cases by cutting down trees. In addition, because cocoa is easier to grow and more profitable in early rotations, cocoa farms frequently are repurposed for other crops, sometimes oil palm plantations. |
| Coffee | LA: Peru, Honduras, Nicaragua and Colombia, Costa Rica, Mexico, Brazil. SEA: Indonesia, Vietnam, Laos. SSA: Kenya, Uganda and Tanzania. | One of the world's most tradeable commodities, coffee leads to massive deforestation, chemical buildup in soil leading to river pollution, land and aquatic wildlife dying, soil eroding, and land degradation. The "sun-grown" coffee plant produces nearly three times as much coffee as the "shade-grown" coffee. Increased production of sun grown coffee plants to meet the increasing coffee demand results in greater loss of forests. |

Source: JP Morgan

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# Sustainable Materiality: deforestation as a key theme for SDG focused portfolios

Deforestation represents an emerging theme for ESG investors. To date, investors that take in account deforestation in their ESG approach are mostly driven by the "**sustainable materiality of the theme**", i.e. the fact that it is a negative market externality. However, we outline some of the channels which could make it increasingly financially material for companies, and as a result, for many (if not all) investors.

## A major role in climate change & biodiversity

Protecting and restoring forests represent a global priority to tackle two major sustainability challenges: climate change & biodiversity.

**The role of forests in maintaining the "earth's carbon balance"**

Forests play a pivotal role in the "carbon cycle", i.e. the movement of carbon from the land and water, through the atmosphere and living organisms, which represents a fundamental cycle to life on earth. The role of forests needs to be considered in perspective with the notion of the "**earth's carbon balance**," which is calculated as the carbon emissions from human activities, minus the carbon uptake by oceans and land systems. Since the industrial revolution, and the widespread use of fossil fuels as primary energy, the net carbon balance was largely positive, hence resulting in atmospheric concentration increasing from 280 to over 409 ppm in 2018, well above highest historical concentration levels, as shown below.

**Figure 7: Since the industrial revolution, the net carbon balance has become largely positive, driving up CO2 concentration**

CO2 concentration in ppm since 1800 (World)
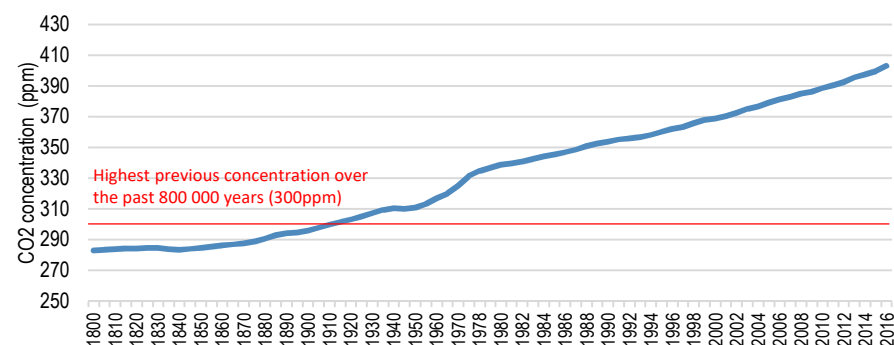
Source: J.P. Morgan based on EEA and NOAA

Forests are a vital part of the carbon cycle, as they are both storing and releasing $CO_2$, in a dynamic process of growth, decay, disturbance and renewal.

Forests can be a **carbon source** if they release more carbon than they absorb. Carbon release will be triggered when trees are burnt and / or when they decay after drying (as a result of old age, fire, insect attack or other disturbance). However, forests can also be **carbon sinks**, if they absorb more carbon from the atmosphere than they release. Carbon absorption, also known as "carbon sequestration" is the result of photosynthesis, a natural process where carbon is absorbed from the atmosphere and

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then deposited into forest biomass (trunks, branches, roots and leaves) as well as in dead organic matter (litter and dead word) and in soils.

**Figure 8: The role of forests in the carbon cycle**
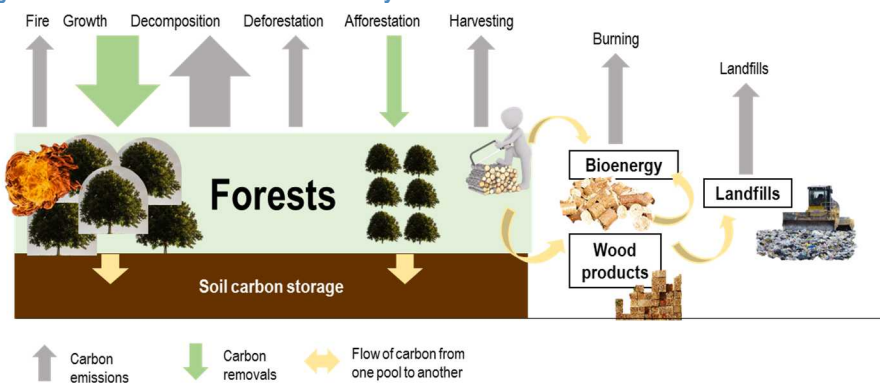


Source: J.P. Morgan

Within the last **40 years, forests have acted as carbon sinks, and contributed to moderate climate change, by absorbing 1/4th of the GHG emitted by human activities**. The future role of forests in climate change depends on whether the net balance of carbon exchanges within forests worldwide will lead to them acting as a carbon source or a carbon sink. As such, it's highly dependent on deforestation and forest expansions rates.

**Climate change & deforestation: a vicious circle**

Climate change and deforestation are starting to grow a two-way relationship that can be described as a vicious circle, where deforestation is both a significant contributor to GHG emissions, while physical effects of climate change accelerate deforestation trends.

On one hand, where **forests absorb a large amount of carbon dioxide** from the atmosphere to help mitigate climate change, **deforestation threatens these carbon sinks and emits further carbon dioxide in the air** from the stored carbon from the destructed trees contributing to global warming. Land use changes, especially in the form of deforestation, are the second largest anthropogenic source of atmospheric carbon dioxide emissions, after fossil fuel combustion.

Climate change, on the other hand, has several consequences such as **extreme weather events** like droughts and heavy rainfall, along with **increased heat**, **pest outbreaks, erosion** etc. which result in further forest damage and deforestation. FAO estimates that the outbreaks of forest insect pests alone damage about 35 million hectares of forests annually.

To remain in line with the most ambitious range of the Paris Agreement's targets (limiting warming to 1.5°C), one would need to increase the potential of forests to be carbon sinks. This would require to stop deforestation, increase reforestation, and manage natural forests. According to McKinsey, this represents a maximum technical potential of 14.9Gt of capture per year (see Figure 9). The potential is however distributed differently depending on geographies (see Figure 10).

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Figure 9: Reforestation, Deforestation avoidance and natural forest management represent a potential of increase capture of 14.9GtCO2e/y by 2050.
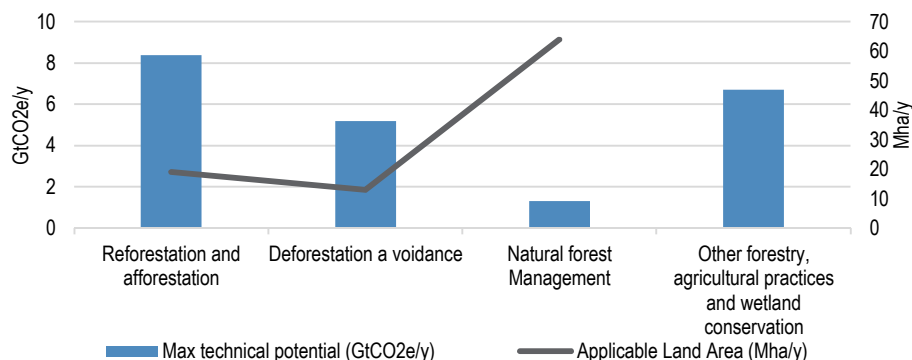


Source: McKinsey based on Adams et al. 2017

### Forests and biodiversity: a virtuous cycle

The conservation of the world's biodiversity is utterly dependent on the way in which humans interact with and use the world's forests. Forests harbor most of Earth's terrestrial biodiversity and provide habitats for 80% of amphibian species, 75% of bird species and 68% of mammal species (*Vié, Hilton-Taylor and Stuart, 2009*). About 60% of vascular plants are found in tropical forests. Along tropical coasts, mangroves provide breeding grounds and nurseries for numerous species of fish and shellfish and help trap sediments that might otherwise adversely affect seagrass beds and coral reefs, habitats for many more marine species.

The natural biodiversity of forests varies considerably according to factors such as forest type, geography, climate and soils – in addition to human use. Most forest habitats in temperate regions have lower biodiversity significance values because they support fewer species than those in the tropics and the species that they do support tend to have larger geographical distributions than those in other regions of the world**.** The lowland tropical forests in the **Amazon** and **Congo** basins have **intermediate biodiversity significance values**; even though these forests are species rich, the **species present often have large distributions**, so the contribution of any individual location to the overall distribution of these species is low. Regions showing the **highest biodiversity significance are those having many species with small geographical distributions**, such as the montane forests of South America, Africa and Southeast Asia and lowland forests of insular Southeast Asia, coastal Brazil, Australia, Central America and the Caribbean islands.

## A price to nature? Forests ecosystem services are not yet fully understood or quantified

### A high value asset when one considers ecosystem services provided by forests

All the points discussed above (carbon cycle, biodiversity, social value) represent many different "ecosystem services". Ecosystem services are the multiple benefits provided by ecosystems, such as forests, to humans. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services such as nutrient cycling that maintain the conditions for life on Earth.

From an economic perspective, ecosystem services have been described as the contributions of the natural world which generate goods which people value.

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However, it is important to note that the economic value of ecosystem services includes not only the income generated from using ecosystem goods and services, but also other benefits they provide for human welfare that could alternatively be called social and ecological values.

**Figure 10: Types of Ecosystem Services**
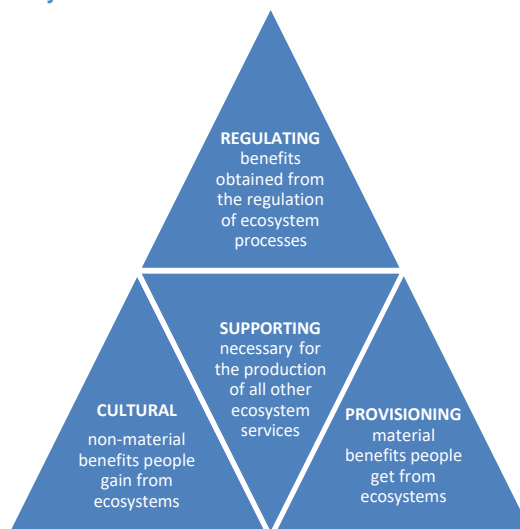


Source: J.P. Morgan based on FAO 2020

**There is no harmonized accounting system for ecosystem services.**
Yet, we believe that protecting forests is a financially material issue from an "outside-in" perspective, i.e. considering the economic value of the ecosystem services. We highlight below several statistics showing the economic importance of forests, and some of their sector dependencies.

*33% of humanity depends on forest*: The FAO notes that a number of population statistics have been used to estimate the scale of human dependence on forests, and by inference, on forest biodiversity. Among the key numbers illustrating the economic contribution of forests, we note the numbers from IFAD & UNEP (2013) suggesting that 2.5bn people practicing small holder agriculture benefit from the regulatory and provisioning services of forests and trees in landscape. Also, the FAO notes that with a world population of around 7.8 bn in Dec. 2019, approx. 33% of humanity has a close dependence on forests and forests products.

*35% of Food production indirectly benefit from forests' services*: The FAO notes that it is estimated that 75% of the world's leading food crops, representing 35% of global food production, benefit from animal pollination for fruit, vegetable or seed production.

*An asset for the healthcare sector*: Moreover, forests represent an asset of high value for the healthcare sector, which is used for existing drugs, but also likely to be used for the development of future medicines. Indeed, as noted by the FAO more than 28 000 plant species are currently recorded as being of medicinal use and many of them are found in forest ecosystems.

*Forestry represents a USD 580bn market / y:* In addition to the various forest related goods, forestry sector provides employment to people around the world.

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Taking into account direct, indirect and induced employment, the formal forest sector provides an estimated 45 million jobs globally and labor income in excess of USD 580 billion per year (FAO, 2018b).

## Forests protection and restoration are sub-components of several SDGs

Beyond the economic importance of forests, fighting deforestation and forest degradation is a clear focus within SDGs, both directly (through SDGs 15 and 6) but also indirectly (through SDGs 12, 13, 14).

**Figure 11: Deforestation is related to several SDGs**



Source: J.P. Morgan, based on sustainabledevelopment.un.org

In terms of official SDG KPIs, deforestation is directly related to:

**Goal 15 (Life on Land)** or – in its more complete version "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably managed forests, combat desertification and halt and reverse land degradation and halt biodiversity loss.  In particular, SDG KPI 15.2 ambitions the following "*by 2020, promote the implementation of sustainable management of all type of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally*", and 15.b "*Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation*".

**Goal 6 (Water and Sanitation)** aims to "Ensure availability and sustainable management of water and sanitation for all", *with KPI "6.6" ambitioning "By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes*"

Forests are also key for the following SDGs: 1) **SDG 13 (climate action)** – owing to their importance in the carbon cycle, in particular as carbon sinks; 2) **SDG 14 (life below water),** as forests host water-related ecosystems of high diversity value; and last but not least 3) **SDG 12 (responsible consumption and production)** – as sustainable forest management, protection and restoration is crucial, especially for the list of FRCs mentioned earlier in this report.

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# Financial materiality: Investors are driving up the financial materiality of the issue

As explained above, deforestation and forest degradation are key factors aggravating the materialization of sustainability risk across portfolios by contributing to the global climate and biodiversity crises. As such, they represent a material issue for ESG-focused portfolios, especially those considering "adverse impacts" and / or those trying to align with SDGs. Deforestation-related practices are increasingly being taken into consideration by investors, thus driving the financial materiality of deforestation for companies. Regulatory and consumer-related reputational risk appear to have less of an impact, in our view.

## Regulators: in spite of an emerging regulatory landscape, the regulatory risks remain limited.

There are several international instruments available to target forest conservation and restoration, from international treaties to national laws. We outline some of them below:

**International agreements:**

- **The Convention on Biological Diversity (CBD)** – a multilateral treaty signed in 1992 which established three goals: 1) conserving biological diversity; 2) ensuring a sustainable use of its components; and 3) ensuring the fair and equitable sharing of benefits arising from genetic resources. It is similar to the UNFCCC, but for biodiversity. As of 2021, it includes 196 states. Its objective is to develop national strategies.

- **The Nagoya Protocol:** The Nagoya Protocol on the Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (CBD, 2011) is a supplementary agreement to the CBD adopted in 2010 and is also of considerable relevance for forests and forest-dependent people. The Protocol has been ratified by 122 contracting parties, including the EU.

- **The Bonn Challenge, launched by Germany and the International Union for Conservation of Nature (IUCN):** A global goal with 61 countries pledging to restore 150 million hectares of degraded landscapes and forest lands by 2020 and significantly increase the rate of global restoration thereafter, which would restore at least an additional 200 million hectares by 2030. As 2020 was the first milestone, pledges to restore degraded land surpassed the 150m ha mark in 2017. The Bonn Challenge website now lists 74 pledges from 61 countries, representing a total of 210.12 million hectares.

- **UNFCCC – Paris Agreement:** Forests have a key role in reducing greenhouse gas emissions and mitigating climate change under the UNFCCC. Article 5 of the Paris Agreement, signed in 2016, lays out a framework for the conservation of carbon sinks, including forests, through schemes such as results-based payments and Reducing Emissions from Deforestation and forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+). Countries can access REDD+ results-based payments from the Green Climate Fund and other similar mechanisms.

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**Trade regulations at national level have limited financial materiality**

In some countries, trade regulations have be put in place stipulating that FRC importers need to demonstrate that these commodities have been grown in a sustainable manner. They can be imposed on the supply-side through national regulations ensuring the sustainable production of commodities through legal compliance and verification (see Brazil's regulatory framework later in this report). They can be applied on the demand side, i.e. in countries importing these commodities. For example, the timber industry is regulated by significant "demand-side" regulation to prevent illegal logging: the Lacey Act Amendment in the United States of America (2008), the EU Timber Regulation (2013), the Clean Wood Act, Japan (2016) and the amendment of the Act on the Sustainable Use of Timbers, Republic of Korea (2017).

Yet, the financial materiality of national regulations remains limited in our view. Running a search for deforestation-related fines on an AI-powered search engine only brought limited results. Among the few examples we were able to identify in press sources, we noted that: 1) the Brazilian environmental agency (IBAMA) had fined 14 meat-packers and applied a total fine of USD 76.5m as part of an investigation into illegal ranching in deforested areas in the Amazon. 2) BRF mentions in its 2019 20-F filing, that on March 2016, they had received an environmental infraction notice for allegedly failing to comply with legal requirements related to deforestation activities. The fine on the date was R$5.0m (approx. 1 USD m at current exchange rate). After BRF presented an administrative defense in this proceeding, the lower court reduced it to R$1.0m (approx. 180k USD). As of 2019, the company reported that an administrative appeal was still pending on the case.

**Towards a more stringent EU framework?**

The EU has already introduced some direct regulatory measures to tackle the issue of deforestation related to imports, which primarily focused on eliminating forest products (i.e. timber) coming from illegal deforestation. Under the EU timber regulation, economic operators putting timber product on the EU market have to undergo and implement due diligence to verify the legality of their sourced timber. Companies can either conduct their own risk assessment and / or rely on voluntary schemes to guarantee sourcing of legal timber. Later, the EU 2009 Renewable Energy Directive has defined sustainability criteria to ensure that the biofuels it promotes do not directly original from agricultural expansion into forests. This criteria was extended to all bioenergy end users by RED II.

Yet, the EU parliament has repeatedly called on the EC to step up action against global deforestation. As a result, on July 2019, the EC released a communication on stepping up action to protect and restore world's forests. Following this and in accordance with the priorities defined in the Green Deal, the EU 2030 Biodiversity Strategy and the Farm to Fork Strategy (see the EU Regulatory Agenda for 2021 here: EU Green Deal – Key milestones reached in 2020, paving the way for further significant reforms in 2021), the EU Commission is considering introducing regulation and other demand-side measures in 2021 to ensure deforestation-free supply chains by 2021. Several possibilities will be reviewed during the impact assessment: mandatory labelling, voluntary commitments & labelling, due diligence, verification schemes and bilateral agreements with producing countries.

In Q4 2020, the European Commission ran a public consultation from September 3rd to December 10th. It is too early to determine the type of measures that could be

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implemented. Yet, we believe this may further reinforce the need to companies at the end of the value chain to have a better control of their supply chains, which is likely to create incentives for suppliers implement better monitoring systems.

## Consumers: The reputational risk is increasing, but not driving consumer purchasing decisions in our view.

**Reputational risks are growing for companies…**
The increasing societal awareness on deforestation and the resultant rise in stakeholder activism (such as NGO campaigns against companies) is adding to the reputational risks of businesses. Controversies can arise even if the exposure is extremely low. We highlight two examples below:

*Tesco:* On August 14th 2020, the group was criticized by Greenpeace for selling meat products of Tulip and Moy Park, UK subsidiaries of JBS, which itself was facing accusation of deforestation in Brazil. As a result, Greenpeace wrote to the supermarket to ask it to cut its links to JBS, and halve the amount of meat it sells by 2025. In particular, the company was accused of having failed its own 2020 "Zero Deforestation pledge". The company responded to this controversy by highlighting it was not selling any Brazilian beef, chicken or pork given the associated deforestation concerns, and highlighted that the companies targeted by Greenpeace (Tulip & Moypark) were also suppliers of other food retail companies in the UK, and highlighted that blacklisting those companies would have a negative social impact on British farmers and compromise their ability to provide British meat to UK consumers.

*Casino*: On September 21st 2020 an international coalition of NGOs sent a formal notice to the Casino Guichard-Perrachon Group to comply with the **French Corporate Duty of Vigilance Law** regarding its supply chain, after accusing the supermarket giant of selling beef linked to illegal deforestation in South America. The French NGO Envol carried out an investigation earlier this year which results suggested that Casino's suppliers regularly purchased beef from farms involved in deforestation and land grabbing activities in the Amazon as well as Brazil's Cerrado savannah eco-region. Although Casino had dismissed the allegations of the investigation report, it released information on its tracing and monitoring processes in Brazil. The NGO coalition asked the Casino Group to respect its legal obligations by taking all necessary measures to exclude all beef resulting from deforestation from its supply chain. The coalition intends to refer the matter to court if the company does not comply within the three months provided for by French law.

However, **for both food retail companies, we believe that these controversies have had no impact on their share price**, and are also **not driving changes to consumers purchasing patterns.** As developed in "[The Long view – Fashion Revolution – are consumers failing to drive up the financial materiality of ESG factors in Retail](#)", consumers are currently not reflecting their increased awareness and interest for sustainability related themes in purchasing patterns.

*JBS*: The world's largest meatpacker JBS has faced several controversies in the last few years over deforestation and corruption in its business and supply chain. In August 2019, news sources (Reporter Brasil, Bureau of investigative journalism and The Guardian) reported that JBS had allegedly been buying cattle from indirect suppliers linked to environmental offences, deforestation and other crimes in the Amazon. This controversy came on the top of corruption-related issues, which had already put the company on the radar of ESG investors. As a reminder, in 2017, J&F

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Investimentos, JBS's controlling shareholder agreed to pay \$3.2bn in fine after its top executives admitted to bribing more than 1,900 politicians in Brazil to advance their business interests (see Reuters).

**These controversies had a higher financial materiality for JBS.** The company was divested by Norges Bank in 2018. In August 2020, Nordea Asset Management had also warned JBS that it would divest from the company because of its approach to the Amazon fires. In response to this increasing pressure from NGOs and investors, JBS in September 2020 announced its goal to monitor 100% of its indirect cattle suppliers by 2025 and created a fund of up to R\$1bn AUM to support sustainability projects in the Amazon region. We discuss these commitments in more detail in the third part of this report.

## Investors: the real driver behind the increasing financial materiality of deforestation

As ESG AuM grow, we believe that the mismanagement of deforestation-related issues will be increasingly financially material to companies exposed to forest risk commodities (FRCs). While for now, this issue rather represents a "reputational risk" with limited financial impact, we believe that a company with significant exposure to FRC and seen as not managing deforestation in a satisfactory manner, will be at risk of a discount applied by investors on its fair value and / or to suffer from a capital outflow driven by ESG concerns and / or from being seen as not investable for ESG funds. In contrast, the current regulatory risks associated with deforestation remain limited in terms of financial materiality in our view, even if laws holding companies accountable for harmful E&S issues in their supply chain could change this.

**SDG and impact-related fund flows are a long term mega-trend for ESG investing**

Since their adoption in 2015, the UN SDGs have increasingly been shaping various investment trends in the industry. Many investors are making commitments to one or several of the SDGs to shape their portfolios' outcomes. The United Nations Principles for Responsible Investment (PRI) notes that focusing on SDG-aligned outcomes can feed back into portfolio performance, and into the resilience of the financial system itself. This feedback loop makes sustainable goals, such as that of zero-deforestation, a natural focus for long term investors like universal owners. For such investors, overall economic performance will influence the future value of their portfolios more than the performance of individual companies or sectors, incentivizing them to support sustainable growth. This weighs on the financial materiality of deforestation, thus reducing the materiality delta (i.e. the difference between financial and sustainable materiality).

We comment in detail on the recent trends related to ESG investment and how the flows are likely to be driven by an increased focused on "impact", as per the double materiality principles in: J.P. Morgan Perspectives - Build Back Better to Boost ESG (December 2020). Of note, the pace of ESG adoption on a universe of funds tracked via Bloomberg, has more than doubled during 2020, helped by a greater focus on environmental and social issues brought about by the pandemic but also in anticipation of a Biden win.

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**Table 4: ESG fund universe growth more than doubled in 2020**

A detailed description of the ESG fund universe can be found in the text.

**Annual growth rate**

|  | ESG Universe Growth | All Fund AUM | Difference |
|---|---|---|---|
| 2015 | 15% | 3% | 12% |
| 2016 | 20% | 6% | 14% |
| 2017 | 36% | 22% | 14% |
| 2018 | 0% | -5% | 5% |
| 2019 | 30% | 8% | 21% |
| 2020 - YTD | 107% | 3% | 104% |

Source: Bloomberg Finance L.P., J.P. Morgan calculations.

**Early movers have already pledged to be deforestation free**

Until recently, the majority of the investor focus with regards to environmental issues has been solely on climate change. But this is starting to change as a growing group of investors are beginning to act on deforestation as another major environmental issue – one which is also correlated to climate change.

In September 2019, following the devastating fires in the Amazon which were fueled in part because of deforestation in Brazil and Bolivia, 251 institutional investors representing $17.7 trillion in assets under management called on companies to take urgent action on deforestation. **The investor group, coordinated by Ceres and the UN's Principles for Responsible Investing (PRI), signed a statement asking companies to implement a commodity-specific no deforestation policy across the supply chain and publicly disclose their progress and risk exposure.**

The Principles for Responsible Investment (PRI) has multiple other investor initiatives on sustainable land use – two of which are listed below:

- **PRI-Ceres Investor Initiative for Sustainable Forests:** More than 35 investors engaging with over 20 companies across the soy and cattle value chains for disclosure and management of deforestation risks.

- **PRI Investor Working Group on Sustainable Palm Oil:** 50 PRI signatories working since 2011 engaging with players in the palm oil industry to promote sustainable practices across the value chain.

Apart from company focused investor initiatives, there are a few which are aimed at the policymakers and governments. A group of **29 investors managing $3.7 trillion in assets, in June 2020 sent letters to Brazilian embassies warning that rising deforestation in the Amazon is creating uncertainty about the conditions for investing in Brazil**. The investors, led by Norwegian insurance and pension firm Storebrand Asset Management, expressed concerns that Brazil is rolling back environmental protections and urged the Brazilian Government to do more to reduce deforestation.

One could raise the question of whether these commitments have been effective. This is the question raised Global Canopy assessment. Their assessment evaluated 235 of the investors that signed the deforestation statement in September 2019 (discussed above) and found that as of October 2020, 202 (86%) of them did not have specific deforestation policies.

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**Figure 12: Investors are ramping up deforestation policies**
N= 235



- Policy covered all commodities    - Policy covered one or more commodities    - No policy
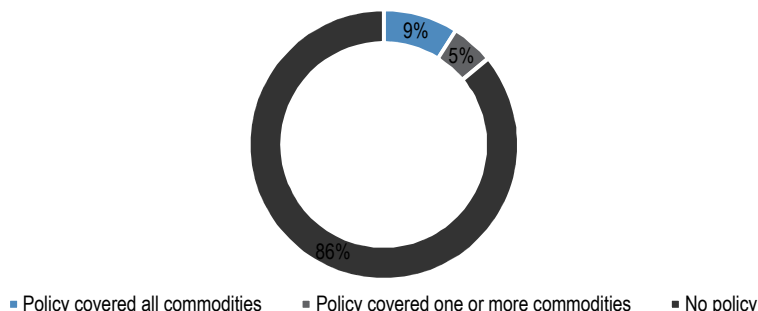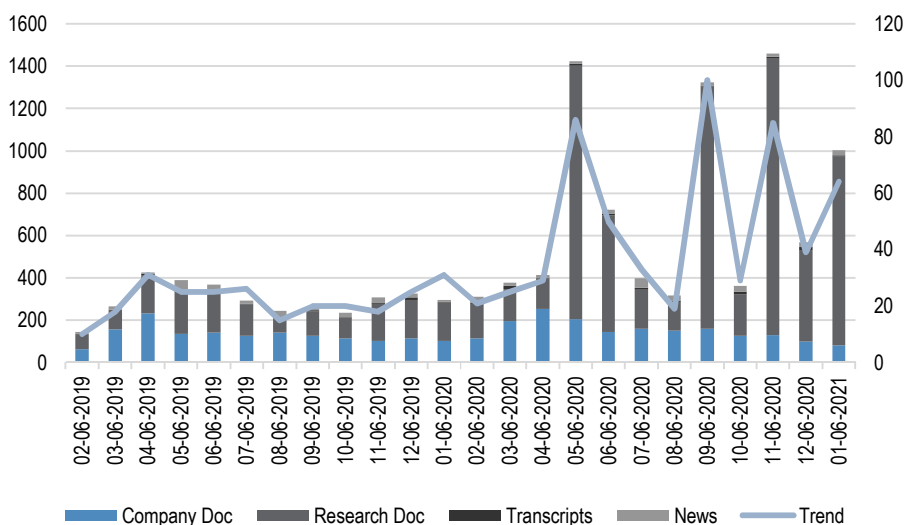
Source: J.P. Morgan based on Global Canopy

Only 21 of the investors who signed the 2019 statement have their own zero-deforestation policies for the forest-risk commodities in their portfolios. They include BNP Paribas, DNB Asset Management, HSBC and Storebrand Group. A further 12 investment firms have policies for timber, palm oil or both but not for soy and cattle, despite these being the main drivers of deforestation.

**COVID-19 acted as a catalyst for the integration of biodiversity related concerns**

The topic of biodiversity and natural capital has long been a topic of increasing importance within ESG, as we highlighted in our ESG Primer published in March. However, we believe that 2020 and the COVID-19 related crises has acted as a catalyst for the integration of biodiversity-related concerns into investment strategies. This was confirmed by the trend and sentiment analysis we ran (Will 2021 be the year of biodiversity? Results from an AI powered trend & sentiment analysis).

**Figure 13: "Biodiversity": The number of documents discussion biodiversity has increased significantly in 2020**

Total documents: 12228; 90D change: +27.5%



- Company Doc    - Research Doc    - Transcripts    - News    — Trend

Source: J.P. Morgan based on AlphaSense

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As noted in our ESG Wire: Managing Biodiversity Risks – The Next Frontier for ESG Investors, we expect these developments in sustainable finance to act as an accelerator for the materiality of the issue, potentially making the case for a more integrated environmental accounting system.

Looking at 2021, we believe that investors are now likely to attempt to proactively price-in and mitigate drivers of biodiversity loss, to avoid the future financial loss associated with more frequent, costly and deadly pandemics that would result from inaction, as recently highlighted by the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem services). Indeed, according to the scientific body, global strategies to prevent pandemics only represent USD 22 to 31.2bn of annual cost, to compare with the USD 8-16tn of costs associated with the Covid-19 crisis in July 2020.

**A regulatory obligation to care will drive the financial materiality of the theme in 2021**
In addition to the other market risks posed by deforestation, tackling the issue is also becoming an obligation for investors under several recently implemented or upcoming regulations in the EU.

The EU Taxonomy Regulation that came into force on 12 July 2020 lists "protection and restoration of biodiversity and ecosystems" as one of the six environmental objectives that must be contributed to for an activity to be labeled environmentally sustainable. It explicitly mentions halting or preventing deforestation through sustainable agricultural practices and sustainable forest management as means to contribute to this objective. This is, for example, particularly important for companies whose activities include "livestock production", which is one of the economic activities for which the EU Taxonomy has developed KPIs and thresholds.

The Sustainable Finance Disclosure Regulation (SFDR) will come into effect in March 2021, for level 1 disclosure (see for more details: Implications of the EU Sustainable Finance Strategy and International ESG developments – page 43 – here). The implementation of the Regulatory Technical Standards (RTS) which will provide more details to the principle-based requirements of SFDR has been postponed to a later date. The RTS will list the 'adverse impacts' which financial market participants must report and mitigate. For assets exposed to FRC, this may imply a requirement to monitor / disclose the proportion of investments in holdings without a deforestation policy.

Additionally, as part of their report on Sustainable Corporate Governance (from Dec 2nd 2020), the members of the European Parliament have also called for the adoption of an EU legislative framework that would require companies to address environmental impacts such as loss of biodiversity and deforestation as part of their corporate governance strategies (see here).

## Corporates: starting to take action

As a result of the trends discussed above, companies have started to take action. In the following section of this report, we take a closer look at Brazil, in collaboration with the LatAm Strategy & Food & Beverages and Agribusiness team. Based on the newly announced targets from meatpackers, we detail our "ideal" engagement framework for deforestation and outline further tools available to investors to screen their portfolio against a larger universe of stocks.

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# Deforestation in Brazil: a case study

The Amazon forest has gained notoriety since 2019, when a rising number of forest fires became a trending topic in social media, at the same time that deforestation and forest fires increased. Trade deals are being threatened (EU-Mercosul), countries have suspended funding for conservation efforts (Germany, Norway) and many companies are now under scrutiny because of their environmental practices related to the Amazon and other Brazil biomes. The advent of ESG investing has increased scrutiny vis-à-vis Brazil's environmental practices, leading governance on that area to be a mirror for other aspects of the country.

But what is fact amid the noise? While there has been an increase in deforestation and fires, there has also been a greater concern from both the public and private sector to make concrete advances in terms of preserving the Amazon. While there is increased oversight and interest vis-à-vis policy direction, there are also economic interests that cry out repeatedly against Brazil and the Amazon, as the advent of trade barriers and/or sanctions for the region would bring immense benefits for competing nations, especially on the agricultural front.

The solution for environmental conservation of forests in Brazil needs to include the advent of better socio-economic conditions for the almost 30 million inhabitants that today live in the Amazon area. This is based on technological developments for the sustainable use of the Amazon biodiversity, including for example the extraction of cocoa, açaí, Brazil nuts, production of medicines, cosmetics, along with different forms of agriculture that move away from monoculture of soy or cattle herding.

## Forest Magnitude

Brazil comprises 12% of the world's forests and the country with the second-largest coverage in the world, losing out only to Russia. Brazil is also considered the most biodiverse country in the world as more than 4,500 endemic-tree species and 9,000 different plant types are found inside the territory.  Indeed, it is believed that the majority of the trees and animals that inhabit Brazil's tropical forests are not yet known to humans.

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**Figure 14: Global distribution of Forests**
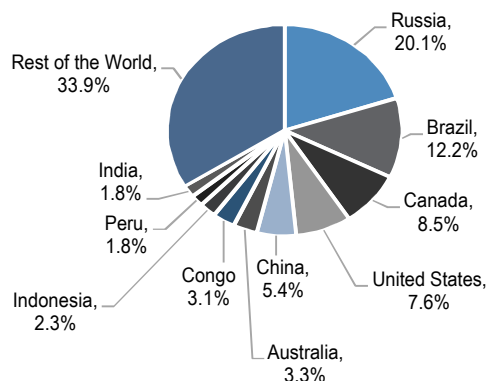


Source: FAO

**Figure 15: Top 10 countries in number of trees' species (thousands)**
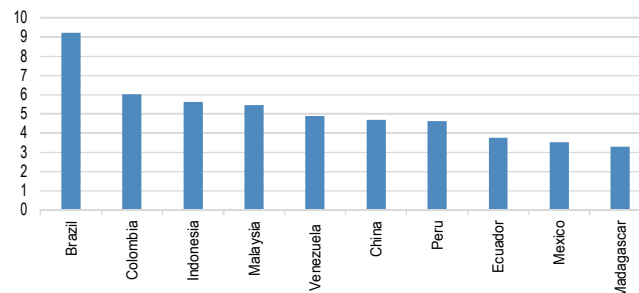


Source: FAO

There are six biomes in Brazil: Amazon, Cerrado, Atlantic Forest, Caatinga, Pantanal and Pampa. They are important not only because of the natural resources for the population but also due to the great natural wealth, being houses to countless species.

The **Amazon** is the largest tropical rainforest in the world and corresponds to 49% of the Brazilian territory. The forest comprises different ecosystems and it is home to at least 10% of the world's known biodiversity. The weather in the Amazon is hot and rainy in the entire year. Besides, the Amazon River flows more than 6,600 km2 and has 20% of available potable water and mineral reserves.

The **Cerrado** is considered to be the Brazilian Savanah, formed by an arid climate, scattered trees and dry forests. However, it is also possible to find in there humid forests and rivers. The biome covers mainly the Brazilian central highlands and occupies 23% of the national territory. The Cerrado is a biodiversity hotspot as it has more than 4,800 endemic plants and vertebrates, which means species that exists exclusively in the ecosystem. Until 1950, the biome was untouched, but with the construction of Brasilia (Brazil's capital), the natural vegetation was replaced by agriculture and livestock.

The third largest Brazilian biome is the **Atlantic Forest**, which represents about 13% of the territory and it is occupied by 50% of the Brazil's population. As the Amazon, the Atlantic Forest is one of the richest natural areas on the planet and is home to unique animal species, such as jaguars, golden lion tamarins and red-tailed parrots. The biome also provides hydric resources that supplies 70% of the Brazilian population. Currently, the Atlantic Forest is most threatened Brazilian biome by deforestation as only 27% of its original forest remains untouched.

The **Caatinga** biome covers around 10% of the territory and is characterized by a semi-arid climate, presenting a huge variety of landscapes and specific species, such as snakes and lizards. The vegetation suffered significant modification in the past years, being replaced by agriculture and livestock. Deforestation and fires are a common practice to prepare the land for livestock and about 36% of the original vegetation was already modified for these purposes.

**Pantanal** ecosystem mean approximatively 2% of the territory and is known by flat lands that get flooded during rainy seasons, which occurs in some specific months. Pantanal is the most preserved Brazilian biome and is home to more than 4,700

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different species of plants and vertebrates. Livestock and eco-tourism activities are very common in the region.

As Pantanal, the **Pampa** biome represents only 2% of the territory and can be found in the South of Brazil. The weather in Pampa region is characterized by constant rains and negative temperatures during the winter, which allows the growth of shrubs and trees. Livestock and agriculture (mainly for rice production) are the main activities in this biome and are also responsible for the biome's degradation over the years.

**Figure 16: Biomes territorial distribution**
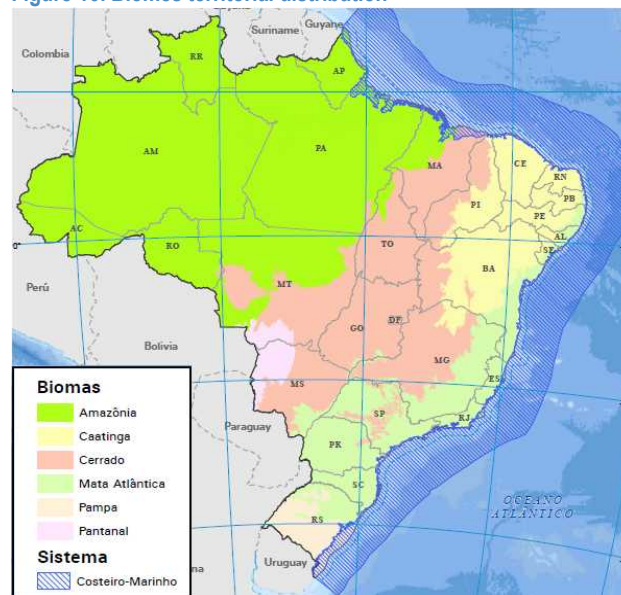


Source: IBGE

## Understanding the Data: Deforestation and Fire Trends

**The Legal Amazon:** Data for forest fires and deforestation englobe the territory known as the Legal Amazon, which is greater than the Amazon biome for grouping together contiguous areas that have the same social, political and economic realities. This area corresponds to 61% of Brazil. In addition to the Amazon biome, it also contains 20% of the Cerrado and part of the Pantanal. It is spread through 9 states in Brazil (Acre, Amapa, Amazonas, Mato Grosso, Para, Rondônia, Roraima, Tocantins and Maranhao). Despite its vast geographical reach, it has only 13% of the Brazilian population, but almost 60% of the indigenous population.

**Tipping Point:** It is estimated that about 17% of the Amazon Forest has already been degraded. According to Carlos Nobre, one of the most respected Brazilian scientists and academics, if this level of degradation is to surpass 20% or 25% (which could be achieved in a decade), there is a high possibility that the forest reaches a tipping point. That is to say 60% to 70% of the forest will lose its characteristic and will become a sort of degraded savannah, will all the climate and biodiversity impacts for the rest of the world that this involves.

**Deforestation:** There are two official datasets for monitoring deforestation, both provided by INPE, the National Institute of Space Research.

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1. **DETER:** A real time deforestation system which sends daily alerts for the purpose of control and supervision. The system has been in place since 2004 and can point out deforestation trends but its purpose is not to measure deforestation rates. It covers areas that are larger than 25 hectares and indicates those that are completely deforested or those that are on their way to deforestation. The system's limitation is that it doesn't detect deforestation in cloudy conditions and images are of low resolution. Data is released monthly.

2. **PRODES**: Provides annual data since 1988 about the deforestation rate and is the main source of information for the government vis-à-vis Amazon forest policies. It has a 95% accuracy and is considered the best monitoring system for tropical forests in the world. Data comes out annually and is typically released around October or November, measuring the deforestation from August to July. It detects deforestation in areas above 6.25 hectares. It registered small areas with less frequency but with far better resolution than the DETER.

**SAD:** Beyond INPE data, the Imazon institute, a Brazilian research institution which aims to promote conservation and sustainable development in the Amazon, also calculates deforestation rates. Since 2008, the Imazon has its own deforestation monitoring system, called Deforestation Alert System (SAD), which is similar to the one from Deter, but with a different methodology. Its satellites can detect deforestation in areas as small as 1 hectare and also works in cloudy conditions.

**Fires:** The INPE captures fire spots/ activity (*foco*) data since 1986, along with NASA and the University of Maryland, but the historical series started being reported in 1988. For a fire to be captured by orbit satellites, it needs to have at least 30 meters of extension and 1 meter in width. Each fire spot doesn't necessarily represent one single fire. If there is a large fire, it could englobe several spots. Thus, the data produced is an indicator of the number of fires, not a precise measure. The data comes out seven times a day.

**What is the data showing?**

**Amazon**: Latest data from PRODES – Satellite Monitoring Program for the Amazon Forest – showed that 11,100 km2 was deforested in 2020 (Aug 2019 to Jul 2020), which represents a 9.9% y/y increase and it is the highest number since 2009. Still, deforestation inside conservation units, which are preservation areas legally established by the government, stabilized in 2020 after rising 43.4%y/y in 2019.

**Cerrado:** Data from INPE showed that in 2020 (Aug 2019 to Jul 2020), deforestation increased 12%y/y in the biome and 13%y/y inside conservation units. Brazil didn't register high deforestation numbers in the Cerrado preservation areas until 2016, when it started to rise back again.

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**Figure 17: Deforestation trends for Amazon and Cerrado (thousands of km2)**
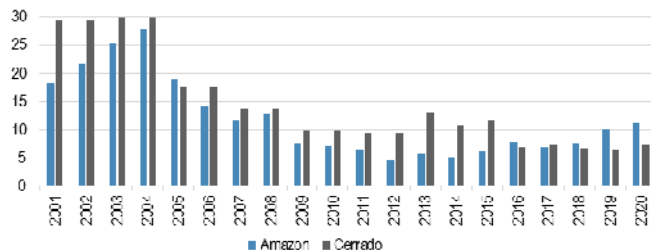


Source: PRODES, INPE.

**Figure 18: Deforestation inside conservation units in Amazon and Cerrado (km2)**
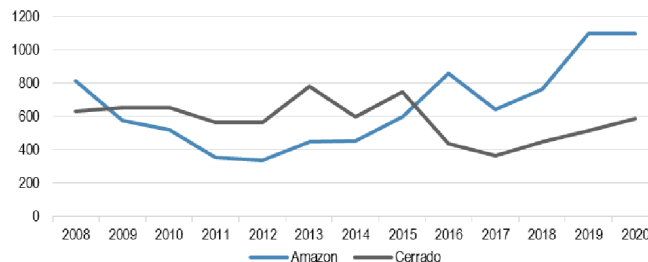


Source: PRODES, INPE.

Data from **Imazon Institute** show that deforestation rates in the Legal Amazon reached the highest levels in 10 years in 2020. The Deforestation Alert System (SAD) registered 8,058 km2 of devastated area in 2020, which represents a 30% increase vis-à-vis 2019 (6,200 km2). More than 70% of the deforestation is concentrated in three states that have intense wood extraction and agribusiness activities: Pará (72%), Amazonas (17.2%) and Mato Grosso (13.4%). Moreover, as per the Imazon report, 276km2 was deforested in December, which is also a record level for the month in 10 years.

**Figure 19: Legal Amazon Deforestation Distribution Per State in 2020**
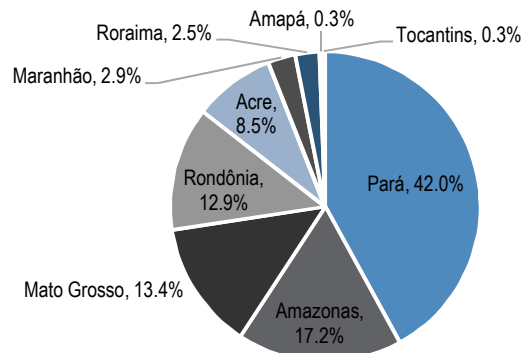


Source: Imazon; J.P. Morgan

**In terms of fires,** the average number of fire spots inside Legal Amazon has increased for two consecutive years. Data relative to 2020 showed an average of 8.6k fire spots per month in the region in 2020, surpassing the levels of 2018 (5.7k) and 2019 (7.4k). The average number of fire spots was once significantly higher than registered in recent years; however it remains in a high baseline. Data from INPE shows that the Cerrado fire trends are stable relative to previous years. In 2020, Cerrado registered an average of 5.3k fire spots, which was about the same registered in 2019. As in the Legal Amazon, average number of fire spots are lower, but deforestation in Cerrado is a hot topic once degradation may lead to the biome's desertification.

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**Figure 20: Average number of fire spots per Biome (thousands)**
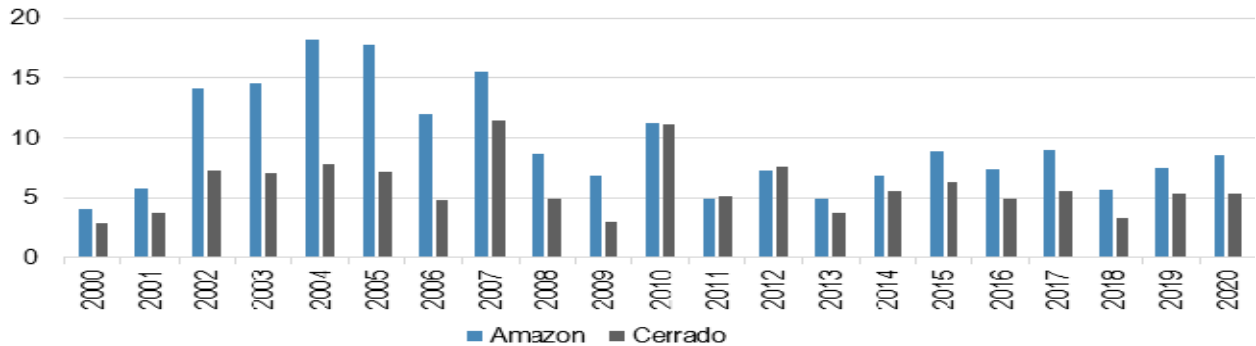


Source: INPE, J.P. Morgan

**Deforestation and fires in other biomes**

**Atlantic forest:** The federal government and local NGO's monitor deforestation and fire activities in the Atlantic Forest as there is only 27% from its original coverage in place. The Atlantic forest can be found in 17 Brazilian States and 7 of them have recently accomplished the national goal to zero deforestation rates in the biome. However, the deforestation rate rose 27%y/y in 2019 after two consecutive years of decreasing trends. The average number of fire spots has also increased in recent years and stood at 1,460 in 2020.

**Pantanal:** Fire trends have been worsening since 2018 and it has been provoking protests in the social media. Latest data from INPE showed that Pantanal registered 8,206 fire spots in September – the worst number for the month within the historical data. The full year average stood at 1,840 in 2020, which represents a 121%y/y increase.

**Caatinga:** The average number of fire spots in the Caatinga biome has been stable over the past years. In 2020, there was a slight decrease in the average number from 1,250 to 1,210 fire spots.

**Pampa:** As in Caatinga, fire spots average are also stable in the biome and stood at 140 in 2020. Research from INPE showed that 47.3% of original coverage remains conserved.

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## Deforestation Drivers

Forest deforestation is closely linked to economic interests, both from corporations that operate in the region and also from the people whose lives depends on forestry activities. It is a point of consensus among researchers, NGOs, and even the corporate sector that the way to reduce deforestation is to create economically viable activities for the approximately 30 million people that inhabits the area (13% of the Brazilian population). The problem, of course, is that other than the indigenous population and the communities that have been in the Legal Amazon for generations, most of those who arrived from 1970 onwards were looking for economic gains, having little knowledge of the forest and its biome. This created a logic in which nature was something to be conquered rather than the creation of a symbiotic relationship. Note that the population growth rate of the Amazon between 1970 and 2000 is almost double of the Brazilian one, mostly due to migration. These migratory flows were an outright policy of the government, which opened roads and devised colonization projects aimed at the exploration of the Amazon. Although these migratory flows have slowed and the population advances in the Amazon are the same as in Brazil today, the causes of deforestation, in our view, are closely linked to the living conditions now found in the region.

It is practically impossible to find precise data and sources for the causes of deforestation in the Amazon. Still, all of them show cattle ranching as the main cause for it. That, along with agribusiness is also the main driver of fires and deforestation in the Cerrado biome. Beyond that, there are important indirect drivers that also contribute to the biome's degradation, such as land grabbing, corruption, and poor law enforcement. According to the Amazon Research Institute (IPAM), from August 2018 to July 2019, land grabbing activity was responsible for 35% (or 3,416 km2) of total Amazon deforestation. Last but not least important is climate change, which is responsible for rising temperatures in the Amazon region, making dry periods longer and more intense and a lead cause of fires.

Figure 21: Deforestation Drivers in the Amazon (2001-2013)
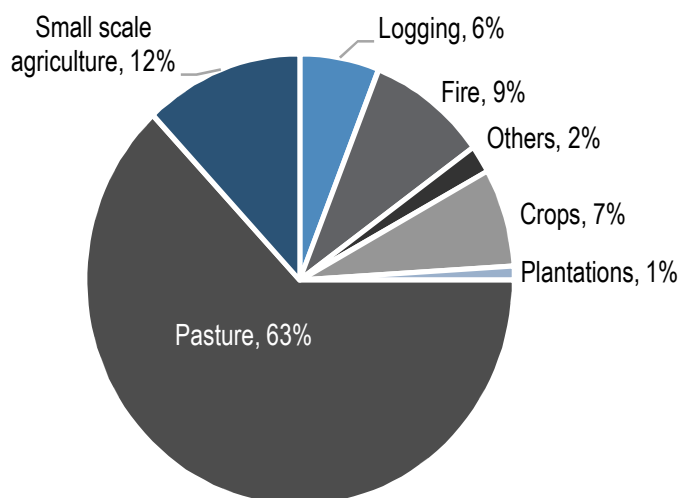


Source: Mongabay, with data from World Resources Institute using Hansen et al. (2019)

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Cattle ranching: The transformation of forest into pasture is still the main cause of deforestation in the Amazon. Estimates are that this activity is responsible for between 50% and 70% of the Amazon Forest deforestation. Brazil is the second largest beef exporter in the world (very close to the leader US) and the frontiers of cattle ranching have been expanded. Still, beef companies have recently pledged to track cattle to make sure that it doesn't come from deforestation areas.

Large Scale Agriculture: This is a lesser problem since 2006, when the Soy Moratorium was imposed, forbidding the purchase of soy produced in deforestation land. Still, rice, corn, sugar cane and other crops continue to be produced in the Amazon.

Logging: Illegal logging has been greatly reduced in recent years, but it remains a widespread problem. Although most of the wood that comes from the Amazon is certified, there is still great commerce in illegal logging. According a study of the Imazon Institute, around 70% of wood extraction in the Pará state, which holds a great part of the Amazon rainforest, occurred in areas that didn't have authorization for the activity.

Climate Change/ Fires: The rising temperature of the Pacific Ocean is causing El Nino to be more frequent and more drastic, leading to intense droughts in the North of the Amazon. This in turn is one of the main reasons behind forest fires, especially in the North area of the forest. The rising temperature of the Atlantic Ocean also causes important droughts in the Amazon, those more focused on the center and South of the forest.

Mining: Mining is a profitable business in the Amazon and it leads to land invasion, mostly from locals and small scale companies interested in precious metals and minerals.

**Causes of deforestation in other biomes**

**Cerrado:** A World Wildlife Fund (WWF) report showed that agriculture, especially soy culture, is the main cause of Cerrado's deforestation which has happened over the years. As per WWF, between 2007 and 2014, 26% of agriculture expansion in Brazil occurred on Cerrado's vegetation area.

**Pantanal:** Deforestation here is a consequence of both exceptional climate conditions in the region, such as lack of rain, and human action. Still, specialists affirm that the main cause for the increase in deforestation was the advance of agribusiness activity. A study from the SOS Pantanal NGO shows that approximatively 15% of the biome's region was converted into land for cattle breeding purposes.

**Caatinga:** The Ministry of Environment estimates that around 45% of Caatinga`s original coverage was already deforested and this was mainly for energy purposes (i.e. coal and firewood).

**Pampa:** Research from INPE shows that 47.3% of original coverage remains conserved. That said, according to the institute, the expansion of cattle breeding activities was the main driver for the biome deforestation in recent years.

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## The Regulatory Context

**Forest Code:** Over the past decades Brazil implemented laws and created several institutions focused on environment protection. In 1934 it created the first Forest Code, a federal law, which is an essential part of the environmental policy. The content and details of the code suffered some changes over the years and the last version, in place until now, was released in 2012. The code establishes rules and limits for the exploration of lands, areas that must be preserved, and which regions are allowed for agribusiness activity. There are two types of protection areas according to the code that must be followed by every person who practices agribusiness activity. The first is named Legal Reserve, which forces rural properties to preserve areas of natural environment. The second is the Permanent Protection Areas (APP), which seeks to protect fragile areas as river sources, tops of hills and slopes. These areas cannot be used for agricultural exploration or deforested. Still, the latest Forest Code (from 2012) demands that **all rural properties must protect and preserve a minimum percentage of its land; in the Amazon the minimum required is 80% and 20% in the other biomes.** The 2012 Forest Code also established the Legal Environmental Register (CAR), which is a mandatory electronic registration for rural properties. The CAR provides clearer information regarding the location of the private properties inside APP and Legal Reserves, as well as the legal situation.

**Table 5: Environmental Policy Developments over the past decades**

| 1930-1940: Legal rules for use of natural resources | 1960-1970: Extension of policy protections | 1980: Creation of institutions and legal instruments | 1990: Creation of Ministry of Environment and tightening of environmental laws | 2000: Brazil approves National Policy for Climate Change | 2011-2018: New Forest Code | 2019-2020: Relaxation of Environmental Oversight |
|---|---|---|---|---|---|---|
| 1st Forest Code | 2nd Forest Code | Creation of Environment Areas Protection (APA) | Law for Agricultural Policy | Creation of Water National Agency | 3rd Forest Code | National Forest Service transferred to the Ministry of Agriculture |
| Water Code | Creation of Special Secretary of Environment | Creation of Environment National Council (CONAMA) | Creation of Ministry of Environment | Creation of National System to preserve environment | Creation of Natonal Policy for Conservation and Sustainable Use of Marine Biome | Water National Agency transferred to the Ministry of Regional Development |
| Fishing Code | Nuclear Activites Law | 1988 Constitution has a chapter dedicated for environment | Creation of Water National Policy | Creation of National Policy for Sea Resources | Creation of National Policy to Fight Desertification | Reformulation of the CONAMA |
| Mining Code | | Limitation for use of pesticides | Environmental Crimes Law | Creation of Biosafety National Policy | Law on Access to Genetic Heritage | Extinction of Collegiate funds from the Amazon Fund |
| Hunt Code | | Creation of IBAMA* | National Policy for environmental education | Atlantic Forest Law | Environment Compensation Law | Relaxation of Atlantic Forest Law |
| | | | | Creation of National Policy for Climate Change | | Land Regularization Project |
| | | | | Creation of Fishing and Agriculture Ministry | | |
| | | | | Creation of National Policy for Solid Waste | | |

Source: Nexo Jornal, J.P. Morgan

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In December of 2019, the Brazilian Congress approved a target to reduce deforestation and illegal fires by 90% until 2023 through the implementation of policies and initiatives encompassing several ministries (agriculture, justice, science and technology, defense, infrastructure, mines & energy, etc.). Still, Congress has some projects in the pipeline regarding environmental conservation (see table below). The list encompasses: a project to encourage the emission of green bonds, allowing companies to buy credit of preserved areas; increase on sanctions against illegal deforestation; and targets to neutralize gas emission until 2050.

**Environmental licensing law:** This proposed bill focuses on land regularization, a source of great controversy. The measure could end up rewarding – with land ownership certificates – those who have invaded public land, using it for illegal activities and often waiting for the "amnesty" of land regularization to sell this land at a profit. It has been suggested that those occupying land that is not registered under their names should show that they have been there for at least one or two decades. In any case, this is an issue that is still going to face a lot of scrutiny in Congress and that is not likely to be ratified in the foreseeable future.

**Table 6: Projects focused on preventing deforestation currently in the process of being approved by Congress**

| | Name | Description |
|---|---|---|
| PL 7578/2017 | Green bonds | Establish rules to encourage the emission of green bonds and aims to allow companies to buy credit of preserved areas. |
| PL 3337/2019 PL 4689/2019 | Increase on sanctions against ilegal deforestation | Tightening of the penalties measures, establishing penal type for seryous violation, with penalty up to 7 years. |
| PL 4531/2020 | Prohibts deforestation in the Legal Amazon for 5 years | The project forbid the deforestation of the Legal Amazon (60% of national territory), for 5 years. Only in specific cases the deforestation will be allowed as necessity to produce food for own consumer, building of houses for local farmes, traditional activities for subsistence and others. |
| PL 4804/2020 | Prohibts the handling of lands subject to irregular deforestation | Prohibts the handling of public or private lands subject to irregular deforestation. The project proposes expropriation of producer machineris, goods and even the cattle if comproved there was illegal deforestation. |
| PL 4902/2020 | Tightening of penalties for environmental crimes | The project doubles the penalty for those who provoke forest fires. The penalty could be from 4 to 8 years and also include the payment of fine. If the fire reaches great proportions, the penalty could be doubled again, amounting to 15 years of seclusion. |
| PL 3961/2020 | Law of climate emergency and neutralization of emissions | The projects determine a national goal to neutralize gas emission until 2050 and establishes that the Executive renew policies on this matter every 5 years. It also prohibits budget limitation to fight climate crisis and deforestation. |
| PL 2633/2020 | Environmental licensing law | The project focus on the land regularization establishing remote fiscalization as a mean to legalize the land. Also it would recognize lands occupied in 2008 or years before. |

Source: Lower House website.

In January 2020, President Bolsonaro transferred the Amazon National Council from the Ministry of Environment to the Vice President, with the mission to coordinate and integrate government actions related to the Legal Amazon. The president of the council is the VP General Hamilton Mourão and he will be in charge of the quarterly meetings. The council was originally created in 1995 and was reactivated this year.

In May 2020, President Bolsonaro signed a decree to combat illegal deforestation, giving autonomy for the military to implement preventive and repressive actions against environmental crimes. Traditionally, these actions are planned and executed by the IBAMA (Brazilian Institute for the Environment and Renewable Natural Resources) or the ICMBio (Chico Mendes Institute of Biodiversity Conservation). The decree was published in May 10 and extended until April 2021.

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Most of the legislation is a federal competence, with states and municipalities being responsible for monitoring and reinforcing the application of the rules. The table below presents some other federal laws and national initiatives on the environmental front.

**Table 7: Main national legislations on environmental front**

| Name | Definition |
|------|-----------|
| Creation of Conama | Conama stands for National Environmental Board and has the purpose of advise and propose measures for government policies on the environmental sphere. |
| Environmental Crime Law | Establishes legal responsabilities to anyone who causes an environmental disaster by atmospheric, water, or soil contamination and generates a state of public calamity. |
| National Policy for Environmental Education | Promotes environment-oriented discusions education inside schools, especially public ones. |
| Atlantic Forest Law | Regulates the use and protection of Atlantic Forest Biome, as the protection of biodiversity, human health, landscape, water resources and social stability. |
| Legal Environmental Register | Mandatory eletronic register for rural properties, which goal is to monitor the Legal Reserves and Permanent Protection Areas as established by the Florest Code. The implementation of the CAR in a state responsability, but it is ruled by a federal law. |

Source: Ministry of Environment

**Oversight:** Environment oversight in Brazil is done by two main government entities: i) IBAMA which is responsible for the implementation of national environment policy and ii) ICMBio an institute that monitors the Country's Conservation Units and executes environmental research programs & protection and preservation initiatives. Both institutes are independent institutes and are financed by the Union and the Amazon Fund. Recently, the Environment Ministry slashed the 2021 Ibama budget by 4% and the ICMBio budget by 13%, which is perceived as negative given the necessity to finance aircrafts rents, personal payroll, equipment and others that are responsible for the preservation and supervision of the region.

**NGOs and Other Pressure Groups**: There are over 820,000 NGOs in Brazil, according to a 2019 study from IPEA. Of those, about 100,000 (12.4%) are located in the legal Amazon territory and 422 of them have the goal of preserving the environment. The government has helped with the funding of about 3,600 ONGs in the Amazon region, with R$6.8 billion between 2000 and 2018 – or only 5.7% of all NGO funding for the period. Beyond those NGOs that are based in the Amazon, there are many others based in other areas of the country that are related to the Amazon or the environment in general, including many of the international ones such as Greenpeace, WWF, etc.

Beyond the NGOs, the private sector is getting increasingly involved with the conservation of the Amazon. Recently, a group of over 100 high profile private sector business representatives came together to form the "Concertation for the Amazon" to think through policies for the forest. Also, the three-largest private sector banks in the country (**Itau**, **Bradesco** and **Santander**) put together an initiative to support the sustainable development of the Amazon in three main areas: environment conservation and bioeconomy development, investment in sustainable infrastructure, and guarantee of the basic rights for the population in the Amazon region.

There has also been significant pressure on the financial community in terms of supporting the Amazon and the environment. In June 2020, 29 investment funds with AUM of over US$3.7 trillion from all over the world sent a letter to the Brazilian

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government voicing their concern over the Amazon and the policies now in place. In July 2020, a group of 40 Brazilian also sent a letter to the government saying that they are worried about the negative repercussions of the Amazon deforestation for the image of the country and their businesses.

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# A focus on Brazil's Beef industry – The context

## Cattle herd in the Amazon biome has been growing faster than Brazil's total

As per Brazilian IBGE data, the country's cattle herd has grown on a 0.5% CAGR over the last 10 years and 0.2% CAGR over the last 5 years. This compares to a 1.7% CAGR and 1.6% CAGR in the Amazon Biome in the same periods, respectively. Cheaper land and improving logistics could be factors behind this expansion in the Brazilian agricultural frontiers.

**Figure 22: Brazilian cattle herd growth decelerated but keeps growing faster in the Amazon Biome**

Mn Heads (Brazil total)                                    Mn Heads (Amazon Biome)
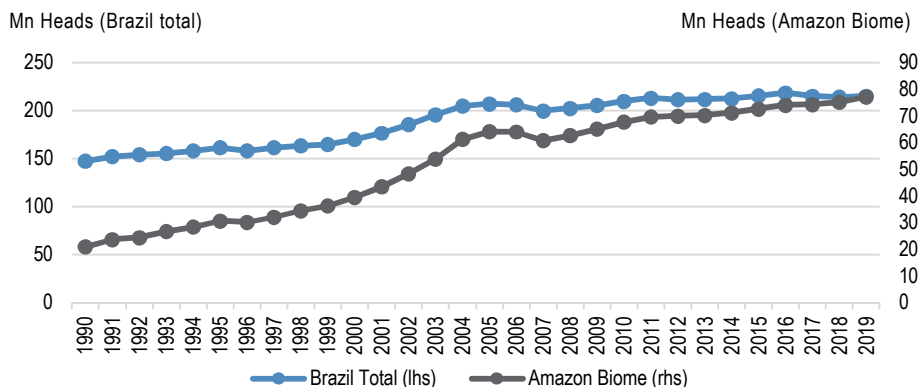


Source: IBGE, J.P. Morgan

**Figure 23: … Cattle being raised in the Amazon biome already account for 35% of Brazil's total herd**

Amazon Biome cattle herd as a % of total Brazil herd
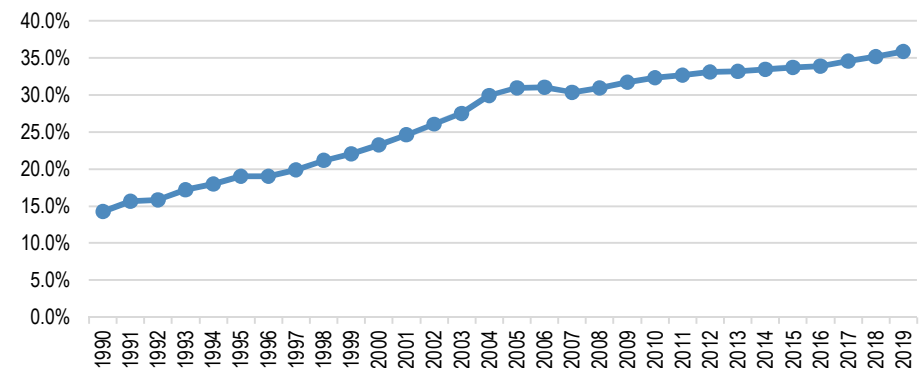


Source: IBGE, J.P. Morgan

The map below shows the distribution of the herd in over 700 municipalities of the Amazon biome, as well as the location of slaughterhouses (the black dots). The states of Pará, Rondonia and Matro Grosso concentrate most of the animals.

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**Figure 24: Cattle Herd distribution in over 700 municipalities of the Amazon Biome**
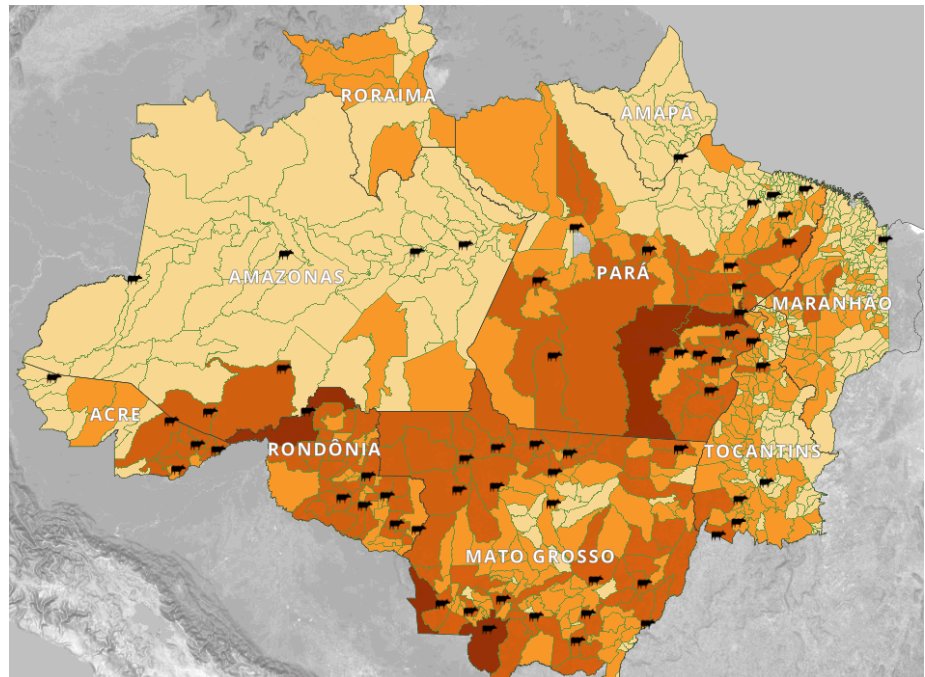


Source: Infoamazonia ([link](link))

According to the Imazon institute ([link](link)), 88% of the amazon biome deforestation between 2010 and 2015 has occurred in areas of potential cattle acquisition (i.e. in the economic reach of the slaughtering plants). Other research conducted by NGOs ([link](link), [link](link)) attribute cattle raising to 65-80% of the Amazon deforestation (directly and indirectly).

## Brazil's average cattle raising productivity is poor

According to Strassburg et al (2014) and research conducted by the Zero Deforestation Cattle institute ([link](link)), Brazil's 115mn hectares of pasture area uses just 32-34% of the production capacity. That means that production could triple without opening new areas.

As per their research, the reasons for the low productivity are:

1. **Low technology intensity**: low maintenance of pastures, low levels of soil fertilization.

2. **Real estate speculation:** cattle advances in forest area so speculators can earn returns (legally and illegally) with these areas.

3. Private propriety is not always a guarantee, reducing investments.

4. Lack of long-term credit lines

5. Lack of services and learning

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**Figure 25: Brazil's cattle raising productivity is just a third of its potential**

Animal Units (AU) pr hectare
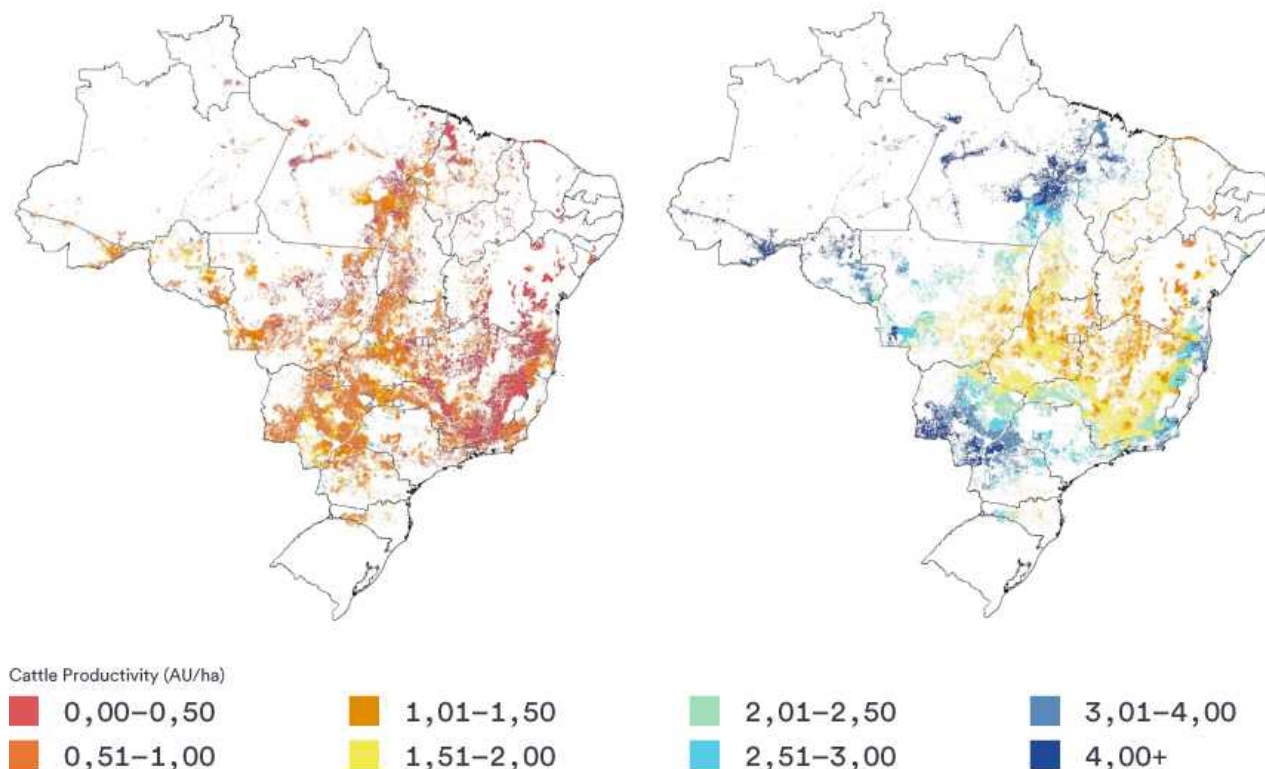


Source: Strassburg (2014), link

The picture above shows that current animal units produced per hectare in Brazil is close to 1 while potential could be 2.5-4 in most parts of the country.

## Indirect suppliers: the main challenge of tracing origin

Even-tough meatpackers have been significantly investing in traceability of cattle origin, the fragmentation and the long integration of the cattle supply chain in Brazil creates several blind spots in the tracing systems.

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**Figure 26: Cattle rising has a complex structure in Brazil**
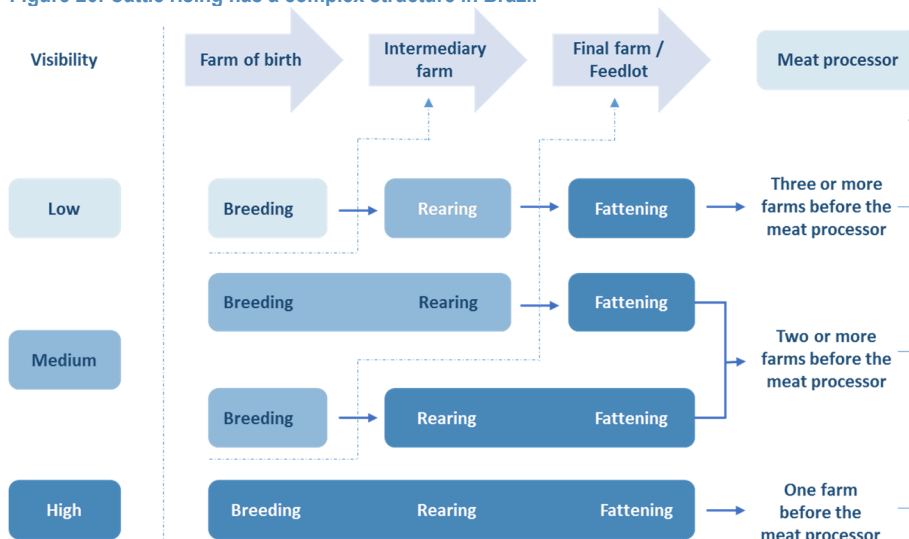


Source: J.P. Morgan based on Proforest (link)

There are over 700k breeding farms in Brazil, most of them specialized in different stages of the breeding process (Breeding, Rearing, Fattening). That means each animal can pass through several different proprieties before they reach meatpackers.

**The connection between these production links is made via a document called GTA ("Guia de Trânsito Animal" or animal transit document) which gathers information of the origin of the animal and the producer in the previous link, as well as other information such as vaccination, health exams and others**. This digital document is gathered by the states is protected by law and **not accessible by third parties**, which means meatpackers do not have access to the information.

That said, meatpackers have good visibility of just the last mile of the animal supply chain, or the direct suppliers. Companies have implemented verification via satellite and crosschecking with the environmental registry of these producers ("Cadastro Animal Rural") to assure they respect the social and environmental regulation.

As there is no tangible government effort to use the GTAs as a source of information for multiple stakeholders to guarantee the origin of the animals, meatpackers are starting to use technology to find a solution for the indirect cattle supply monitor. The efforts are relatively in initial stages. **JBS** seems the most advanced on in terms of technology (using blockchain) and **Marfrig** has in our view the most ambitious targets.

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# A focus on Brazil's Beef industry – Companies taking action

## Meatpackers looking to improve animal traceability. Greenhouse gas emission cuts still in very early stages

Here we discuss the initiatives Brazil's major meatpackers have taken to comply with a zero deforestation policy. Out of all meat producers under our coverage, Minerva is the only to monitor 100% of its suppliers using satellite imaging to crosscheck with deforestation areas. Marfrig aimed to get to this level by the end of and we have no firm deadlines for JBS or BRF yet. All producers have third-party verification of the monitoring data. None of the producers have yet found a solution to fully tracing indirect suppliers, but JBS seems, in our view, to have the most ambitious plan. Marfrig also has firm deadlines in place. In our view, the companies have a notable lack of targets for zero deforestation with the discussion more centered on the Amazon biome. Finally, in terms of greenhouse gas emissions, the companies have no tracking of their emission footprints and lack clear reduction targets.

### JBS

JBS has been working with a zero deforestation policy since 2009. According to JBS, the company has the largest cattle supplier monitoring system in the world currently monitoring 100% of its direct cattle suppliers in the amazon region (~90k suppliers). The company is not yet providing satellite monitoring for other biomes like the Cerrado, just crosschecking documentation with public databases identifying suppliers with issues. Nonetheless, indirect cattle monitoring is still a challenge and JBS is investing towards being able to fully track its cattle supply in order to avoid acquiring from cattle producers that are involved in illegal deforestation and consequently improve its ESG metrics.

JBS had implemented two targets towards amazon biome preservation: i) 100% of direct cattle suppliers within the Amazon biome need to be registered with JBS *plataforma verde* (green platform) by 2025; and ii) raise R$1bn in donations towards "Fundo pela Amazonia" by 2030 with JBS committed to investing a minimum of R$250mn.

JBS *plataforma verde* initiative has as its main objective the identification and analysis of cattle suppliers and suppliers of suppliers through its block chain platform in order to prevent illegal deforestation and have a whole view on its supply chain. This initiatives is divided in four phases: i) development; ii) operationalization; iii) expansion; and iv) mandatory adherence. The first phase of this initiative is currently under development and expected to be concluded by the end of 2020, which consists on developing its block chain platform and communicating and engaging with suppliers. The fourth and last phase states that by 2025 it will be mandatory for direct suppliers to be part of JBS green platform in order to sell cattle to JBS. Moreover, the company is committed in sharing the intelligence from their monitoring system with third parties, including cattle producers, financial institutions and other companies.

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**Figure 27: JBS green platform steps**
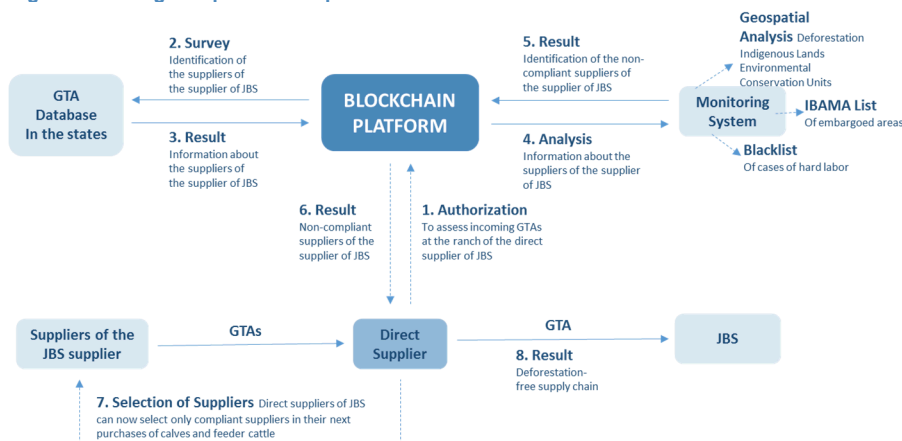


Source: J.P. Morgan based on JBS

*Fundo pela Amazonia* is a recently created initiative that aims to reach R$1bn or ~$250mn in donations until 2030. The objective of the fund it to foster initiatives and projects aimed towards the sustainability, conservation and reforestation of the Amazon biome while also promoting scientific & technological research and supporting local communities. In order to achieve the target R$1bn in donations by 2030, the company made a public commitment of a minimum R$250mn in donation in the first five years of the fund and has also committed to match third-party donations until its own contribution reached R$500mn.

**Figure 28: JBS fund for the Amazon**
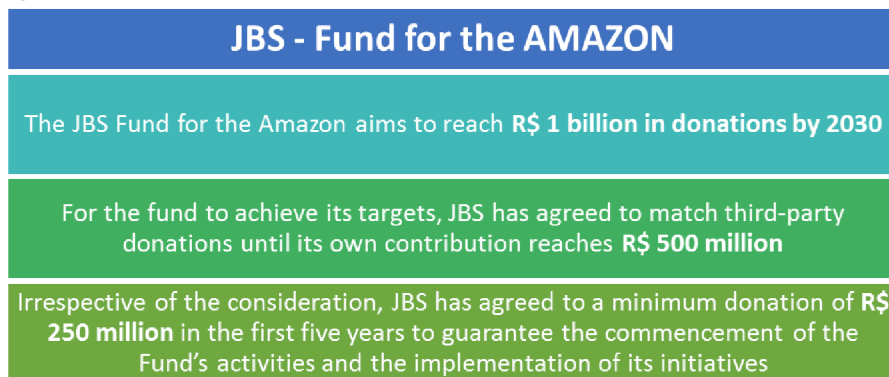


Source: J.P. Morgan based on JBS presentation

## Marfrig

Marfrig introduced a public manifesto against deforestation in Brazil and a commitment to a zero deforestation target for the Amazon in 2025 and for the Cerrado in 2030. The goals are based on three pillars: cattle origin traceability, engagement of suppliers and transparency (they will make targets and progress public).

Marfrig has created a sustainability platform with five core targets: i) monitoring the origin of cattle; ii) preserving natural resources; iii) reducing gas emissions; iv) ensuring animal welfare; and v) environmentally responsible treatment of disposables. Moreover, the company has implemented a 10 years program to act on

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all of the above mention targets with investments estimated at R$500mn with use of proceeds mainly destined to develop tools that ensure that ongoing projects are effective and targets are reached.

Regarding cattle monitoring, the company has committed itself to monitoring all direct suppliers until the end of 2020. The company already monitors all of its direct suppliers in the Amazon biome, but is still lagging in other regions, although a minor portion. Aside from the target of monitoring 100% of its direct suppliers by the end of 2020, Marfrig also has as a target for the next two years to expand this program and start monitoring indirect cattle as well. By 2025 the company expects to have full monitoring of indirect cattle sourcing, but it is not fully clear what mechanism is to be used to guarantee full tracking. The company says it will establish a partnership with companies to test solutions available in the market. Until they have all the tools to properly monitor direct and indirect cattle sourcing, the company is working with a list of suppliers that have or are suspected of having

We noted that Marfrig recently hired Mr. Paulo Pianez (coming from Carrefour and Santander) to lead the efforts as the company's sustainability director. While the system is currently based on excluding suppliers/cattle ranchers from "grey areas", the new approach will strive to include producers, work with them to improve their environmental standards, offer credit and improve their controls.

On preserving natural resources, Marfrig is already committed with zero deforestation in the Amazon biome, which means that the company doesn't buy cattle from producers that have deforestation issues or are acting in indigenous and/or protected areas. The target is to expand this initiative towards the Cerrado biome and to all regions from which they buy cattle until 2025.

The company has recently launched its carbon neutral/low carbon project in order to reduce gas emissions. Given this is a fairly new project, there is only a few number of producers and cattle within this project. Nonetheless, the company is confident about the future of this project, especially on low carbon beef. According to the company, more than 10mn hectares in Brazil can be converted into low carbon beef throughout the entire country. We discuss some of the questions raised by low carbon beef in the next section of this report.

## Minerva

Minerva is the only company to monitor 100% of its direct cattle suppliers using satellite imaging in all Brazil biomes. The company is currently mapping over 9k ranchers (equivalent to 9mn hectares), more than 2.4k were restricted as they were no compliant. Their checking is monitored by third-party entities, including Public Prosecutor Office (PPO).

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**Figure 29: Minerva is currently not fully monitoring indirect suppliers, but claims their business model reduces the risk of buying cattle from deforestation areas**
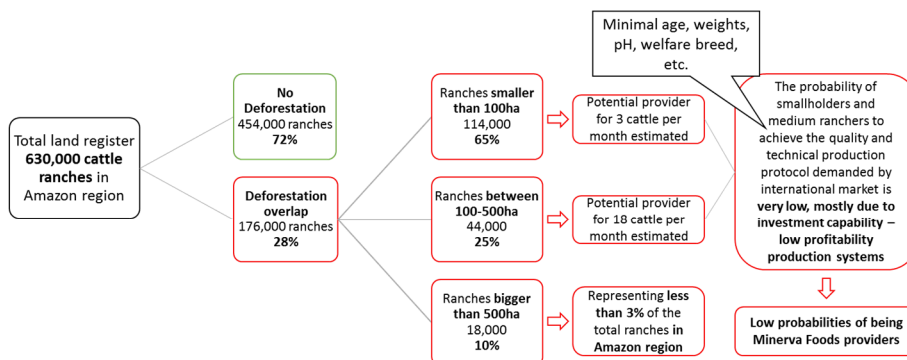


Source: J.P. Morgan based on Minerva

Minerva now works with NWF & Wisconsin University to implement VISIPEC, a software that will help crossing public documentation and satellite images to improve visibility beyond the direct suppliers. **Since VISIPEC will not access GTAs, we think it will diminish, but not fully solve the indirect supplier tracing issue**.

Even tough Minerva cannot be 100% of the origin of the cattle given the lack of full visibility of the indirect supply chain, the company estimates less than 3% of their cattle supply comes from ranchers with quality supply in the Amazon region, with overlap with deforestation areas. That means, in their view, just 3% of their supply could be at risk of having issues.

## BRF

In a recent event (Dec 10th), BRF has committed to tracing 100% of its suppliers by 2025. Different from the beef companies, the pork and chicken industries could be running supply risk in their feed (corn and soybean) acquisitions. Currently, BRF crosschecks its suppliers with public databases to check for compliance in the environment and social fronts. It also has a focus list of suppliers in the amazon biome, who must comply with the soybean Moratorium. The moratorium is a guideline of actions for producers required by soybean costumers to achieve certain environmental requirements (more info here). As of now, the company has no satellite imaging of suppliers and no full traceability.

On the emissions front, the company has committed to a 20% reduction by 2030, but at this stage we have no details on the plan's millstones until then.

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# Can regenerative agriculture practices result in a "carbon neutral beef"?

In our view, further academic research is required to establish whether a "carbon neutral" beef is feasible and scalable at industry level and in all geographies. Findings from product Life Cycle Analysis conducted by Quantis suggest that a carbon neutral beef is feasible. However, in a Brazilian context, this would require having more details on the integration of Land-use and Land Use Change emissions in the boundary of the calculation used.

**Understanding the life-cycle emissions from beef production**

Beef production leads to GHG emissions through two main sources: 1) **emissions from agricultural production process** and 2) **emissions related to land use change**. The emissions from agricultural production are: methane ($CH_4$) emissions linked to the "enteric fermentation" process (cows' burps) and manure, as well as nitrous oxide emissions ($N_2O$) linked to ruminant wastes and the use of chemical fertilizers for crop production used to feed cattle. The emissions related to land use change are those related to the loss of $CO_2$ sinks and emissions of $CO_2$ when forests are turned into pastures and / or turned into fields to produce crops used for cattle feed (e.g. soy).

**Table 8: Simplified overview of GHG emissions sources in beef production**

| GHG | Land-Use-Change | Agricultural Production |
|---|---|---|
| **CO2 (27% of CO2e emissions)** | - Forests turned into pasture<br>- Forests turned into fields for crop production | |
| **CH4 (44% of CO2e emissions)** | | -Enteric Fermentation (Cow burps)<br>- Manure |
| **N2O (29% of CO2e emissions)** | | - Fertilizers used to produce crops used to feed cattle<br>- Emissions from ruminant waste |

Source: J.P. Morgan, based on FAO

**Approximately 6% of World GHG Emissions and among the least resource efficient food to produce**

In a study from 2013 ([here](#)), the FAO estimates total annual GHG emissions from animal agriculture (inc. LUC) to be approximately 14.5% of human emissions, with beef representing 41% of it, i.e. approximately 6% of world GHG emissions. According to the World Resources Institute, this represents a conservative estimate, which modestly accounted for the land-use change emissions.

Beyond its absolute impact, Beef is also pointed at as one of the least resource efficient proteins to produce. The chart below highlights it from a land use and GHG emissions perspective, but it is also true for other environmental issue (e.g. water use).

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**Figure 30: Conventional Beef is among the least resource efficient protein to produce**
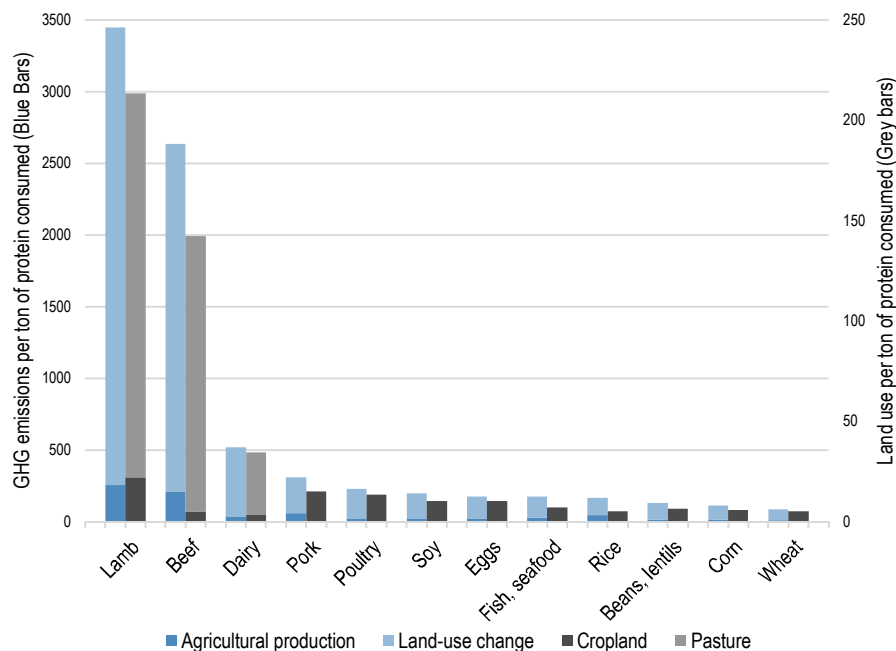


Source: World Resources Institute, GlobAgri-WRR Model

As a result, several scientific reports, including the landmark report from the EAT-Lancet Commission (see here) concluded that to safeguard natural systems and processes, a massive transformation of food production and consumption systems is required. This would require, among other, "doubling in the consumption of healthy foods such as fruits, vegetables, legumes and nuts, and a greater than 50% reduction in global consumption of less healthy foods such as added sugars and red meats". Similar conclusions were also reached by the IPCC, which highlighted that food production must be drastically altered to prevent the most catastrophic effects of global warming.

**A sector spared from carbon pricing mechanisms**

In spite of its high environmental impact, the agricultural sector has been mostly spared from carbon pricing mechanisms. Several academics have been considering the case for a carbon tax on meat (see: Bonnet et al . 2016, Briggs et al. 2015). Yet, we believe that such a tax would raise significant social challenges and may be politically tricky.

**Is there really a potential for "carbon neutral beef"?**

As beef is pointed at as the most highly emitting food protein, the beef industry is ramping up its communication about a "carbon neutral beef". The principle behind this label is to offset the GHG emissions from beef production, by modifying the way beef are "grazing" by moving them regularly to let plant fully recover. This system is called "regenerative grazing" or "holistic planned grazing" or "holistic management". As a result, plants and soil enhance their carbon capture potential.

There seems to be a limited number of studies available that quantify the net carbon footprint of regenerative agriculture. On the top of the project announced by Marfrig, we highlight the results of a carbon footprint (at farm level) and a product LCA

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analysis done by Quantis, on "White Oak Pastures" (WOP) a major supplier of General Mills, which restores degraded cropland to perennial pastures and uses multi-species regenerative farming practices to produced beer and other animal products. This study seems of particular interest to us, given that Quantis is an established LCA company. The product LCA concluded that WOP-Produced beef have up to 111% fewer emissions per kg of beef produced vs. conventional US beef.

**Figure 31: Based on Quantis product LCA, regenerative agriculture practices can indeed lead to a net negative carbon footprint**
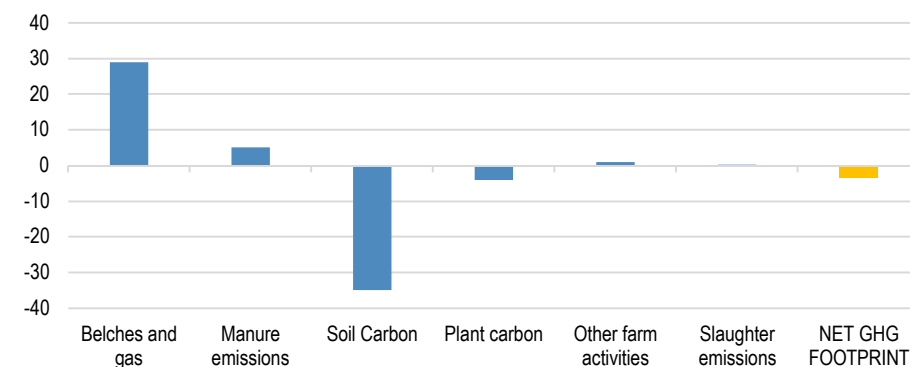


Source: Quantis – General Mills case study (link); all numbers are in kgCO2e/kg of fresh meat

**Figure 32: As a result, WOP beef is less GHG intense than several other protein sources**
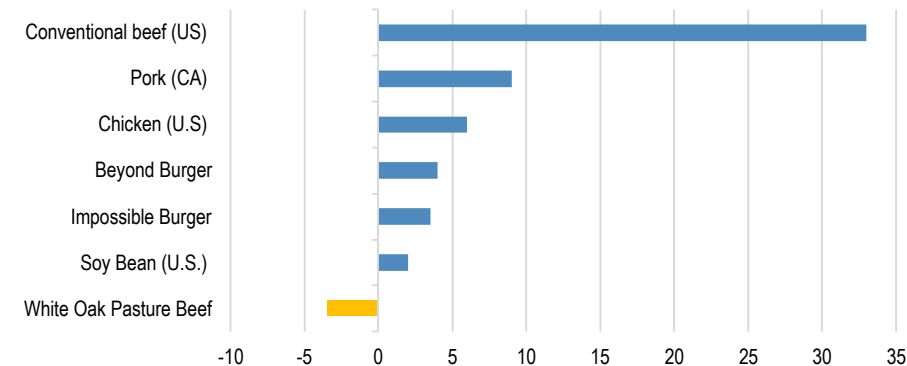


Source: Quantis (link)

These results were obtained with LCA boundaries considering only the carbon footprint of the production, in line with conventional beef LCA. As such, emissions related to Land-use and Land-use-change (i.e. those related to deforestation) would not be taken into account.

**Reflecting on scalability and application to a Brazilian context**

In our view, there is a need to see further academic and independent LCA research on other regenerative agricultural practices, to establish whether this model is scalable, and assess the additional costs it generates (and how this can be passed through to consumers).

Moreover, as "holistic grazing" is based on moving cattle in order to ensure that plants have time to regenerate before taking a second bite, this approach likely requires largest surfaces of land per animal. In a Brazilian context, this raises the questions the necessity to expand the boundaries of the calculation, compared to the ones used by Quantis in the above mentioned study, to include the potential

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destruction of carbon sinks that have occurred to free land for cattle farming. In an academic paper published in a peer reviewed journal ([link](#)) Cederberg et al. (2011) highlighted that omitting emissions linked to LULUCF from food carbon footprint LCA calculation to serious underestimates, particularly for meat. In this paper, the scientists highlight that while Brazilian beef exports have originated mainly from areas outside the LAR (Legal Amazon Region), i.e. not subject to recent deforestation, the increased production for export has been a key driver of the pasture expansion and deforestation in the LAR during the past decade, and this should therefore be reflected in the carbon footprint attributed to beef export.

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# Our toolkit to engage on Deforestation

## Our engagement questionnaire

To mitigate effectively deforestation-driven risks, companies should have robust no-deforestation policies with sufficient granularity to eliminate deforestation from their supply chains. We highlight below a few points that investors should have in mind when looking at the information reported by companies on these issues, in order to facilitate further engagement with the aim to drive positive change.

## 1. Exposure

**1.1. Identify FRC:** Identify the Forest Risk Commodities to which the company is exposed, and identify the significance of this exposure:

**1.1.1.** Significance relative to the company (% of raw materials cost)

**1.1.2.** Significance relative to the market of the raw material considered

**1.2. Locate exposure:** Locate the exposure to the FRC in the company value chain.

## 2. Management

**2.1. Generic commitments**

**2.1.1. GHG specific / climate related commitment:** Deforestation related GHG impact should be integrated into upstream scope 3 GHG reduction commitments. Companies with Scope 3 targets that include supply chain are more likely to manage deforestation related risks.

**2.1.2. Supply-chain sustainability commitments:** If the company is exposed to FRC in its supply-chain, check the scope of the supply-chain related commitments.

**2.2. Deforestation specific commitments**

2.2.1. **Definitions:** The definition of terms like "forests", "deforestation" etc. may vary across companies. We recommend to pay attention to the terms used and seek further details, as this may influence the scope & ambitions of the commitments. In particular, we recommend to pay attention to:

**2.2.1.1. Zero vs. net zero deforestation:** Zero deforestation means no land use change on existing forest. It is different from Net Zero Deforestation which means land use change must be "compensated" (e.g. by replanting of trees elsewhere). This requires to pay particular attention to the related "offset" projects and credits.

**2.2.1.2. Legal vs. illegal deforestation:** Is legal deforestation of primary forests considered acceptable.

**2.2.2. Compliance with a commodity specific market standard:** Progress on deforestation commitments is mostly reported through various certifications (see below). It is important to verify the scope, authenticity and independence of such certifications. Certain certifications (such as RSPO) can deliver labels that certify different levels of assurance.

**2.2.3. Scope of commitments:**

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**2.2.3.1.** Which commodities are considered?

**2.2.3.2.** Does the commitment apply to all geographies in which the company operate?

**2.2.3.3.** To which extent are indirect suppliers considered?

**2.2.4. Timeframe of commitments:** Deforestation policies should be paired with time-bound commitments, i.e. commitments that defines a KPI, a base year, a base year value, a target year, and a target year value.

### 2.3. Performance

2.3.1. **Disclosure on progress:** Deforestation policies should be paired with time-bound commitments and the company should publicly and regularly disclose quantifiable progress towards these commitments. Few metrics that can be used are: proportion of commodities that are traceable, proportion of supplier in compliance and proportion of commodities in compliance.

2.3.2. **Monitoring & remediation:** Companies should monitor and verify supplier compliance with their no-deforestation policy and have protocol in place for suppliers that are not complying with the deforestation policy. The tools used to monitor deforestation should be highly efficient and the data should be accurate.

2.3.3. **Related investments & costs:** In order to help investors gauche the financial materiality of deforestation related risks & risk management, the companies should strive to provide a reporting on their deforestation related actions in a monetary unit. Typically, the additional costs that may be associated with sustainable certifications, investments in monitoring technologies. It would be worth questioning this aspect, and in particular the investment payback and the expected benefits from such policies. Similarly, investments in regenerative agricultural practices should be looked at.

## Certifications and offset schemes – an overview

As corporates and nations ramp up their deforestation commitments, it is important to understand some of the schemes that they may opt to rely on. Indeed, the implementation of deforestation commitments is often presented through the use of various commodity specific certification programs, to which the company pledges to comply. While this report does not pretend to explore all of them in an extensive manner (as each of them would require a dedicated report), we chose to highlight below several of the one we had encountered as we mapped the supply-chain, GHG and deforestation commitments from EMEA Consumers staples companies as part of our "Consumers Double Materiality Mapping".

**Product level certifications:**
The leading certifications used on a product level are:

- **Palm Oil**: the Roundtable on Sustainable Palm Oil (RSPO),

- **Soy bean**: Round Table on Responsible Soybeans (RTRS), Proterra, Amazon Soy Moratorium.

- **Beef**: while we discuss the potential for a "carbon neutral beef" in appendix, we believe that to date there are no existing certifications for "sustainable beef". Yet,

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the EU Taxonomy for Sustainable Activity defines KPIs and thresholds for Livestock.

- **Cocoa, coffee & tea**: UTZ (which merged with the Rainforest Alliance in 2018), and now goes under the new Rainforest Alliance trademark.

- **Forestry & forest products**: Forest Stewardship Council (FSC), and Programme for the Endorsement of Forest Certification (PEFC), Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+)

We note that REDD+ is of specific importance, as REDD+ projects can be linked to forestry "carbon offsets", which can be eligible under several offsets markets (including CORSIA, the offset market for international aviation – see here)

**"Nature Based" Carbon Offsets are likely to grow in significance over the coming years.**

There is an urgent need to prevent further forest losses and in the cases where the damage has already been done, forest landscape restoration can begin to reverse the losses. When implemented appropriately, it helps restore habitats and ecosystems, create jobs and income and is an effective nature-based solution (NBS) to fight climate change (see earlier in this report the carbon capture potential) and biodiversity loss. Afforestation projects can be financed through the use of "offset" credit, such as those issued as part of the REDD+ initiative mentioned above, or other voluntary offset schemes, such as ACR (American Carbon Registry), CAR (Climate Action Reserve), GS (Gold Standard) or the Verified Carbon Standard from Verra.

In An Investor Guide to Negative Emission Technologies and the Importance of Land Use, the PRI outlines how corporates have already started to channel their resources to forest-related NBS projects to decarbonize their value chains to meet their net zero targets. The analysis concludes that in the near term, investors can reap the greatest financial gains from NBS, especially through measures arresting deforestation and promoting re/afforestation.

With no doubt, the offset markets is likely to grow fast in terms of size, and will require to source an increasing number of NBS projects. In a dedicated publication "the bullish case for carbon offsets and why they need to focus on carbon removal" we highlight the momentum behind this growth, and some of the difficulties associated with their accounting. In our view, the governance surrounding the accounting and the monitoring of the GHG and biodiversity benefits associated with an offset credits (and the underlying project) will be key to ensure that investors can trust this certification schemes. In the absence of commonly agreed certification standards, we believe that the reliance on offset credits will remain subject to public criticism, and rightly so, given the risks associated with the misuse of offsets.

In our view, a balanced and fair approach towards offsets – and more specifically those related to NBS - is to recognize that they can represent a significant opportunity to create the economic incentives which are lacking in many geographies, to encourage forest preservation and restoration. Yet, using them in place of direct emissions reductions, in sectors these direct emissions reductions are economically feasible, represents in our view a counter-productive action from a climate mitigation perspective. In our view, one should rather explore the

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opportunities behind creating new demand sources for offsets credits, e.g. by encouraging the use of offsets to "net" the carbon footprint of ESG funds, while keeping explicit and implicit carbon pricing mechanisms in place in high emitting sectors.

## Tracking companies engagement – tools available to investors

There are several global platforms designed to help companies that buy and sell major commodities better understand and trace their impact on forests. These tools can also be useful to investors willing to develop granular deforestation related research projects. Other research platforms are focused on ranking companies & financial institutions based on their exposure to FRC, and their actions to manage associated risks. We list several of them below:

**Tools primarily designed for companies**

- **Global Forest Watch Pro:** A free online app that allows commodity producers and buyers to upload the location of their production and supply areas such as soy farms and palm oil concessions. Consumer goods companies, for example, can then receive such data from suppliers for any commodity anywhere to monitor for signs of forest clearing or fires. GFW Pro also allows companies to easily report and share progress on curbing deforestation and by empowering civil society and local enforcement agencies (about a third of the app's users) to monitor for themselves. The Global Forest Watch (GFW) has multiple other platforms to manage deforestation such as GFW Commodities, Forest Monitoring for Action etc.

- **The Sustainability Consortium Commodity Mapping Tool:** The Sustainability Consortium (TSC)'s Commodity Mapping Tool is designed to help members visualize and communicate the risks present in their product supply chains. The Commodity Mapping Tool helps identify where commodities are produced for different supply chains, what potential issues or risks occur in these commodity producing regions, and how a user can address these issues by utilizing TSC KPIs and working with partners on the ground.

**Tools most useful to investors**

- **TRASE:** TRASE can help companies determine whether they are linked to deforestation through their supply chains. Although Trase data cannot definitively answer whether a company's supply chain has deforestation, it can help identify commodity flows that risk being linked to deforestation.

- **Global Canopy - Forests 500 project:** Data available here. Global Canopy publishes every year its ranking of companies and financial institutions commitments related to forest-risks supply chains. It assesses companies on publicly available information on their commitments to tackle commodity driven deforestation. As a result, it computes a total score over 100, broken down into 1) Overall approach (14/100), Commitment strength (36/100), Reporting and Implementation (34/100), Social Considerations (16/100).

- **Forest Trends –** Supply change Initiative: Run by Forest Trends in collaboration with the WWF and CDP, it represents the world's largest and most comprehensive (865 companies covered) database on company commitments to reducing deforestation related to agricultural commodities. Some of the data available online may however not be up to date.

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- **The CDP "Forest questionnaires"**: acting on behalf of 515 investors representing USD 106tn of AuM, as well as 14 large purchasing companies, CDP forests provides a framework of action for companies to measure and manage forest-related risks and opportunities, report and progresses and commit to proactive action for the restoration. This database is however only available to investors' signatories.

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