TRABAJO FIN DE GRADO

“Environmental impacts of multinational companies in the beef agribusiness sector operating in the Brazilian Amazonia; through the liberalism theory and under the scope of the United Nations SDGs and the Paris Agreement.”

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ABSTRACT

This research study shows, from a liberal perspective, the environmental impacts of multinational companies in the beef sector operating in the Brazilian Amazon. It shows a historic trend of illegal deforestation and how it is done nowadays by major companies that source the meat in Brazil to later export it around the world, making consumers automatically become part of an environmental problem that is enhancing global warming and climate change, and affecting everybody around the world.

It also shows how the biggest meat company in the world -JBS- is doing this, and what are the general industry trends in Brazil. In addition, it relates the issue to the Brazilian government and the international treaties made in the United Nations regarding environmental global conflicts; in particular, the Paris Agreements and Sustainable Development Goals.

KEYWORDS

- Deforestation
- Sustainability
- Liberal International Order
- Cooperation
- Meatpacking
- Cattle ranching
- Agribusiness
- Joint statement
- Biome
- CO2 emissions
- Cattle-laundering
- Term of Adjustment of Conduct (TAC)
- Guide of Animal Transport (GTA)
- Nationally Determined Contribution (NDC)

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0. INTRODUCTION

This study aims to analyze how major multinational agribusiness companies in the beef sector are causing profound environmental impacts in the Brazilian Amazon Forest area and affecting the international community through increasing global warming. This is going to be assessed from the theoretical framework of “liberalism” and international cooperation; specifically, under the scope of international environmental treaties and agreements such as the United Nations’ “Sustainable Development Goals” and the COP21 “Paris Agreement”.

There are different important reasons as to why to study these impacts. Firstly, the Amazon Forest is the biggest rainforest in the world, which means it is of vital importance for the global climate since it is a central element in the “oxygen-recycling system” of the planet’s atmosphere and therefore, key to human existence. Secondly, some leading causes of these impacts come from foreign demand, so it is interesting to see how foreign actors’ behaviors can affect the supply chain of Brazilian food -and its origins- and what possible changes could be made. Thirdly, this is an outstanding topic for the international community as many agreements and discussions have taken place regarding environmental issues at national and international levels; however, the outcomes and results are not enough in many cases. Therefore, there needs to be closer attention to the effectiveness of the United Nations and these cooperative agreements.

The research question of this study is to find out how much damage to the global environment is being caused by the beef industry in Brazil, specifically by the biggest companies in the sector and in terms of deforestation. The objective is also to raise awareness about the reality lived in the Brazilian Amazon and the true impacts of beef demand by actors in other parts of the world, as well as the potential power for change they have. In addition, the study wants to analyze the real effectiveness of UN environmental agreements such as the SDGs and the Paris Agreement.

The methodology used for all of this is descriptive and analytical, by using a wide variety of primary and secondary sources from the internet such as scientific articles, official reports from the United Nations and international environmental NGOs, reports from official Brazilian institutions such as the IPAM -Amazon Environmental Research Institute- or ABIEC -Brazilian Association of Beef Exporters-, annual reports from the analyzed companies, relevant newspaper articles, and other research initiatives related to Amazon deforestation. All of these different sources are put together and compared throughout the paper to contrast the different perspectives and finally draw on some conclusions and recommendations.

1 THEORETICAL AND CONCEPTUAL FRAMEWORK

1.1 LIBERALISM

The theory chosen for this theoretical framework should definitely be “liberalism” as it is one of the most predominant theories in International Relations and it is strongly related to international cooperation and the importance of international organizations in the world order. Given that this research study is targeted at the main environmental agreements nowadays, which are the 2030 Agenda and the Paris Agreement, it makes sense to analyze the project through liberalism and its perception of international cooperation.

Before World War II, the most dominant theory was “realism”, which is based on state power and military threats, with the state as the most important actor in the international arena and little relevance to international organizations as big actors. Realist authors like Machiavelli or Hobbes believe that humans are evil and driven by “fear and insecurity”, as well as in a “constant fight in order to survive”. They think states are “power seekers” that are always defending themselves from foreigners’ attacks and that is why they have such aggressive foreign policies. Lastly, they see cooperation as a failing measure because since states compete against each other, it is easy for a state to betray an ally at any moment for its own benefit (Bermejo, 2020).

However, after World War II, cooperation among states started to increase and important international organizations started to be created -such as the United Nations- and function well, so the realist theory became less relevant while the liberal theory became the dominant one.
Contrary to realism, liberalism thinks human nature is good and cooperative. Liberals believe that states are not the only important actors in the world order, but also individuals and other groups; in fact, liberalism mostly focuses on the “demands of individuals and social groups” (Moravcsik, A., 2012) and the achievement of their personal freedom.

Economic liberalism, for instance, says that people want to grow their benefits, and that is what leads to businesses and economic activity, not just the will to satisfy other people's needs, but also their own needs for profit. Consequently, they believe human nature has a self-interest component (Kurtz, L., 2022).

Derived from this self-interest comes the understanding of states' and companies' behaviors. Some authors like Moravcsik think that states behavior changes according to their "demands for certain international outcomes", so the level of cooperation or international conflict "reflects the nature of state preferences" (Moravcsik, A., 2009); in other words, states act in some way or another depending on their desires, which sounds logical, but is opposite of the realist belief that states' behavior changes just upon external violent threats. The one problem about doing whatever they want is that, on many occasions, the actions and events happening to one country -or one company- can affect the rest of the countries in the world order.

The surge of liberalism after the war was mainly due to the United States' liberal policies and its influence across the globe through the "liberal international order". Extracting from "Bound to Fail: The Rise and Fall of the Liberal International Order" by John J. Mearsheimer (2019), it can be seen that the world order is arguably led by the US nowadays -although China is increasing its power-, since it is the most dominant actor and has a profound influence in the key institutions of the order. This liberal order of highly interdependent nations relies its peaceful coexistence upon different international institutions -economically, militarily, environmentally…- which even though they possess great power, can not actually force states to act against their interests or sovereignty, because international rules that guide them are just based on mutual compromise (Mearsheimer, J., 2019).

Nonetheless, the established peace triggered by the liberal policies and institutions has given very promising results during the last decades in terms of development, cooperation and globalization.

Globalization has had both very positive but also negative outcomes. It has created a large interconnection between nations, which has led to an integration of nations in terms of trade and sharing of cultures, but also produced increased inequalities among nations and people (Amadi, L., 2020) and propagated the conflicts of some states to the rest of the world.

One of the key parts of globalization and also the well-functioning of the liberal international order is trade. Trade is the base of international cooperation and is founded on liberal policies such as trust in allies, will to help less developed nations, or peaceful relations among partners to establish long-lasting agreements. For liberals, “trade is how states and their people interact during times of peace” (McGlinchey, S., 2022).

Trade and globalization are synonyms of cooperation, which is the most relevant part of liberalism to this research project. Cooperation is seen in many aspects of international relations and has various forms. The most important are trade, international law and international democratization.
Trade is a key part of cooperation, and it can cause economic interdependence among nations, which makes them “reluctant to use force against each other” as war is a threat to the good relations of countries (Nejati, M., 2021).

Constant cooperation and adhesion to international law lead to long-term mutual benefits rather than short-term impacts of working alone. Moreover, since there is no international police to enforce these laws, nations and institutions have created a system of “backlash” to stop aggressors from breaking them, such as economic sanctions, military intervention or halted diplomatic relations (Meiser, J., 2018); another effective strategy to stop countries from defecting is better monitoring of their actions by third parties and strong consensus by the international community.

This way of working is perfectly seen under the democratic peace theory, which says that states that share liberal and democratic values are more likely to work together in peace and avoid wars among themselves because they see themselves as legitimate partners that seek similar objectives. A perfect example

is the United Nations, established in 1945 to avoid future global wars and which is seen as a “permanent big table” to “conduct diplomacy” and reduce the need for war (McGlinchey, S., 2022); the UN system is based on democratic peace since every state amounts for one equal vote in the general assembly, regardless of its size or power.

Relating this liberal democratic system to the research topic, it is fundamental to note that the two environmental agreements that are assessed -2030 Agenda and Paris Agreement- are both developed by the United Nations through a democratic process and based on liberal policies and mutual cooperation. Because globalization has expanded economic activity across the world and global warming has consequently increased across the world, it was important to address its causes and consequences to help the people and countries suffering from it and make the liable ones change their conduct or pay the fair price.

However, even though climate change is considered a global security threat, international law on its own is not enough to force the necessary change of behavior by polluting countries, so these kinds of agreements are necessary to solve essential environmental issues, because how states act on their own have impacts on the rest of the world.

For the specific case of the beef industry, how companies act in Brazil and what production policies they carry on regarding deforestation, will have consequences on the global environment and affect every other country. Similarly, the purchasing decisions by the countries buying Brazilian beef will also have effects on the demand and production and thus, affect the global environment in the end. Therefore, and from a liberal view, because states and individuals have freedom of choice, international institutions need to create these cooperative environmental initiatives to protect the undefended countries.

In conclusion, liberalism is the perfect theory for this research as it helps understand and analyze how the different actors involved -mainly countries, organizations, companies and consumers- behave and interact regarding international environmental cooperation -and non-cooperation-.

1.2 INTERNATIONAL AGENDA

2030 Agenda and SDGs

The Preamble of the 2030 Agenda for Sustainable Development (United Nations, 2015) says it is a “plan of action for people, planet and prosperity”, with the main mission being eradicating poverty and realizing human rights in all countries by 2030 with the help and work of all states. The non-legally binding plan is made up of 17 goals and 169 targets that integrate the “three dimensions of sustainable development: economic, social and environmental”. The Agenda was unanimously signed on the 25th of September 2015 by all 193 Member States of the United Nations, which means a historic achievement for international cooperation. It recognized that the governments of those states had the primary responsibility of applying the goals and targets in their policies, and checking on the progress made at the different political and geographical levels during time.

This plan tackles the “root causes of poverty” while also boosting “economic growth, meeting people’s health, education and social needs, and protecting the environment” (Martin, 2018); it all seems like an ideal scenario where everything is positive. However, implementation of the plan requires new ways and mindsets for thinking, acting, consuming and producing; so leaders should not forget the reality of the world and the system, because a project of such dimensions is likely to be difficult when it comes to actually implementing new policies in each of the countries, as the universality of the plans might interfere with the particular problems, habits or situations going on at a local or regional level, and lead to unwanted consequences or conflicts of interests.

The Agenda is ambitious for various reasons as well; for instance, some countries have higher levels of corruption, others have a higher division in public opinion towards certain topics, internal political instability… Several reasons like these may lead to obstacles and disagreements when it comes to implementing the 2030 Agenda and achieving the expected results in time.

The 17 goals focus on a wide range of aspects, such as hunger, health, education, clean water, energy, gender equality, peace… However, for the purpose of this study, the most relevant -as stated in the 2030 Agenda Resolution (United Nations, 2015)- are the following ones:

- Goal 12. “Ensure sustainable consumption and production patterns.”
- Goal 13. “Take urgent action to combat climate change and its impacts.”
- Goal 15. “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”

The reason why these are more relevant is that deforestation and the later unsustainable use of the land for the production of different goods directly affect the environment and lead to a worsening of climate change, as it will be explained throughout this paper.
Each of the general goals has more precise targets within each of them, some relating more than others to the purpose of this research.

Goal 12 (consumption and production) contains different targets that refer to “sustainable management and use of natural resources”, reducing food waste throughout the supply chain, management of chemicals during the production cycle and control of their “release to air, water and soil”, reduction of “waste generation through prevention, reduction, recycling and reuse” … Other targets aim for large transnational companies to develop more sustainable practices, and also for governments to provide “relevant information” for sustainable lifestyles. A final target that also affects this specific study refers to the support needed by developing countries in terms of “scientific and technological capacity” to become more sustainable.

Goal 13 (climate change) is broader and directed to the implementation of policies to combat climate change; capacity for mitigation and/or adaptation to it with a special remark on natural disasters.
An interesting part of this goal is the connection with the United Nations Framework Convention on Climate Change plan of raising $100 billion annually

from developed countries to developing ones so they can have more resources to act; it materializes in the “Green Climate Fund”, which is explained in the “Annex” section at the end of the paper.

Goal 15 is about “conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems”, with a focus on stopping deforestation, preventing desertification, droughts and floods, reducing the “degradation of natural habitats and loss of biodiversity”… Encouraging a “fair and equitable sharing of the benefits arising from the utilization of genetic resources”, promoting biodiversity values and financial resources in government policies to safeguard ecosystems; and finally, financing and incentivizing “sustainable forest management”.

All these specific targets have a relation with the study of deforestation by international companies in Brazil, and although some are more obvious than others, it is important to mention all of them. For example, targets relating to Goal 15 are closely linked to the topic because they refer to deforestation and use of the land themselves. Targets of Goal 13 are connected to the topic because the loss of forest leads to a reduced capacity of CO2 absorption and therefore contributes to global warming and climate change. Finally, targets of Goal 12 are relevant because the reason why companies are cutting forests down is to obtain raw materials like timber and produce goods such as meat or soy, but they do it in an unsustainable way, because to obtain more land and produce more, they burn down old trees that cannot be brought back, and which release big amounts of CO2 in the process.

Paris Agreement

The United Nations Framework Convention on Climate Change (UNFCCC) was created in 1994 with the objective of “preventing “dangerous” human interference with the climate system” (UNFCCC, 2022). This body is formed by 198 Parties, which are the 193 UN Member States plus the two UN Observers -Palestine and the Holy See-, two non-member states -Niue and the Cook Islands- and the

European Union. Since its creation, Parties have met almost every year in what is called “Conference of the Parties” (COP) to discuss about climate change (UNFCCC, 2019).

In COP3 (1997) at Kyoto, Parties created the so-called “Kyoto Protocol”, which focused on the need to reduce greenhouse emissions in developed countries to stop global warming and climate change; it also established the basis for the “carbon market” (Acciona, 2019).

In COP13 (2007) in Bali, the “Bali Road Map” was created, and Parties decided to include developing countries as well in the agreement. In COP15 (2009) in Copenhagen, they decided to set the target of not letting global temperatures go above 2ºC. To finance the goal, the “Green Climate Fund” was created the year after in Cancun (Acciona, 2019).
20 years after negotiations started, the Parties finally agreed -unanimously- on a common goal, limiting global warming to 2ºC maximum above “pre-industrial levels”. This was the Paris Agreement at the COP21 in 2015, the same year the 2030 Agenda was signed (Acciona, 2019).

Parties first need to sign agreements and also ratify them at their national congresses so that they become binding and governments can actually enforce them in their country. Out of the 198 Parties that signed the Paris Agreement, 195 have ratified it as of April 2023, with the latest one being Eritrea two months before (United Nations Treaty Collection, 2015). The only countries missing are Libya, Yemen, and Iran, with the latter accounting for 1,85% of global greenhouse gas (GHG) emissions (Apparicio, S, 2020), most of which come from its energy sector as it is a big producer of oil and gas.

The goal of the Paris Agreement is to limit global warming to a maximum of 2ºC above pre-industrial levels and ideally to not go beyond a +1.5ºC increase, the reason is that the UN Intergovernmental Panel on Climate Change (IPCC) has said that crossing that irreversible tipping point could cause stronger impacts in the global climate such as “more frequent and severe droughts, heatwaves and

rainfall"; but to achieve that limit of global warming, GHG emissions "must peak before 2025 at the latest and decline 43% by 2030" (UNFCCC, n.d.).

The reason why this agreement is so relevant and linked with the deforestation in the Brazilian forests is based on pure science of climate change and therefore, worth mentioning.

Trees act as a sink for carbon dioxide because they store it while doing the photosynthesis and then when they are burnt they "release hundreds of years' worth of stored carbon dioxide -a GHG- into the atmosphere in a matter of hours" (Bennett, L, 2017). Burning -and cutting down- vegetation also means destroying CO2 sinks permanently, which implies a larger accumulation of this gas in the atmosphere and results in a thicker layer of greenhouse gases, which traps more radiation from the sun into the atmosphere and makes global temperatures rise; this increase would cause the melting of the poles and then a rise in sea levels (Twardy, S, 2013). All of that combined would lead to changes in the climate and have consequences such as droughts, floods, hurricanes… and it could also lead to ocean water currents to stop, which would alter the temperature regulating system of the Earth (Buis, A, 2019). This extreme scenario would be a risk for "human life as we know it" and it would occur if average global temperatures rose more than 2ºC above pre-industrial levels, as IPCC reports state (Fendt, L, 2021). Nevertheless, the world can still prevent this from happening if countries take the necessary actions.

Within the Paris Agreement, some articles are more relevant to this research study than others.

Article 5 "encourages Parties to conserve sinks of GHGs" such as forests (UNFCCC, 2022).

Articles 9, 10 and 11 refer to how developed countries should support developing ones in terms of "finance, technology and capacity-building" so they can prepare climate mitigation and adaptation strategies for their future (UNFCCC, 2022).

Article 14 is about the "Global Stocktake", a system for "taking stock" of the progress made by countries and assess how well they are doing towards achieving their goals and how they can improve. This information is compiled for

two years and analyzed every five; the first Stocktake started in Glasgow at COP26 (2021) and will conclude in Dubai at the end of 2023 at COP28 (Owen-Burge, C., 2022).

Article 4 is probably the most important of all, since it sets the real basis of action for each country. This article establishes “binding commitments” by which Parties must create “Nationally Determined Contributions” (NDCs) where they set how exactly they are going to work and towards what specific domestic objectives. The functioning of the NDCs is based on five-year cycles, starting in 2020. In each cycle they must review the strategies they had set for themselves and come up with an updated version for the next cycle that, ideally, has more demanding goals as possible (UNFCCC, 2023). These updated versions should show more ambitious goals and symbolize a progression in time, but this does not necessarily need to be a positive progression. In addition, these versions can be adjusted at any time if needed (UNFCCC, 2023).

Green Climate Fund

The GCF is a financial instrument related to both the SDG and the Paris Agreement that serves as a relevant example to show the “inefficacy” of international environmental agreements. “Figure 1” shows how the target of collecting $100 billion annually to invest in developing countries’ sustainable strategies has kept failing throughout the years.
The GCF and its failure are analyzed in the “Annex” section more deeply.

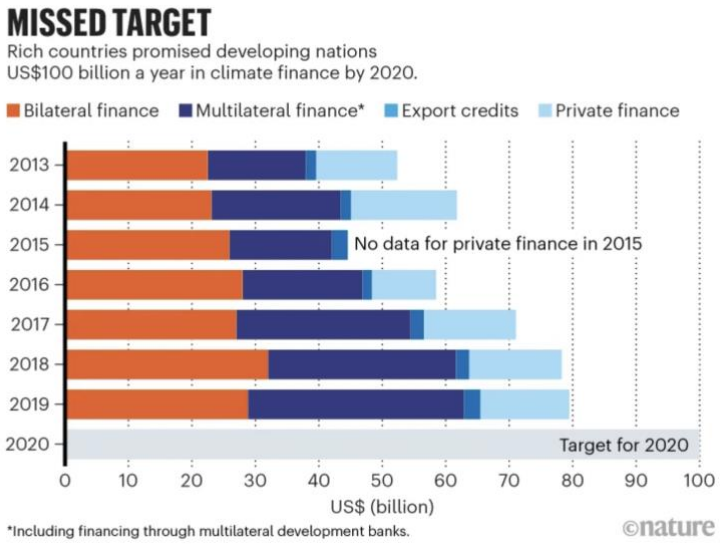


Figure 1: Sources of GCF funds between 2013 and 2020. Nature.
https://doi.org/10.1038/d41586-021-02846-3

International Law

The 2030 Agenda and the Paris Agreement are arguably the two most important climate agreements in recent history, and they are closely interconnected by some aspects such as having their origin in the same year, coming from the UN, sharing resources such as the Green Climate Fund… And now that they have been explained, the specifics about international law should be clarified as of which one is legally binding or not.

Firstly, 2030 Agenda and SDGs are not legally binding, so countries are not required by law to enforce the agreed terms. However, after ratification they are expected to implement a "national framework for achieving the 17 Goals" and track its progress (United Nations, 2018).

On the other side, the Paris Agreement is legally binding (UNFCCC, 2022) but in a quite soft way.

Countries decide for themselves what they include in their NDCs and then they send periodic reports of the progress made. They can set stronger or easier NDCs and the main driver on this decision is people's and other government's

pressure to establish high ones as climate change is a growing concern for many (Tso, K., 2021).

They can change their NDC at any time and they are encouraged to do it in a more demanding way, but this is not legally required -Article 4.11- as long as one NDC is in place -Article 2- (C2ES, 2017).
Moreover, the Agreement can be considered soft because it would not be considered “self-executing” by a court since legislation needs to be implemented in the country’s domestic law to enforce its measures, which means that congresses first need to make changes to their countries’ laws to be able to comply with the terms of the agreement, so after a country signs it, it does not automatically become enforceable.
But even if a court saw it as “self-executing”, the Agreement itself does not actually oblige a Party to achieve its NDC so in the legal sense its requirements and compliance measures are a bit loose (C2ES, 2017).

Furthermore, the actual consequence of failing to reach the NDC goal is a “meeting with a global committee of neutral researchers” to “work with struggling members to create new plans” (Tso, K., 2021), so even though the Paris Agreement is “legally binding”, the “punishment” for not complying with it is not a huge deal further away than damage of public opinion.

Current Climate Situation

It is a shared belief that the wide flexibility of the Agreement -and the Agenda- is one of the main reasons why almost every nation signed and endorsed it (Tso, K., 2021).
However, it is this very flexibility what makes governments not feel so pressured to achieve their deadlines, given that consequences of non-compliance are so soft and other priorities might go before environmental ones. Therefore, in addition to not raising enough funds for the GCF, countries are also polluting and emitting more than they should.

The United Nations Environmental Programme releases an “Emissions Gap Report” every year where they highlight the situation and the differences between where we are and where we should be to reach the target of “limiting global warming to well below 2°C”. Its findings on the latest report, October 2022, show that we are on a pathway for a “2.8°C rise by the end of the century” and that we would need an “urgent system-wide transformation” requiring emissions cuts of at least 30% in order to achieve our objectives (UNEP, 2022).

To understand how this is happening, attention should be drawn to the biggest emitters, which are China, the United States, the European Union and India. These four together “account for more than half of historical emissions of planet-warming gases” (Popovich, N., 2021).

The big emitters still have a very large room for improvement. The richer countries have historically been responsible for much more emissions per capita than the rest of the countries. In fact, the top five emitting countries -the US, China, Russia, Brazil and India- “have collectively caused US$6 trillion in income losses from warming since 1990”, which is around 11% of annual world GDP (Callahan, C. W., & Mankin, J. S., 2022). The problem is that while the rich countries are causing the problem and benefiting from it, low-income countries are the biggest sufferers because they tend to be located in areas where atmospheric disasters and temperature changes are more noticeable and also because they have fewer resources to overcome those situations. Plus, it is very difficult to attribute the responsibility to individual actors since it is hard to prove that emissions from one specific company have caused a specific change in temperatures in another place and that has turned into economic losses… Therefore, liability claims get complicated to make (Callahan, C. W., & Mankin, J. S., 2022). But even if this was possible, it has been seen that real legal requirements are too soft for polluting countries to truly bother.

All of these leads to a moral dilemma of responsibility -or blame- of who has done what and why should some pay the consequences of the others’ acts. Why should poor countries pay the price of wealth-generating activities of the rich. Why do they have to suffer from natural disasters induced by the others.

And seeing it from the other side, why should high-income countries have to stop their normal development and economic activities to try to help people in the other part of the world while they will not see any benefit for their country or citizens. In the end, it comes down to an “unfair” dilemma between morals and economics. And people “cannot buy food with morals”.

2. CASE STUDY

2.1 DEFORESTATION IN BRAZIL

To begin the case study section of this research study, a small introduction should be given about Brazil.
Firstly, Brazil is the 5th largest country by area in the world with a population of 214 million, making it the 6th largest populated country, with 87% of the population living in urban areas. The unemployment rate is 13.3% and the GDP growth was 4.6% in 2021 (World Bank, 2021); inflation has decreased in 2023 to its lowest point in two years, at 4.65% (Reuters, 2023).

The Covid-19 pandemic hit Brazil really hard, increasing its poverty rate up to 29.4% in 2021 (IBGE, 2022) and leaving more than 700.000 people dead -second largest in the world- (WHO, 2023) and although it has “challenges of low growth, high debt, and inequalities”, its economy has been doing better than expected lately (IMF, 2021).

While 70% of its economy is in the service sector, Brazil is considered one of the “global giants of mining, agriculture and manufacturing” (Delivorias, A., 2022), with its biggest exports being iron ore -16%- and soybeans -13.5%- and its main destination being China -30.6%- (OEC, 2021); and although agriculture is not the biggest part of its economy, it is the biggest greenhouse emitter sector, as seen in “Figure 2”. Lastly, it is key to say that 59% of its land is covered by forest, although “from 2000 to 2020, it experienced a net change of -5.9% in tree cover” (Global Forest Watch, 2021) due to deforestation for agriculture and cattle-raising purposes, as it will be seen throughout the paper.

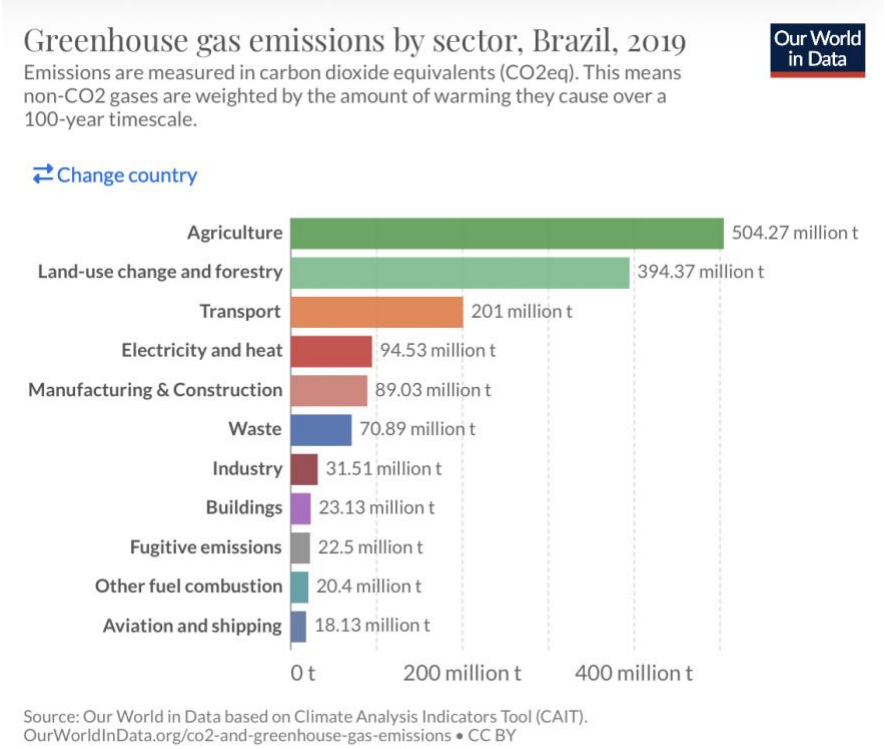


Figure 2: Greenhouse gas emissions by sector, Brazil, 2019. Our World in Data. *https://ourworldindata.org/co2/country/brazil*

Deforestation

Environmental impacts are “changes in the natural environment resulting from activities that may have adverse effects on the air, land, water, fish, and wildlife or the inhabitants of the ecosystem” (Abdallah, T., 2017); these changes usually involve short and long term consequences that damage people’s and wildlife’s health. Examples of environmental impacts are: air pollution, land pollution, global warming, deforestation, biodiversity loss, ecosystem damage, water pollution, floods, droughts… Some impacts are direct and others are indirect because they are a consequence of the first impact (EU Commission, 1999), for instance, dumping waste into the river would have the direct impact on water pollution and the indirect impact on biodiversity loss. There are a few occasions where these environmental impacts could be positive, such as global warming providing better temperatures and enabling new crop harvesting, but these kinds of “benefits” are rather considered adaptation strategies. Environmental impacts

are mostly negative because anything that involves “destroying nature” translates into “destroying life”.

One of the most important and arguably the biggest direct environmental impacts in South America, and especially in Brazil, is deforestation (Carvalho, K., 2023), as it causes many other indirect impacts that affect local, national, and even international communities; indirect impacts are greenhouse gases emissions, global warming, soil degradation, air pollution, disrupted water cycles… Also, deforestation has tremendous long-term effects because it is very costly to repair in terms of time, as growing a forest might take decades or even centuries; Sustainable Development Goal 15 is all about this.

The biggest drivers of deforestation are unsustainable agriculture, cattle ranching, logging, oil companies, mining and dam building (Rainforest Concern, 2023), both by legal and illegal techniques, sometimes overlooked by the government. Deforestation in Brazil occurs in many of its states, but the affected areas are mostly near the Cerrado forest and more importantly, near the Amazon rainforest, where this study is focused.

The Amazon is the biggest rainforest in the world, “covering 40% of the South American continent” and having a biodiversity of around “three million species of plants and animals” (Robinson, D., 2022). Brazil accounts for 40% of Tropical Forest Deforestation in the world, with one-third of the global annual tropical deforestation occurring in the Amazon rainforest -most of the rainforests in the world lie within the tropics-, an average of 1.5 million hectares yearly (Ritchie, H., 2021).

This deforestation of natural and wild areas was originated in the 1970s when the government tried to relocate poor people in the forest, by building a road -the Trans-Amazonian Highway- that allowed access to remoter areas and with the hope that it would eventually bring more food and money to the cities; however, the construction of the road was unstable due to materials used and the sediments’ based land that would flood very often, so the project was a failure at the time (Patowary, K., 2014). Nonetheless, it was the building of these kind of

roads that gave people access to new areas to exploit, even nowadays, when “loggers, goldminers, and unauthorized land settlements” keep using them. It is estimated that “86% of the extent of these roads is unofficial” and that “41% of the Amazon Rainforest is already cut by roads or lies within 10 km of one” (Savoldi, A., 2022), which means that many untouched areas have gained accessibility. More recently, these kind of roads have been paved or improved and it has resulted in an increased deforestation of areas near the roads. Primary forest loss -old natural forests that have never been touched- has been intensified with up to 25% increases from 2020 to 2021 and the hotspots where it is happening suppose “large-scale clearings” (Weisse, M. (2021).

As seen in the chart below, Brazil was the country that lost more primary forest in 2021:

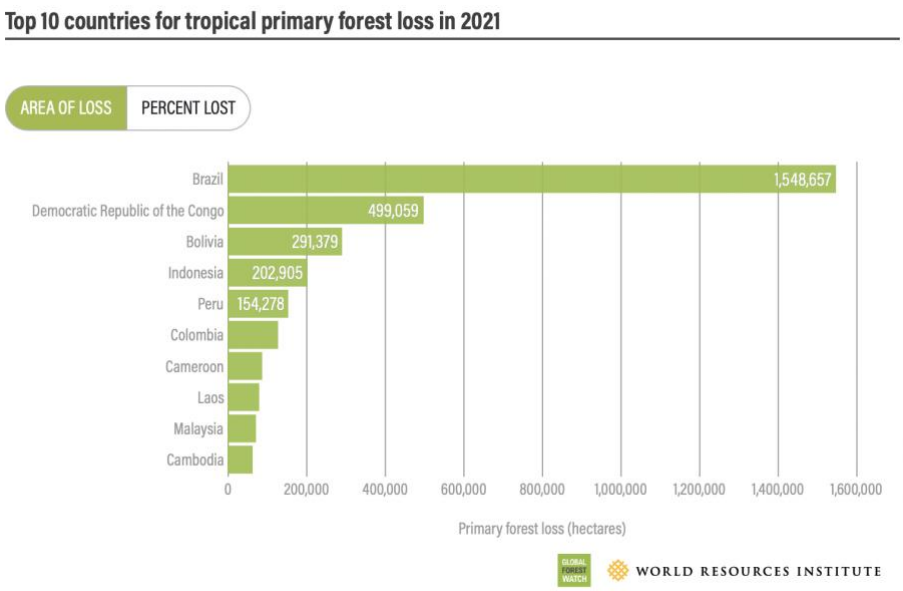
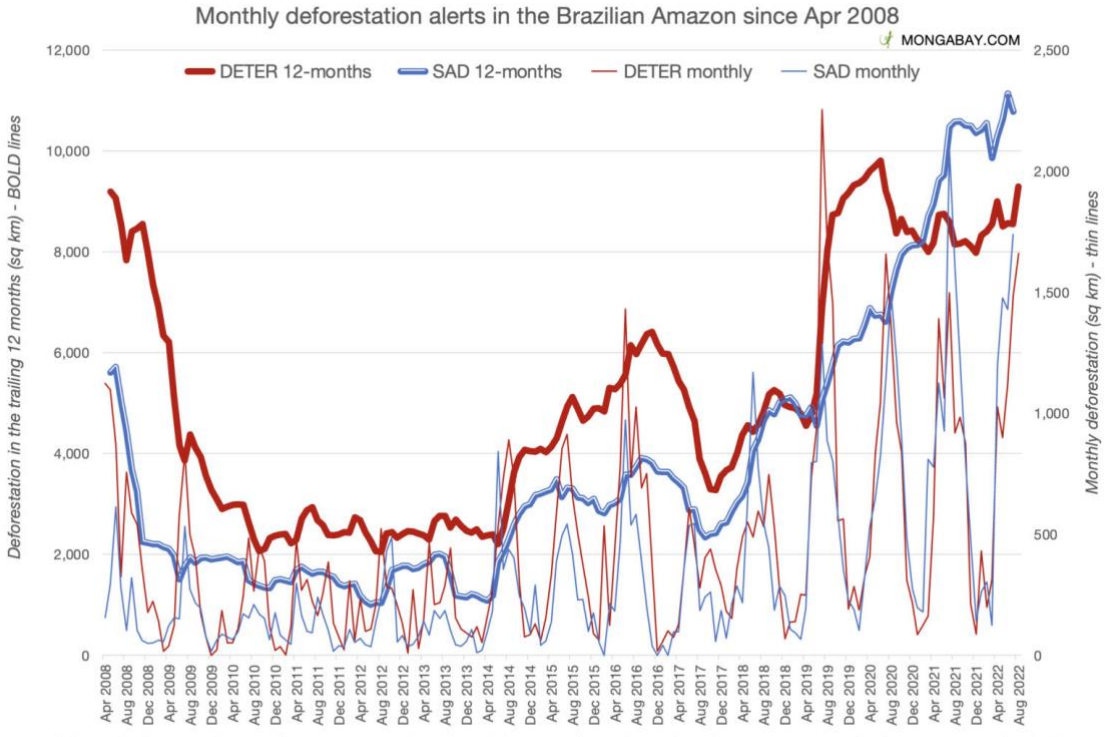


Figure 3: Top 10 countries for tropical primary forest loss in 2021. World Resources Institute
https://research.wri.org/gfr/latest-analysis-deforestation-trends?utm_campaign=treecoverloss2021&utm_medium=bitly&utm_source=PressKit

Most of these forests belong to conservation zones and also to the public domain, in fact, according to the IPAM -Instituto de Pesquisa Ambiental da Amazônia- 75% of the deforested land in the Amazon is public land (IPAM, 2021).

According to the Brazil's National Institute for Space Research (INPE), 17% of the Amazon land has been deforested just in the last 40 years (INPE, 2023). These occur because people illegally occupy and destroy forests to use the land for economic purposes such as cattle ranching or agriculture.

The way they normally clear out forests is by making huge fires and burning down the trees, which means a very fast release of huge amounts of carbon dioxide into the atmosphere. In August 2022, the INPE documented record fire hotspots, 33,116, despite "an official ban on fires by the federal government"; it was an 18% increase compared to the previous year (Greenpeace, 2022). The graph below shows the 2022 record high for deforestation alerts in the previous 15 years, most of them due to human activity or human caused.



Monthly and 12-month- moving average data for deforestation alert data from Imazon's SAD system and INPE's DETER system. Imazon is a Brazilian NGO that independently tracks deforestation in the Amazon.

Figure 4: Monthly deforestation alerts in the Brazilian Amazon since April 2008. Mongabay.
https://news.mongabay.com/2022/09/amazon-deforestation-in-brazil-booms-in-august/

Until very recently, tropical forests were considered sinks for carbon dioxide, but “changes in temperature and precipitation patterns may create severe environment alterations for vegetation that can turn them into carbon sources” (WMO, 2021). One study showed that the possible benefits from deforestation, such as forest growth from planting new crops, actually meant a 69% balance loss against the carbon density reduction from deforestation; which translates into rainforests becoming net carbon sources, instead of sinks. In other words, deforestation not only makes forests stop absorbing CO2, but it also makes them become carbon emitters and therefore cause damage to the environment (Baccini, A. et al., 2017).

Going more in-depth into the drivers or causes of this massive deforestation, there are two reasons that stand out probably more than the others in the international domain, which are cattle ranching and agriculture. These two drivers are closely related to multinational companies because a good amount of the food produced is dedicated to export markets and since the destinations are widely spread around the globe and they are products people consume on a daily basis, it has greater importance than other drivers like logging for timber. Also, deforestation has increased due to a higher demand for these products, which means that people around the world are indirectly responsible in some sense for this ecological disaster; in addition, of course, to companies doing it and governments allowing it.

The global food system, some studies have shown, “is responsible for up to one-third of all human-caused greenhouse gas emissions” (Gilbert, N., 2012). Others, like the one on “Figure 5”, suggest it a smaller percentage -26%-; this one divides that result into different categories, being “livestock and fisheries” 31%, “crop production” 27% -which is mostly about the use of fertilizers and its GHG emissions-, or “land use” 24% -which basically refers to deforestation- (Ritchie, H., 2019). The latter percentage would translate into 6% of total emissions, however, other reports from “Climate Funds Update” indicate that it would be between 12 and 20% of global GHG emissions (Watson, C., & Schalatek, L., 2020).

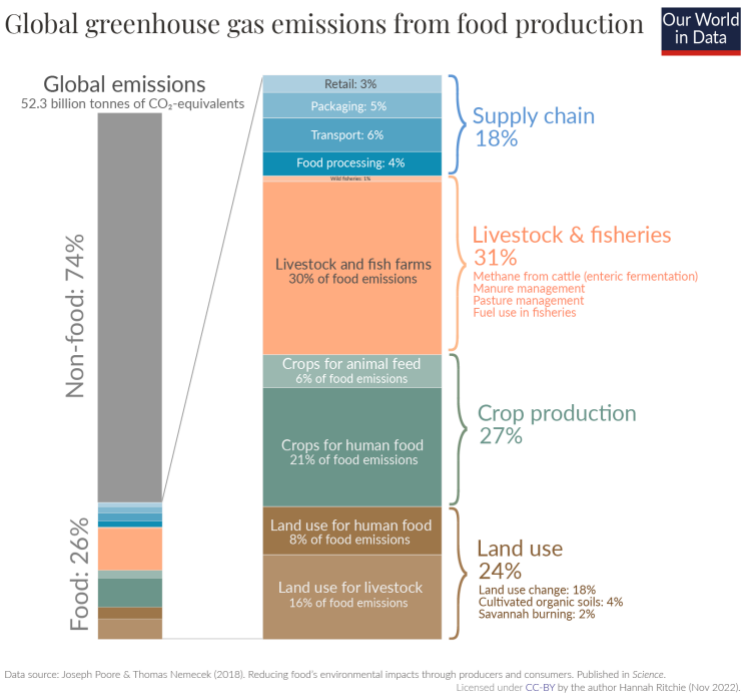


Figure 5: Global greenhouse gas emissions from food production. Our World in Data. https://ourworldindata.org/food-ghg-emissions

Regarding cattle ranching, it is estimated that 80% of the deforested land for meat production purposes every year, happens in the Amazon, with the biggest buyers being the US and China (Lai, O., 2021). “60% of the world’s agricultural area is dedicated to cattle ranching, although it only makes up 24% of global meat consumption” (Mulhern, O., 2020). While other food alternatives like vegetarian options would mean a more efficient use of the land and water, because agriculture consumes huge amounts of freshwater -three quarters of the world’s supply- (United Nations, 2019) and therefore they suppose an incredible waste of water in relation to the amount of product made.

According to the US Department of Agriculture, in 2018, Brazil was the largest exporter of beef in the world, reaching almost 20% of the global supply. The top two destinations for Brazil’s beef were China and Hong Kong, which amounted to 44% of the total shipments (Zia, M., et al, 2019). However, according to the last report from the Brazilian Beef Exporters Association, in 2022 more than 60% of the beef exports went just to China, as shown in “Figure 6” as well. The report also said that 25% of the beef produced -9.7 million tonnes CWE (carcass weight

equivalent)- in Brazil was for exports and the rest was for the domestic market (ABIEC, 2023).

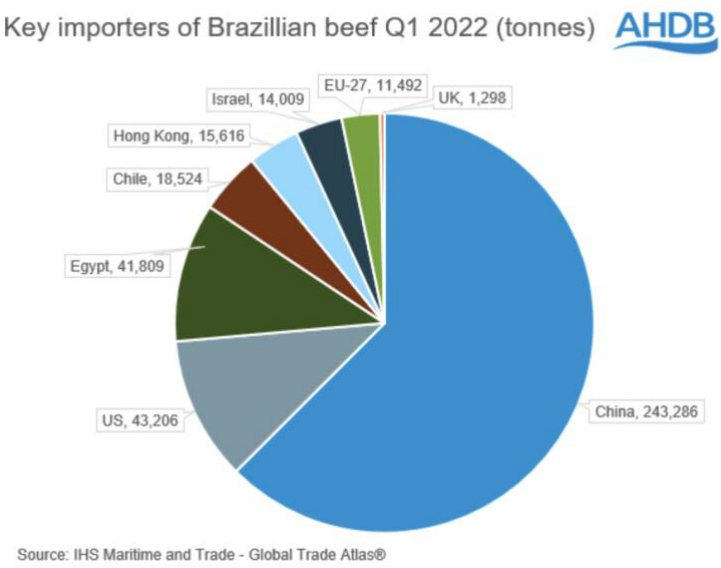


Figure 6: Key importers of Brazilian beef Q1 2022. Agriculture and Horticulture Development Board.
https://ahdb.org.uk/news/brazilian-beef-production-increases-as-exports-continue-to-flourish

2.2 BEEF INDUSTRY AND MAJOR PLAYERS

According to Nepstad, D., et al (2008), an approximate 75% of Brazilian deforestation is due to the beef industry.

It is a widely agreed fact that deforestation in Brazil is mainly caused by agriculture, primarily driven by the beef industry and then followed by soy plantations; however, sometimes it is not easy to make a distinction between these two types when it comes to aggregated macro data as both industries are very interlinked (Prager, A., 2019).

One of the reasons is the lack of common land databases or registries between the different states and agencies related to agriculture and the environment, because some of them use different categorization criteria and when they are compared -if access is allowed- it can be difficult to distinguish between land uses. Another reason for this link lies within the common illegal techniques of business owners in the fields. In Portuguese it is called “grilagem”, which means land grabbing, and refers to the old practice of “artificially aging documents in drawers to get hold of public areas” (PlenaMata, 2023). Nowadays it is done in more modern ways by creating false registries in corrupt government offices, and today it is one of the pillars that support the “grilagem” and illegal deforestation systems. The whole problem is very well explained in detail in a 2022 German documentary by “DW Documentary” called “The Amazon in Danger”. They show and explain how land grabbers go after land spaces that have not been designated either as conservation or indigenous land so they remain as general public land without any of the special protections that those two types of land would have. In order to appropriate the land, grabbers go and deforest it -either by cutting down or just burning the trees-, they fence it and use it for pasture, they create some fake registry papers and some years later they sell it at a higher price for new pasture or more profitable uses like soy plantations (DW Documentary, 2022).

A more recent study has shown that in 2020 there were 50 million hectares of undesignated public forests (UPF) in the “Brazilian Amazon with no tenure status”

so they become the “target for land grabbing and speculation”. Of those 50 million, 5% had already been deforested by 2018 – emitting 1.2 billion tons of CO2- and 23% had “been illegally registered as “private property”” in the Brazilian Environmental Rural Registry (CAR); with 70% more deforestation in federal UPF than state UPF (Azevedo-Ramos, C., et al, 2020). The fact that so much land is exploited but officially unregistered or has fake registries makes deforestation tracking even harder.

Another study by the University of Maryland found that between 2000 and 2014, Brazil’s cropland almost doubled “mainly because of the repurposing of pastures (80% of new cropland) rather than conversion of natural vegetation (20%)”, which shows that land grabbers first use the land for cattle and later use it or sell it for plantations such as “as soybean, sugarcane, cotton, or corn” (Zalles, V., et al., 2019). The reason is that new pastures take “around seven years to be profitable” and some crops like soy “yields much higher profits from a piece of land than cattle ever can” so the land becomes object of speculation (Prager, A., 2019).

According to Piotrowski, M. (2019), the “farming sector accounts for more than 7% of the country’s GDP and almost one third of agribusiness GDP”. In the Amazon biome, 80% of deforestation is related to this industry, and around 40% of all Brazilian herd is located there.

Figure 7: Biomes of Brazil. Environmental Research Letters. 2022. *https://iopscience.iop.org/article/10.1088/1748-9326/ac8ab2*

In Brazil, there are several areas badly affected by deforestation, but the most prominent ones are the states near the Amazon biome (green area on the map above) and the Cerrado biome (light yellow). The most common state for cattle ranching is Mato Grosso, where the two biomes collide, but there are other big producer states too, such as Para, Rodonia, Goias, Minas Gerais or Mato Grosso do Sul. States that produce a lot coincide with states that have high deforestation exposure, as shown below in “Figure 8”, and municipalities that are big producers, also coincide with municipalities with high deforestation exposure, as shown in “Figure 9” and “Figure 10”, although it does not actually seem to be a coincidence at all.

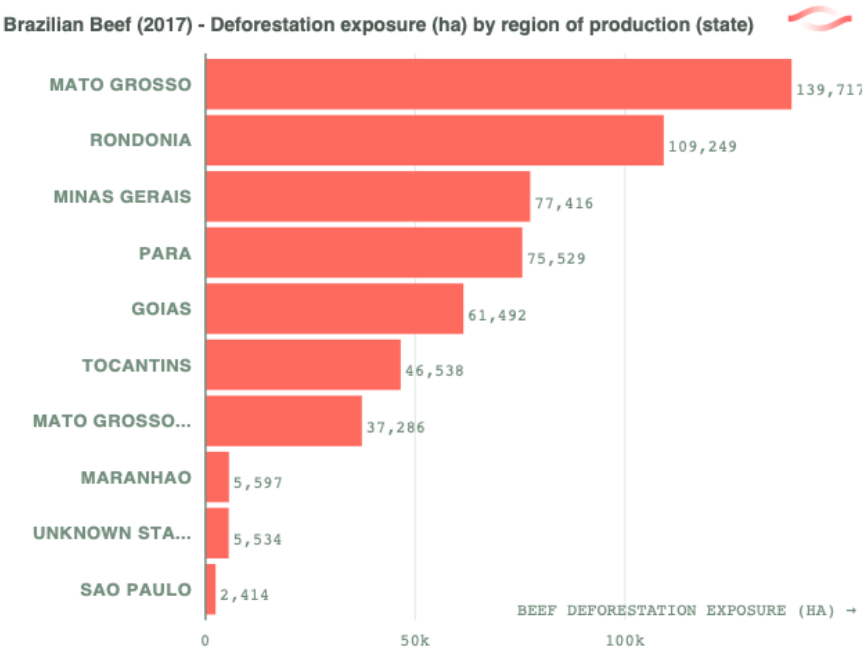


Figure 8: Deforestation exposure by region of beef production. Trase, 2017. *https://explore.trase.earth/explore/brazil/beef/commodity_deforestation_total_exposure?includes_domestic=false&year=2017&region_type=STATE&region_level=3*

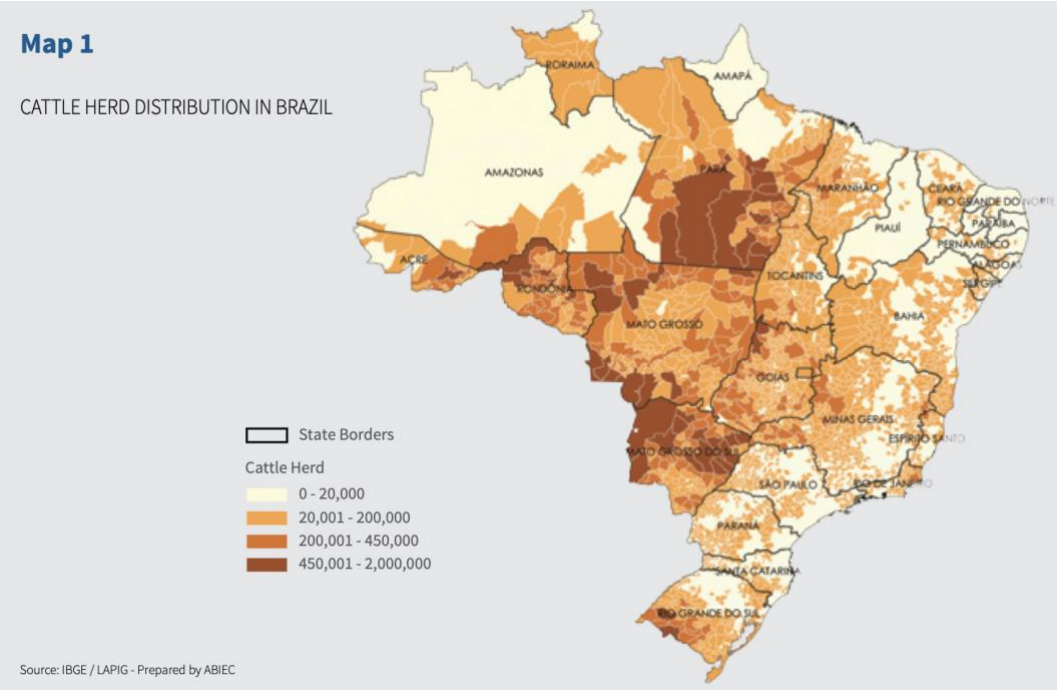


Figure 9: Cattle herd distribution in Brazil. ABIEC 2017. *http://www.newsprime.com.br/img/upload2/sumario-ingles-010217.pdf*

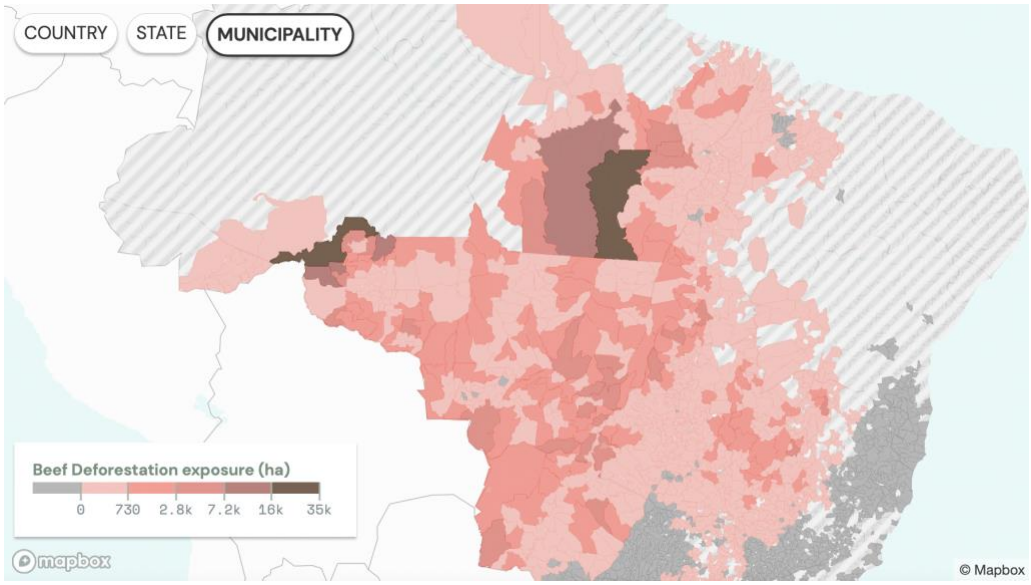


Figure 10: Deforestation exposure by municipalities of beef production. Trase, 2017. *https://explore.trase.earth/explore/brazil/beef/commodity_deforestation_total_exposure?includes_domestic=false&year=2017&region_type=STATE&region_level=3*

When the two maps above are compared, it seems that there is a connection between municipalities that produce a lot of beef and some with high deforestation risk. The state of Mato Grosso is the biggest beef producer, but as it is divided into many small municipalities, “Figure 9” makes it look less relevant because the numbers get diluted, while the state of Para -that produces almost four times less in total- has some big municipalities like Sao Felix do Xingu (dark one in the middle), where the density of production per square km is actually smaller. Nevertheless, the state of Para is still a key player in both the beef industry and deforestation, and that specific municipality is well-known for its cattle because they “outnumber people almost 20-to-1” (Brice, J.,2022), which is a result of the huge land speculation -the consequent deforestation- and the illegal beef dealing going on.

As mentioned in the previous section, just around 25% of the total beef produced in Brazil is dedicated to the export market (2021). This figure has been increasing throughout the years, as in 2016 exports accounted for 20% of total production

(ABIEC, 2017). This figure is also divided into three categories of beef exports: “In Natura”, “Processed”, and “Offals and others”. Most of the exports are in the “In Natura” category -around 80%- and depending on the category, the country destinations vary a lot. As a general rule, the biggest buyer of “Offals” is Hong Kong, the biggest buyers of “Processed” are the US and the European Union, but for the big “In Natura”, the case is trickier.

The top buyer position is contested between China and Hong Kong, depending on the source and mostly, on the year. For instance, the 2017 ABIEC report had Hong Kong as the top 1 with 16% and China was third with a 15%; but the 2022 ABIEC report had China in the top 1 with a 64% -massive increase- and Hong Kong as second with 12%. Truth is that in the last years there have been some irregularities regarding Brazilian beef sanitary inspections and China has imposed restrictions on the product, which has led to reduced exports to the country and therefore, other countries like Hong Kong have been the major buyers during some times.

In 2017, the so-called “Operation Weak Flesh” was launched and accused more than 30 companies -JBS included- of “unhygienic practices”, as well as mixing the meat with chemicals to “mask the aspect” and even mixing it with materials like cardboard paper. Bribe money was paid to the government coalition as well; and JBS shares fell 10% as a consequence (BBC, 2017).
In 2021, two cases of mad-cow disease in Brazil led to a Chinese ban on Brazilian beef that lasted three months (Al-Jazeera, 2021).

Recently in February 2023, another case of mad-cow led to China banning beef imports again, however, it only took a month until they lifted it. This rapid reaction was made a week before President Lula visited the country, but it also shows that China is somehow dependent on Brazilian beef imports, as it is its biggest supplier by far (Freitas, T, 2023).
Although in the first two months of 2023, Brazil exported 37% more in natura beef than in 2021 (Cepea, 2023), it is true that when China imposes these -frequent- restrictions, beef values in the domestic market decrease, which confirms that China plays a relevant role in the Brazilian cattle sector.

Term of Adjustment of Conduct (TAC)

Moving forward to some specific measures taken in Brazil to reduce deforestation, Terms of Adjustment of Conduct (TACs) must be explained, as this is arguably the most important strategy going on.
To fully understand these agreements between companies and the government, there are three reports on beef and deforestation from non-profit organizations that are of great help: 2021 Imaflora plus Beef on Track, in partnership with the Public Federal Ministry (MPF) and the UK Government (Garcia-Drigo et al, 2021). 2017 Imazon plus Instituto Centro de Vida (Barreto et al, 2017). 2020 Amigos da Terra (Armelin, M., et al, 2020).

To give some context, between 2000 and 2005, the amount of head of cattle in the Amazon biome went from 42 to 74 million -36% of the national total- and that number increased to 89 million by 2019; in other words, the industry was experiencing a massive boom in the early 2000s.

Since 2009, the three biggest exporters in Brazil have been JBS, Marfrig and Minerva. Barreto et al. (2017) made a list of the 157 slaughterhouses in the Amazon -only 128 are active- and they are owned by 99 companies. 21 units belong just to JBS, and they can "directly or indirectly influence 390,000 farms", which is 93% of the total (Garcia-Drigo et al, 2021). On that year, "the Federal Public Prosecution Service (MPF) and the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama) sued meat-packing plants in the state of Pará" (Barreto et al, 2017) because they were working with illegal ranches that had been embargoed for deforestation; the MPF also threatened supermarkets that were working with those companies.

These companies -JBS, Marfrig and Minerva- also signed Terms of Adjustment of Conduct (TAC) with the MPF. These agreements are "legal commitments that, if not followed, authorize the MPF to carry out sanctions without the need for court intervention" (Barreto et al, 2017). They require companies to buy from direct suppliers -the fattening farms- that are free of deforestation after 2009, not

embargoed by the IBAMA, not overlapping conservation units or indigenous lands -shown in green and yellow in the map below-, not related to slave workers, and registered in the “Rural Environmental Registry” (CAR). These first TACs were signed in the state of Para, but later expanded to other states in the Amazon (Armelin, M., et al., 2020).

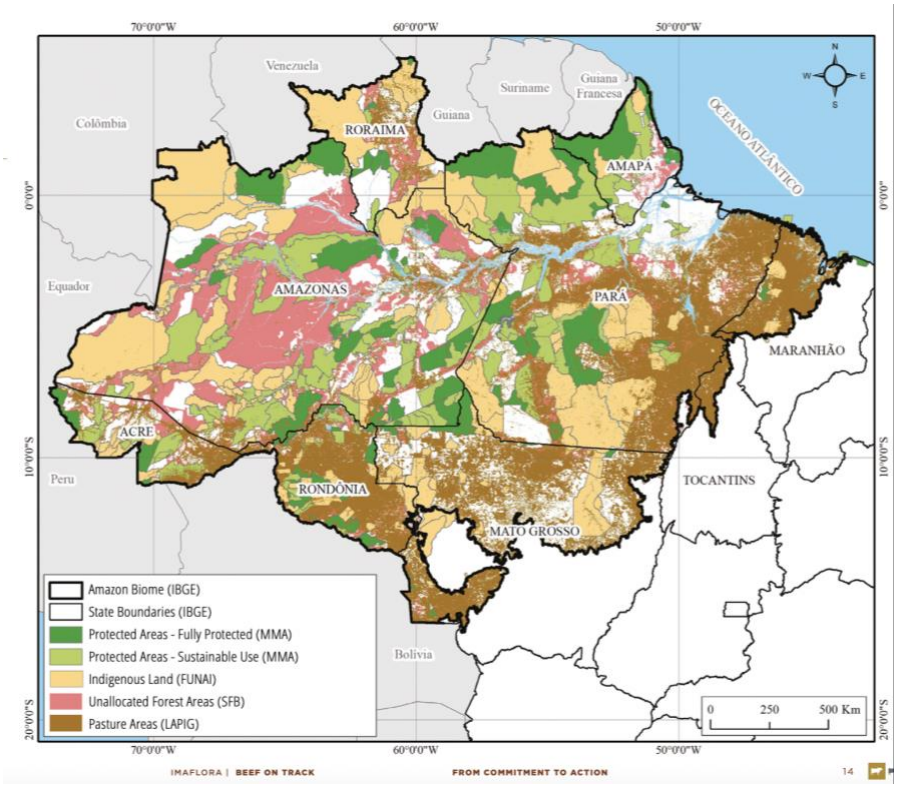


Figure 11: Types of land in the Amazon biome. Imaflora. 2021
https://www.beefontrack.org/wp-content/uploads/2022/10/LIVRO-BOI-NA-LINHA-From-commitment-to-action-14x21cm-INGLES_V4-WEB.pdf

To fully understand TAC, it is important to first understand the proper dealing and transferring of cattle. Firstly, cattle are more expensive to trade when the animals are heavy -500 kg- so they are normally moved from one farm to another when they are still young and light -150 kg- and therefore, the breeding normally takes places in specialized ranches in more remote regions, while the regions closer to the slaughterhouses are more specialized in fattening them (Veiga et al., 2004). The life cycle of cattle can take place in several different locations, as shown in “Figure 12”, and this makes it harder for investigators to find out where each

animal is really coming from and thus, if any of the places of origin have been deforested (Garcia-Drigo et al, 2021).

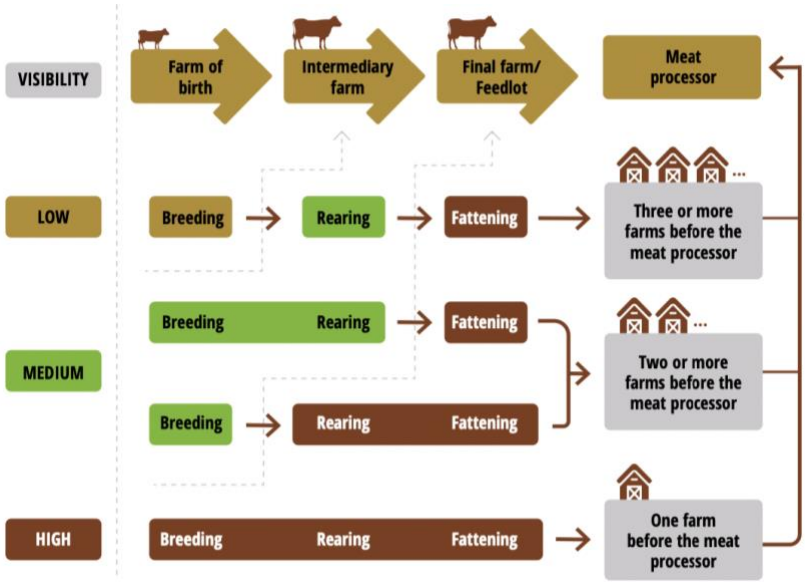


Figure 12: Complexity of the bovine chain. Beef on Track + Imaflora. 2021 https://www.beefontrack.org/wp-content/uploads/2022/10/LIVRO-BOI-NA-LINHA-From-commitment-to-action-14x21cm-INGLES_V4-WEB.pdf

The more locations involved, the more complex it gets to follow the path to the origins of the cattle; this is a huge problem because most of the buyers only verify their direct suppliers -as that is what the TAC requires-, but not the suppliers of their suppliers, so the whole strategy might become pointless.

This mobility of cattle requires an “Animal Transport Permit” (GTA), which is a confidential sanitary regulation document that proves the animal is healthy, however, it is not very useful for tracking purposes because the beef processor is only requires the GTA of the last supplier. Furthermore, this document is often used for “cattle laundering”, which occurs when a supplier’s land has been embargoed by the environmental agencies and uses the “clean” GTA from another farm in order to sell their cattle in a legal way (Garcia-Drigo et al, 2021).

This kind of techniques are possible because the different agencies, registries and state governments have different databases that are unconnected to each

other, so it is easier for suppliers to evade accurate tracking by using documents from other confidential registries; with the help of corrupt public managers. The Ministry of Agriculture has other systems for identification, but they only apply to exporting producers and do not have information about the animal's origin (Almeida, 2019) so traceability is still one of the big problems in fighting deforestation; mostly concerning indirect suppliers.

Moreover, the meat-packing companies that have signed TACs own 70% of the slaughter capacity in the Amazon, so if they all comply with the agreement, reduction of deforestation would be much more effective than having government agencies going after each of the ranches individually. The problem is that it has "not been verified if all of the signatories are controlling the suppliers" due to the complexity of the task, the "size of the territories and the lack of agents and funds" (Garcia-Drigo et al, 2021). On the other side, the companies in the resulting 30% of slaughter capacity that have not signed the TACs have the possibility of buying from those ranches that are rejected from the TAC plants, which means a "leakage of the effect of the agreements and unfair competition" (Barreto et al, 2017). Therefore, it can be assumed that just formally excluding illegal ranchers will not prevent the sale of their cattle.

On top of that, when the Brazilian Forest Code was changed in 2012, it allowed "deforestation in the Amazon biome up to the limit of 20% of the property area" (Garcia-Drigo et al, 2021) and this reduction of environmental protection led to an increase of 75% in deforestation during the following four years. Although when the TACs were implemented in 2009, Amazon deforestation decreased 42% in just one year, and almost all suppliers -of JBS- in Para rapidly registered in the CAR to legalize their status (Barreto and Gibbs, 2015). A lot of ambiguity can be seen from the implementation of these agreements and the actions taken by governments, because there are some good consequences, but also many problems arising to stop progress.

In Brazilian Environmental Law there is a concept called "shared responsibility" that refers to the accountability of an actor over the environmental damage caused by their supplier. Due to this concept, the big leading companies in the

beef sector came together in 2017 to develop common monitoring rules. The beef processors JBS, Marfrig and Minerva, together with the retailers Grupo Pão de Açúcar, Walmart and Carrefour, with the approval of the Public Prosecution Office (MPF), created the “Aligned Monitoring Protocol” in 2020 aimed at improved TAC compliance. Despite that, companies wanted to show their profound concern for the issue, so they also made public agreements with NGOs like Greenpeace, such as the Cattle Agreement in 2009 mentioned earlier (Garcia-Drigo et al, 2021). However, these three producer companies had many ups and downs with Greenpeace. For instance, they failed to meet their targets in the very first year after the agreement -2010- and were inconsistent in their actions in the following years, even getting to the point of making lawsuits against the NGO and withdrawing later; until 2017, when it all exploded with Operation “Cold Meat” by Ibama.

In this investigation, JBS was found to be buying cattle from some embargoed ranches in Para. This operation together with the sanitary one -Operation Weak Flesh- in the same year was “the perfect storm”. After these events, Greenpeace withdrew from its negotiations with JBS and later from the agreements with the other big companies due to a “lack of advances, the involvement of JBS in corruption, and setbacks in environmental policies” (Barreto et al, 2017).
In addition to making all these public environmental agreements, the three big multinational companies also launched their own private programs.

For example, JBS created the “Together for the Amazon” program, to cross-reference information from suppliers using blockchain technology by 2025. Marfrig introduced the “Marfrig Green+” plan, to ensure all its production is “sustainable and deforestation-free” by 2030. Minerva used “geospatial technology monitoring” to ensure the same objectives (Garcia-Drigo et al, 2021). Yet, none of them have any mechanisms capable of monitoring their indirect suppliers (Armelin, M., et al, 2020). So they can launch as many initiatives as they want but if they do not target their indirect suppliers, none of it will be effective, because the bigger the companies are, the further away their supplying ranches might be and more deforestation risks could appear.

From all these different agreements, there are some key takeaways. Firstly, implementation of new policies is more effective in the short term and when real outside pressures appear, such as government sanctions or public opinion changing market demands. Secondly, corruption and inefficiency of politicians and public workers are some of the pillars that sustain the established unsustainable system. Thirdly, if importing countries do not enforce measures to restrict purchases from conflictive locations, suppliers will not change their behaviors and local initiatives will be useless. In the end, the TAC is a positive strategy with a good potential, but it will never be enough if the other failed aspects do not change, mostly regarding indirect suppliers.

Big Companies in the Beef Industry

According to a 2018 report by “Chain Reaction Research”, the biggest retailers in Brazil control 75% of the beef market: “Carrefour (FR), GPA (Group Casino (FR)), Walmart Brasil (Advent International (U.S.), Cencosud (CL), and Grupo Muffato (BR)”. But “only Carrefour, GPA, and Walmart have committed to zero-deforestation” (Kuepper, B. et al., 2018). The picture below shows the interconnections between the biggest meatpackers and retailers in Brazil.

Source: CRR research.

Figure 13: Supply chain relationships between meatpackers with Amazon locations and top-retailers. Chain Reaction Research.
https://chainreactionresearch.com/report/cattle-driven-deforestation-a-major-risk-to-brazilian-retailers/

According to that report and regarding retailers, in 2018 Walmart Brasil occupied the third position with a market share of 15%, operating as "subsidiary of Walmart, the world's largest grocery retailer". In 2018, it sold 80% of its operations to a private equity company that did not have a deforestation policy. In addition, they said monitoring the origin of "forest-risk commodities" is not a business priority for them (Earth.org, 2021).

The second largest position was hold by GPA, with a 25% of market share; it has stores in 22 of 26 Brazilian states (Kuepper, B. et al., 2018).
The top 1 position was and still is occupied by Carrefour Brasil, a subsidiary of the French Carrefour Group (ABRAS, 2018), with a market share of 27% and 638 stores. They have a traceability program –"Garantia de Origem"- for their own in natura brand, but that is a small percentage compared to the many other brands sold at their stores (Kuepper, B. et al., 2018).

To understand the role of the retailers in the beef industry, it would be interesting to analyze Carrefour, as it is the most dominant one.
Carrefour is a massive power in the international food market, so their actions can potentially have deep impacts around the world, and they seem to be aware of it. In 2022, they announced the creation of a "forest committee" and a ten million euros fund for combating deforestation. However, they also stated they wanted to reduce the amount of beef supplied from "critical areas" by 50% in 2026 and 100% in 2030, which may be too far in time (Carrefour, 2022). In that same year, the parent company launched a Climate Plan with some objectives worth highlighting: "net zero emissions via stores by 2040", using 100% renewable electricity, and reducing emissions from refrigerants (Carrefour Group, 2022). In the scope of this policy directions, Carrefour also tries to make some profit out of the situation. While COP27 was going on in Egypt, they released plans to cancel business with their 100 largest suppliers if their actions were not

aligned with the Paris Agreement. At the same time, they expect to boost their own brand to fill that -purposely made- gap (Wilkinson, R., 2022). They rapidly started taking action in a big move of halting “beef supplies from two JBS slaughterhouses linked to deforestation on Indigenous land in the Amazon” due to an investigation made by “Mighty Earth” that found evidence of irregular beef in Carrefour stores coming from JBS (Mighty Earth, 2022).

On the other side, the big beef producers probably play the most important role in stopping deforestation in the Amazon.
The largest producer in the world and in Brazil is JBS, with 25% of slaughtering capacity in the country -half of it in Mato Grosso- and 21 active units in Amazon states. The second one used to be Minerva, with more than 4,600 suppliers and four slaughterhouses -TAC signatories- in Amazon states (Kuepper, B. et al., 2018). However, the position is now held by Marfrig, which used to be the third one. In 2019, Marfrig had more than 70% of its revenues related to North American operations and company acquisitions (Forbes Brasil, 2021), resulting from an expansionist strategy. Nonetheless, their record is not clean as to deforestation matters; in 2019, an investigation by “Reporter Brasil” together with “The Guardian”, concluded that Marfrig had supplied McDonald's, Burger King and other companies in the UK with meat from illegally deforested areas in the Amazon. This investigation also accused JBS and Minerva of similar actions (Wasley, A., 2019).

Following these kinds of behaviors, there are some consequences that appear, such as the cancellation of a $200 million loan from the Inter-American Development Bank in 2022. Ironically, Marfrig wanted that money for its “Green+ Plan”, which aimed at improving “sustainability of its beef supply chain” (Brice, J., 2022). These types of consequences could potentially be positive in the future if they lead to behavior changes in the companies; because in most cases, they embrace new uncomfortable policies that transform their “business as usual” only when it is ultimately necessary and required.

According to Prodani, K., et al. (2020), these three companies have an approximate 26% market share in the Brazilian beef sector -15% for JBS, 6% for

Marfrig and 5% for Minerva-. Considering that an estimated 75% of Brazilian Amazon deforestation comes from the beef industry (Nepstad, D., et al., 2008), it could be concluded that only the three companies together directly cause about 19% of Brazilian Amazon deforestation, of which, 11% is just from JBS -the biggest meat company in the world-.

It should also be reminded that “in the last fifty years, Brazil’s Amazon has lost about a fifth of its forest cover” –around 777,000 km2-, which equals the size of Spain and the UK combined (McMahon, R. (2021).

JBS

JBS is so important in this study that it deserves a full analysis just for itself. Founded in 1953, it is now the second largest Brazilian company with 400 production centers across 15 countries. It sells beef, pork, chicken, leathers, biodiesel and other products under more than 150 different brands in more than 190 countries (Forbes Brasil, 2021).

Its operations in Brazil account for more than half of the total revenues in all other countries together; more than half of its 260,000 employees are located in Brazil as well. Exports revenue increased 13% in 2022 compared to the previous year, amounting to 19 billion USD, and with China -Hong Kong included- as the main destination -26%-, which implies that the Chinese market is a fundamental part of its exports and has been increasing their demand (JBS, 2022). The map below shows how much of the total revenue is originated in each of the key regions; it means that half of its revenue comes from the US alone and that it even though its main activity occurs in Brazil, its income comes from a very wide variety of locations, which indicate that it is somehow dependent upon foreign demand and moreover, that an increased foreign demand could lead to higher pressures on the producing plants and consequently, more beef ranches hired and potential new deforestation cases.

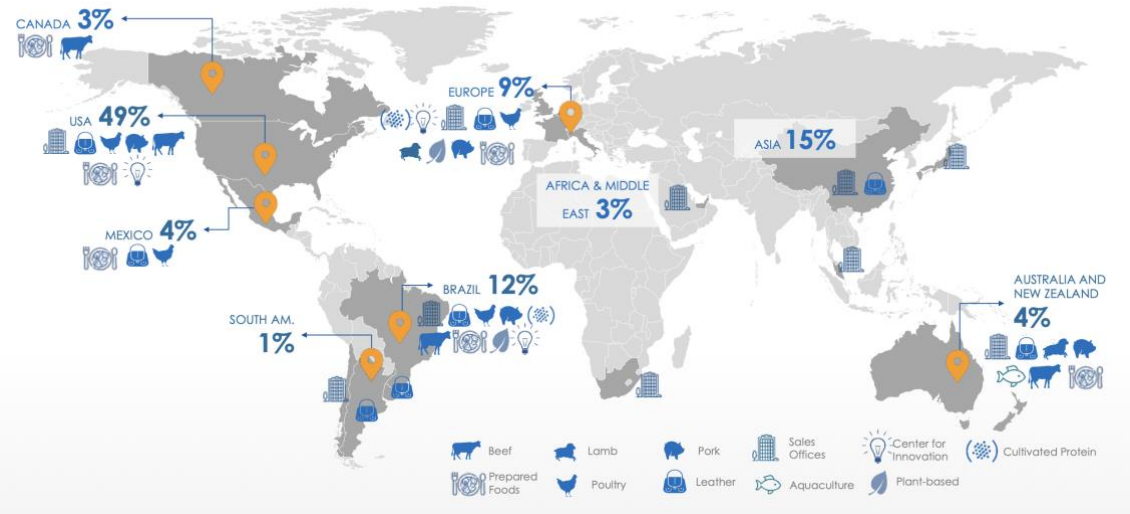


Figure 14: JBS geographical diversification multiprotein (revenue originated in the region FY2022). JBS. *https://api.mziq.com/mzfilemanager/v2/d/043a77e1-0127-4502-bc5b-21427b991b22/1d2b91d3-974b-c16c-bdab-629531e0a4d5?origin=1*

On the other side, from a compilation of JBS's earning releases and financial statements, it can be seen that in just four years they have doubled their net revenues from $36 billion in 2018 to $76 billion in 2022. Nevertheless, their net income has seen more fluctuations, with $1.2 billion in 2019, decreasing to $0.9 billion in 2020, then massively going up to $4 billion in 2021 and then going back down to $3 billion (JBS Global, 2023). Despite a steady growth in the company, many other factors interfere with such an international company when it comes to expenses and similar.

Likewise, because the company is so incredibly big and needs to supply so much, it also has to expand its network of Brazilian suppliers to more distant and "less explored" areas where there might be more availability, and by doing so, it exposes more to deforestation risks, as it can be seen in "Figure 15".

"Figure 16" from Imazon shows the potential purchasing area of JBS according to the location of its meatpacking plants and it can be seen that deforestation areas seem to be near official roads, which makes transport possible and easier. In addition, the plants in "northern Mato Grosso are more exposed to the

deforestation risk", including "municipalities with high incidence of embargos" (Barreto et al, 2017), which means that JBS operates in areas of conflict and restrictions are not being respected. That Imazon report also suggested that "JBS also has some units with low deforestation exposure because they are in zones in the Amazon biome that are already highly deforested", which is an idea that brings much concern regarding the accuracy of the data that environmental organizations work with, as the criteria to categorize deforested land might be different throughout the years and that may distort results and favor big deforesters.

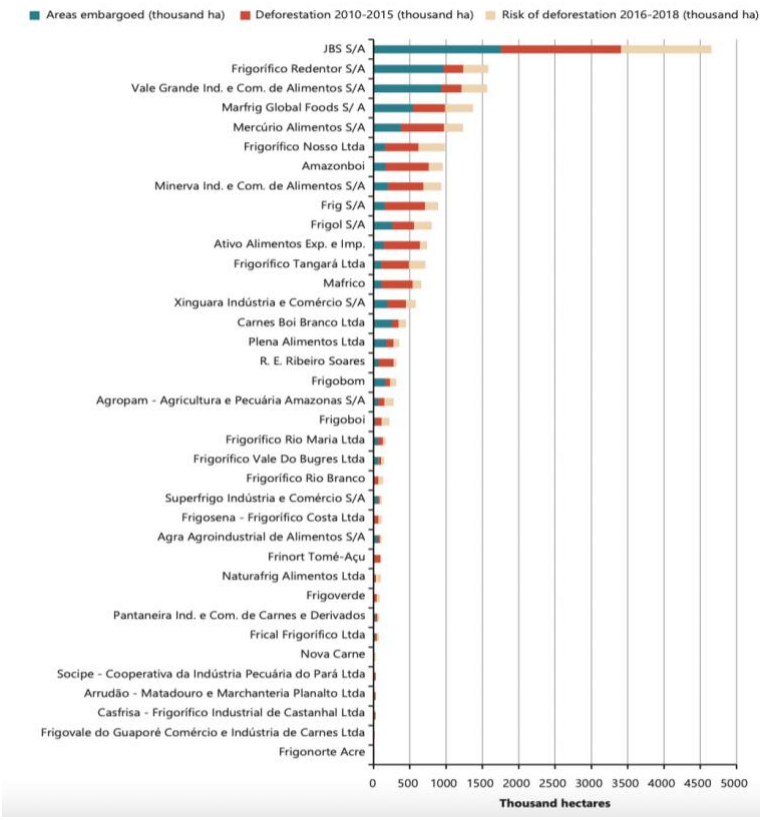


Figure 15: Ranking of the 38 companies with TAC in terms of exposure to deforestation risks in their potential buying zones in the Brazilian Amazon in 2016. Imazon. *http://imazon.org.br/PDFimazon/Ingles/books/Meat-Plancking%20Deforestation.pdf*

Figure 26. Potential zones for purchasing cattle of the 32 active and inactive JBS plants located in the Brazilian Amazon in 2016. Numbers next to the meat-packing plants correspond to the SIF registered in Mapa

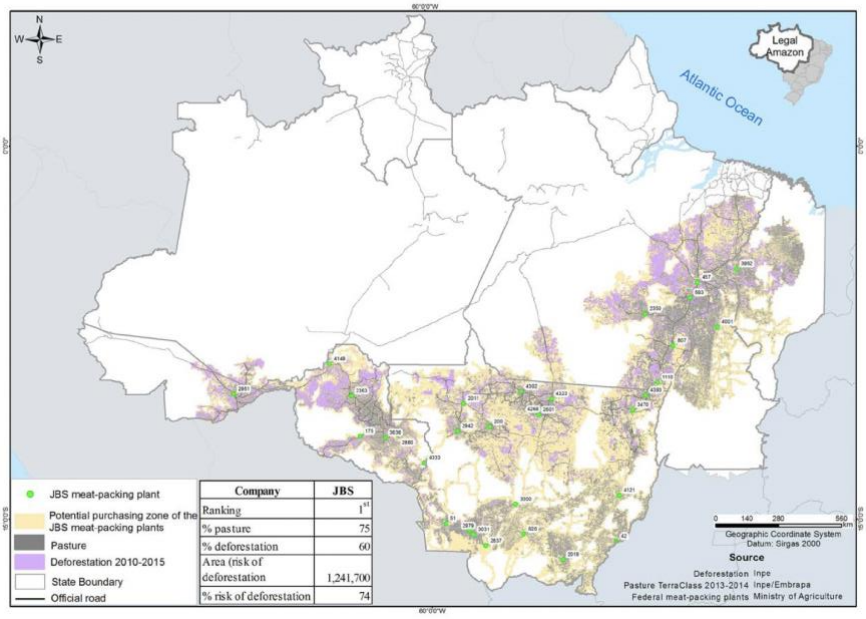


Figure 16: potential zones for purchasing cattle of the 32 active and inactive JBS plants in the Brazilian Amazon 2016. Imazon.
http://imazon.org.br/PDFimazon/Ingles/books/Meat-Plancking%20Deforestation.pdf

To fight against this growing public concern about the environment, JBS has launched several initiatives in the last decade. For instance, in 2020 it created the "JBS Fund for the Amazon", which aims to raise R$ 1 billion -200 million USD- by 2030 to help projects and startups regarding forest conservation, "quality of life of local communities", "scientific and technological development of the region", and local job creation (Marques, L. O., 2021). In its first year, it funded six projects with one million USD related to agroforestry systems that convert farming locations into carbon sinks and hubs for local forest products such as açai, cocoa, manioc…

Additionally to the Amazon Fund, JBS also announced in 2021 its "commitment to achieve net-zero greenhouse gas emissions by 2040". It also started operations of the "Transparent Livestock Farming Platform" that intends to monitor 100% of direct and also indirect suppliers through blockchain technology by 2025; they said 14% was already obtained at the end of 2021 (JBS, 2022).

However, so many investigations have been carried out against JBS and most of them have found compromising evidence about the company.
In 2022, the American Institute for Agriculture & Trade Policy (IATP) found that, despite targeting for net zero emissions by 2040, JBS “increased its annual greenhouse gas emissions by a whopping 51% between 2016 and 2021”, which is more “than Italy’s annual climate footprint” (DeSmog, 2022).

In that same target of zero emissions, it actually declares that legal deforestation will have to continue until 2035. And this is so true that different investigations have recently linked JBS suppliers to both legal and also illegal deforestation: in 2021, the New York Times reported luxury SUVs leather coming from illegal JBS production, “Brazilian federal prosecutors concluded that JBS had purchased over 300,000 cattle from ranches with “irregularities” the previous year”, in 2022 a “Bloomberg investigation concluded that JBS was “one of the biggest drivers of Amazon deforestation” (DeSmog, 2022).
In fact, this Bloomberg investigation gives very interesting insights about the reality of JBS, from an inside perspective of on-field researchers.

The investigation analyzed one million cattle shipments -that the company posted online by mistake-, together with data from 50,000 land registries and more than 500,000 deforestation alerts. In addition, their team made a ten-day trip to the area of study to prove how easily illegal cattle was being supplied thanks to a “legal system full of loopholes that prosecutors, environmentalists and even ranchers themselves consider it a farce” (Brice, J., 2022). The research found that there is no requirement for meatpacking companies to make on-site visits to direct suppliers so companies are not really monitoring if suppliers tell the truth about the origin of their cows. Bloomberg argued that the beef system has two ends, one made of 2.5 million ranchers, many of them so far away in the Amazon that there are no government offices or even phones, and another end made of buyers from 80 countries, such as big fast-food chains or supermarkets; and in the middle of that system, slaughterhouses like JBS’s connecting both ends. This means that the key piece to solve this global issue may be the meatpacking companies since they are in the center of it, and the other two extremes of the system are too large and divided to be controlled individually.

The investigation concluded that “more than half of all beef exports from the region to the European Union may be tainted by deforestation” (Brice, J., 2022).

Another investigation by The Washington Post on 2022 found some new interesting insights about JBS’s operations in the USA; which is the biggest market for beef in the world, as it holds 4% of the world population but consumes 20% of its beef. The Post found out that JBS exports most of its “US-bound beef to its own American facilities” and from there, neither the government or the consumers know where it goes. They said once it passes the inspection, they can remove all foreign labels and sell it as domestically produced and no agency tracks it down (McCoy, & Ledur, 2022). This means that JBS might be selling most of its US products as American beef but in reality it might be coming from deforested Brazilian land; and given the huge amount of operations in its US subsidiary, the total figures might be massive and nobody would know.

Some consequences of these behaviors can be seen around the world by the rejection of diverse entities. For instance, following an investigation by “Reporter Brasil” and “Mighty Earth” in 2021 that related beef from deforested Amazon areas to European retailers, a bunch of supermarkets decided to cancel their purchases to JBS. In the UK, Sainsbury’s dropped corned beef, in Belgium, Carrefour cancelled Beef Jerky, and in The Netherlands, Lidl dropped ribeye beef steaks (Mighty Earth, 2021).

On the other side of the world, JBS has also caused opposing reactions. “The Butchers from Brazil” is a documentary by “Four Corners” shown in an ABC News article about Australia and JBS. It explains how a $1.9 billion takeover of the US company “Swift” in 2007 led JBS to have control over the biggest beef company in Australia -“Australian Meat Holdings”- and how they achieved that by corruption, bribery, and “financial backing of the Brazilian government” (Tobin, G., 2022).

To conclude this section on JBS and the beef industry, it can be said that the biggest meat company in the world is causing a lot of damage to the Amazon forests and the global environment but it tries to greenwash its image by

projecting “zero-emissions” ideas and agreements, while the reality is much different. The fact that it has so much money and power enables it to deploy lots of influence in the markets and the political spheres, whereas people and environmental organizations try to fight back and show some light of truth trying to force a change of behavior. The most powerful tool to achieve these changes would be a shift in international demand, since half of its operations are in the US and more in other regions; because new rules take time and even when they arrive, it is difficult to monitor its implementation. Sanctions are another potential measure although their effect might be just temporary, but a change in consumers’ demand would for sure force a change in production policies because without demand, there is no more business. However, this is very difficult to trigger since the general public does not normally receive this information and even if they got it, they might not care enough to change their buying decisions, so in the end it comes down to environmental education, public information, government interests and people’s priorities.

2.3 POLITICS AND ITS INVOLVEMENT

After acknowledging that even if the three big meat companies –JBS, Marfrig and Minerva- have signed agreements and created initiatives toward zero deforestation, the reality is that the “systems for supply chain monitoring” are “susceptible to fraud” (Harari, I., 2022), it is time to move to the last section paper study.
It is important to comment on some highlights or relevant points within the environmental policies of Brazil during the recent years and their relation with the SDGs and the Paris Agreement targets.

First of all, it should be kept in mind that the beef industry keeps expanding and demand keeps growing, and that is difficult to reverse. The Ministry of Agriculture has projected a 17% increase of slaughtered cattle over the next ten years due to domestic demand and also to a higher export demand from China and the US. One clear sign is that in 2022, meat exports “saw a 26% increase in volume compared with the previous year” (Zanon, S., 2023).

As a consequence of this projected higher demand, there will be a stronger pressure on forests and ecosystems, so new sustainable policies and production innovations need to appear.
In 2018, “environmental regulators, supermarket chains and beef producers gathered” to try to implement a simple but effective idea to better track and monitor the cattle transportation. The idea was to use the “Guide of Animal Transport” (GTA), a mandatory document for cattle with pure sanitary purposes, to share the information of the animals and have open access to it and thus, avoid cattle laundering and improve traceability. However, the government of Bolsonaro restricted access to this information arguing conflicts with privacy rights and the initiative ultimately failed (McCoy, & Ledur, 2022).

Another initiative was brought up in COP26 by the European Commission, in order to ban the import of six food products from deforested areas; “beef, soy palm oil, coffee, cacao and timber account for around 19% of total commodity

imports into the EU" (Lai, O., 2021b). This one failed as well but led the way to new potential solutions.

Another smart, simple and efficient solution lies on the principle that deforestation is not really necessary. A report by a coalition of Greenpeace and other NGOs launched in COP23 showed that there already was enough degraded land in the Amazon to cover the necessary production. "65% is used for low-efficiency pastures - less than one cow per hectare" (Ortolani, G., 2018) so if the land is used more efficiently, and the soil is regenerated, there is no reason to deforest anymore while growth and profits keep increasing.

For instance, as it can be seen in "Figure 17", that between 2008 and 2012, deforestation decreased despite strong demand for both cattle and soy -two of the biggest drivers of deforestation-, so it is proven that productivity can increase without deforestation.

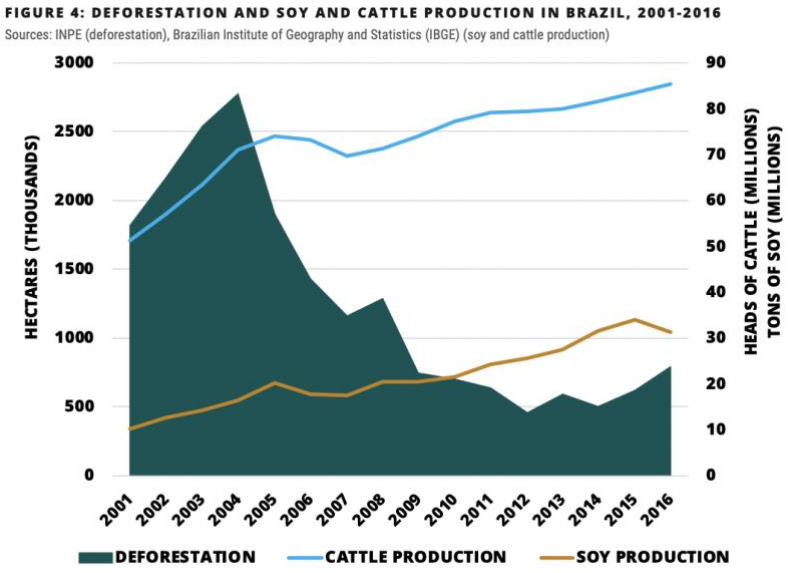


Figure 17: Deforestation and soy and cattle production in Brazil, 2001-2016. The Dialogue.
https://thedialogue.wpenginepowered.com/wp-content/uploads/2019/05/Nearing-the-Tipping-Point-for-website.pdf

Some strategies from the “2022 Emissions Gap Report” to implement regarding the SDGs and the food system are the following: fiscal policies such as carbon taxes to polluting companies, incentives to decarbonize food transport, renewable electricity from biomass waste, changing consumption choices… (UNEP, 2022).

There are plenty of new potential solutions to sustainably address future demand, however, much of it ultimately comes down to what the government wants to do and decide, and that is one of the biggest reasons why in the last years there has been an irregular trend in deforestation, due to changing governments and environmental policies.

For example, deforestation in the Amazon decreased between 2006 and 2012 after different policies such as the 2006 “Soy Moratorium” -a voluntary agreement to stop deforestation in soy plantations- or credit restrictions on deforestation-related activities (Chain Reaction Research, 2018).
On the other side, President Roussef “weakened the Brazil’s Forest Code in 2012” and “removed deforestation restrictions”. Her successor, Temer, “reduced the protections of the environment” and conservation areas further and cut the Ministry of Environment’s budget (Gaworecki, M., 2019); all of these were big contributors to the shift in deforestation rate, that had been decreasing since 2008.

These trends can also be seen in “Figure 18”, as well as the recent breaking news: “Amazon rainforest is being destroyed at fastest pace in 15 years” (Brandimarte, W., 2021).
This last and very sad “achievement” has been fueled by the anti-environmental policies of President Bolsonaro. It is clear on the graph that in the years that President Lula governed -darker area-, deforestation decreased massively, and that ever since Bolsonaro was elected, it has kept increasing.

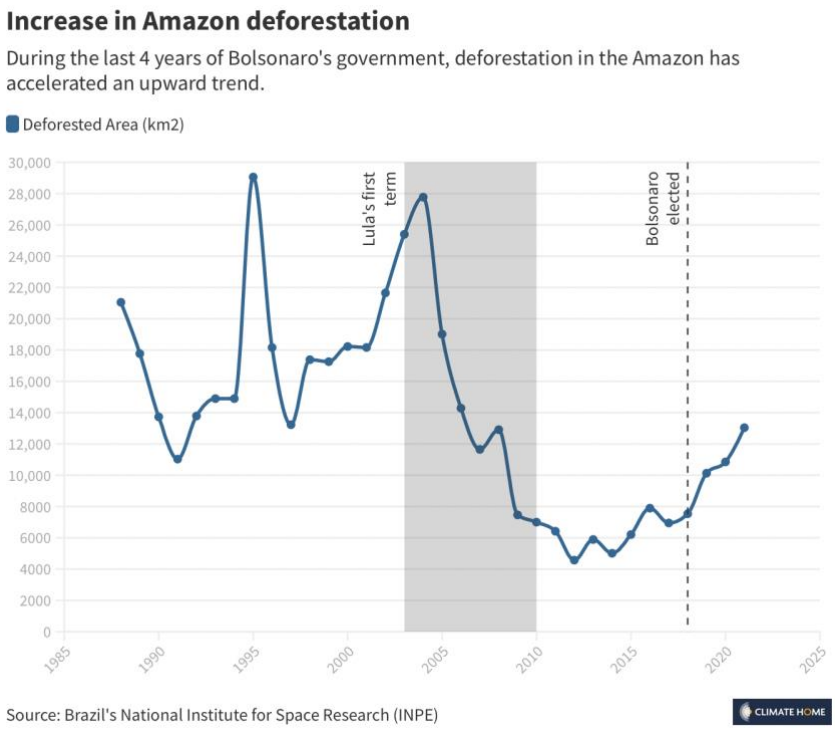


Figure 18: Increase in Amazon deforestation. Climate Home. 2022 *https://www.climatechangenews.com/2022/10/07/lula-campaign-update-brazil-climate-plan-ndc-new/*

President Bolsonaro has been widely accused of undermining environmental policies and impacting the national and international climates very negatively.
To begin with, he expressed the “Amazonian paradox”, which meant that while the Amazon has the world’s “greatest natural resources” in terms of commodities and oxygen cycle, “24 million people living in and around it are poor”. So as a compensation, he said other countries should pay for it or they would continue using their resources as they wanted (Brice and Smith, 2021) because it was their right to do. In fact, he also said that Brazil might pull out of the Paris Agreement because its conditions were dangerous for the country’s sovereignty (Agência Brasil, 2018).

In addition, he tried to “expand the definition of legal deforestation” by “changes to land-grabbing laws which extend amnesty”, “opening up Indigenous lands to farming”, or “by stripping status from protected areas” (Jordan, L., 2022). He even took advantage of the Covid 19 pandemic situation to reduce environmental fines

-in 72%- “despite an increase in Amazonian deforestation during this period” (Vale, M. et al, 2021).

His government reduced the budget for environmental agencies up to 27% in 2021, making it its lowest budget in 21 years (Sordi, J., 2022). Resulting from these policies, by 2022, deforestation had increased 56% since he took office. Another result is that when he lost the last general elections, he still won in most of the Amazon municipalities where deforestation take place (Schroder, A., 2022), because the people living there benefit directly from those activities.
Controversially, on his last COP -COP26- he said Brazil was aiming to end illegal deforestation by 2028 and carbon neutrality by 2050, which were more ambitious goals than expected (Roy, D., 2022). However, there was a trick within.

Regarding the Nationally Determined Contributions (NDC) of the Paris Agreement, Brazil updated theirs in 2016 and later updated it again in 2020 and 2022. In the updates, countries are supposed to set more ambitious goals. However, Brazil apparently set the same goals in the updated version of 2020; but taking a little deeper look into the update, it could be seen that their emissions allowance had actually increased.
Their strategy was to use accounting tricks to deceive people and change the baseline for the calculations of the percentage decrease of emissions so that they would be allowed to pollute more than before. In other words, their emissions reduction target was still a 43% but in the updated version it was a 43% compared to a higher baseline emission, so the total allowance had actually increased by a lot. In the 2020 version, they “committed to a 37% emission reduction by 2025 and 43% by 2030” (Souza, A., 2022); so they appeared to have the same targets when in fact, their emissions allowance had increased. After international pressure to change that version, Brazil released a new one in 2022 that was better than the 2020 one, but still worse than the initial one, as seen in “Figure 19”.

Figure 19: Brazil's emission target. Politica Por Inteiro. 2022. https://www.politicaporinteiro.org/wp-content/uploads/2022/04/Brazils-NDC-2022-analysis_V0.pdf

In addition to this change, the newer versions included "climate neutrality" by 2050 and also no formal reference to "implementation of sectoral mitigation actions, such as the end of illegal deforestation in 2030, recovery of 15 million hectares of degraded pastures and others" (Unterstell & Martins, 2022), so they had said they would end deforestation, but did not say how.

As a result, Brazil stood out as the country whose NDC had a negative impact over the previous one, even to the point of positively creating more emissions, as seen in "Figure 20".

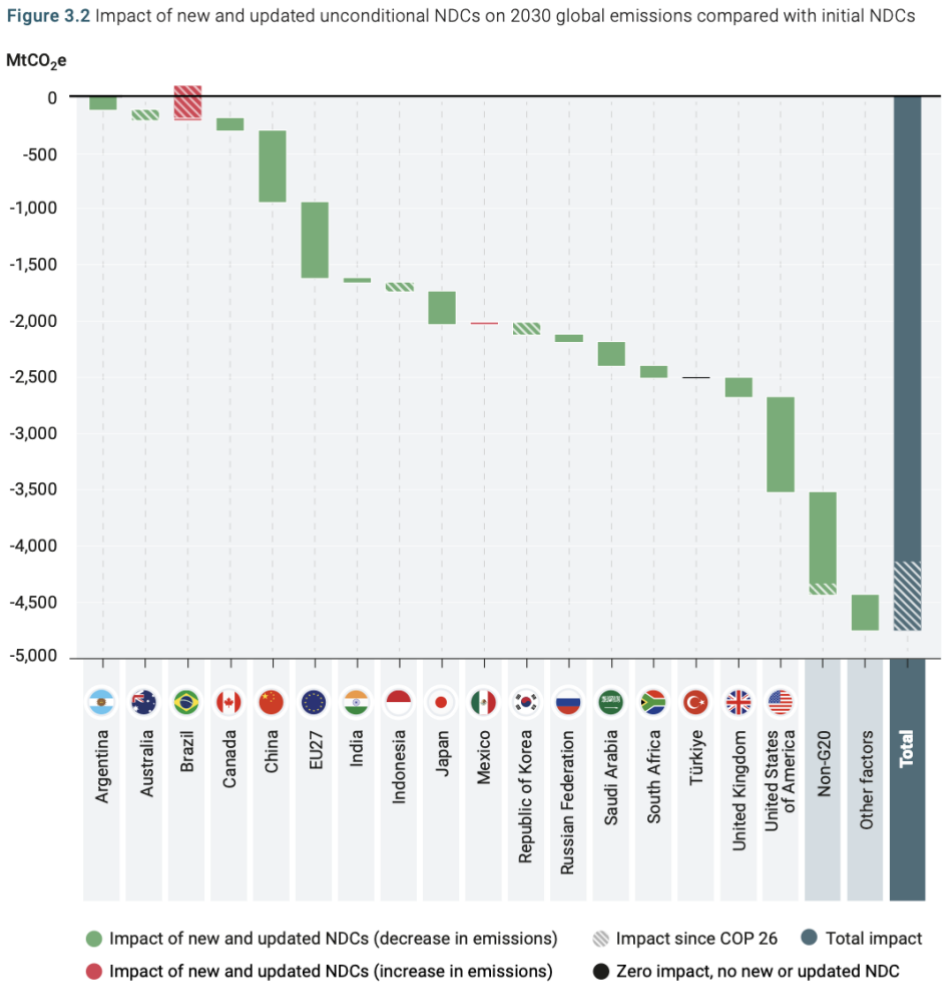


Figure 20: Impact of new NDCs on 2030 global emissions compared to initial NDCs. UNEP. 2022.
https://www.unep.org/resources/emissions-gap-report-2022

Luckily for the forest and the world, Bolsonaro lost the elections and Lula, who had been president in the past and wanted to amend environmental losses, won. During his previous mandate, deforestation decreased by an outstanding 72%, and Ibama's and other environmental budgets increased, so when this new presidency started at the beginning of 2023, one of the first things Lula did was to increase Ibama's resources (Spring, J., 2023). He also brought back the "Amazon Fund", which he started during his previous mandate. This $1.2 billion fund "supports 102 conservation projects in the Amazon, among them, forests managed by indigenous people and small-scale farms" (Rodriguez, S., 2023). It

was closed during Bolsonaro's term and countries like Norway or Germany are set to resume donations, in addition to the US, who has signed a joint statement with Brazil committing to work together to conserve the Amazon.
Another recent joint statement is the one with China, signed in April 2023, after Lula went on a visit to the partner country. This joint statement is related to meat and referred to as "the Beef Alliance" and its goal is to collaborate to "eliminate deforestation", "control illegal trade causing forest loss" and improve monitoring through satellites, although some experts still question how this will actually be done (Rodriguez, S., 2023b).

Brazil and China are good partners and together they are concerned about the climate crisis and the Sustainable Development Goals efficacy. They complain that the UN promise to issue $100 billion per year through the Green Climate Fund has not yet been achieved since its creation.

During the first months of Lula's mandate, deforestation has dropped by 11% from January to March compared to the year before, but then 14% up in March compared to the previous year. These mixed results are a sign of how difficult it will be to change all the established illegal activities allowed by the previous presidency (Al-Jazeera, 2023). To the point that "six out of nine Amazonian states are run by Bolsonaro allies" (Maisonnave, F, 2023) so domestic cooperation will probably be a challenge in the climate fight.

Nevertheless, the president is very committed to this environmental change and has declared his intention to host the COP30 in 2025, as Brazil was supposed to host it in 2019 but Bolsonaro cancelled it when he was elected.
Overall, Lula has brought back hope to the international community that the Amazon is not lost yet and there is still a lot to be done.

3. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

To conclude this research study, there are different takeaways worth highlighting. First of all, it has been seen that the current international environmental agreements by the UN are not having the desired impacts or reaching the necessary targets, and one of the most prominent reasons, as seen in the case of Brazil and the NDCs, is the lack of power by the UN to force a real change in the behavior or policies of signatory countries. This happens because national sovereignty prevails and enforcement of the agreed policies is based on the country's own will. Also, in many cases they can set their own targets even if they are not demanding enough, as in the Paris Agreement. Moreover, the sanctions for non-compliance are based on mere debating and re-structuring, but there is no hard sanction for not achieving the goals set, so sometimes countries just focus their efforts on other matters with more urgent priorities for them.

Another reason for the failure of the agreements is that in many cases, the requirements are too vague and countries do not have a individual and specific target, such as in the SDG case; so without a measurable target they end up doing too little. This can be seen in the Green Climate Fund initiative, where contributing countries do not have a specific amount set to contribute and as a result, the agreed amount has not been achieved yet. The liberal theory would say that this happens because of the self-interest component of human nature, as cooperation among countries comes from the human desire to seek benefit for themselves, and therefore, governments would prefer to invest their resources in matters that would bring them a direct benefit, instead of investing in long-term global objectives where benefits are harder to measure.

Moving on to deforestation in Brazil, it can be said this issue brings great concern to the whole international community because it can potentially affect every single country. It has been shown that among all the big causes leading to deforestation in the Brazilian Amazon, agribusiness is the dominant one, specially the beef industry, which is the biggest trigger of illegal deforestation.

Deforestation rates vary across the country, with higher incidence in the Amazon and Cerrado biomes; and also across time, with changing rates mainly due to government policies that lead to changes in companies' behaviors. During the previous Lula presidency, deforestation rates declined a lot but later on during Bolsonaro's term, it saw a massive increase. Nowadays, rates are expected to go down again since Lula is back in power.

Among the different policies and initiatives that have been created by governments and also by companies themselves, the TACs -Terms of Adjustment of Conduct- are probably the most impactful ones so far. These agreements try to monitor the supply of cattle so that companies do not buy from farms related to deforestation, and although they have a great potential, there is a fundamental hole in the system. This refers to non-traceability of indirect suppliers, because it does not matter how much information companies report about their direct suppliers, if that cattle are originally coming from illegal farms of other suppliers.

The three biggest companies, JBS, Minerva and Marfrig -who own 25% of the market share- are a great reflection of what the industry is about. They are TAC signatories and also have their own initiatives against deforestation, however, they all have been related to scandals regarding illegal deforestation and many of their initiatives have been shown to be "greenwashing" of not efficient enough. These companies operate across the whole world and consequently, foreign demand for their Brazilian products may be having a devastating impact in the Amazon without consumers knowing it. Nonetheless, this very foreign demand is also a potential tool for companies' policy changes.

But then, which actor should be blamed responsible for all this established business structure that is killing the forest? It could be the Brazilian government "allowing" illegal practices, the inefficacy of international organizations, the companies producing it, the very workers of the farms, or perhaps the consumers in other countries buying these products… The answer to this question is very subjective on the perspective because of the responsibility dilemma. Because,

why should one of the actors be voluntarily worse off for the benefit of others? Following the liberal theory, cooperation among countries would be more efficient if it brought a direct benefit to the contributing actors, otherwise, it is very unlikely to occur.

Recommendations

From a more personal perspective, it would be interesting to draw upon some notions of the liberalism theory. The liberal international order and the current globalized trade system allow governments to interact with each other and obtain benefits from that cooperation. However, practice is not always as beautiful as theory, and it has been seen that the “permanent diplomatic table” that is the UN, is failing in the environmental side of cooperation.

One possible reason is the lack of a global collective consciousness concerned with the climate, perhaps because other priorities and more urgent matters require more resources. Brazil and its companies, for instance, appear to have a more individualistic mindset and not care so much about environmental issues, since the benefit they gain outweighs the negative consequences -suffered by others-. Another issue is the difficulty to relate the emissions produced by one actor in one place to the damage caused to another agent somewhere else, so accountability of actions becomes extremely challenging.

Nonetheless, the Amazon Forest is a key piece for the global environment and although Brazilian sovereignty is a big obstacle in this “fight”, there are still some possible solutions.

For the governmental actors, both national and international, and following the liberal thought, one possible solution is economic sanctions and trade restrictions as a coercive measure. This has been effective in the cases where sanitary conditions were too weak and foreign governments prohibited beef imports.

Another option is an improved monitoring system of the supply-chain, which is expected to appear now that Lula is ruling. This could be easy as part of the already established TACs; improved periodic reports and verifications required by foreign governments and companies would also trigger a more effective monitoring system.

In addition, the government urgently needs to require information about indirect suppliers in the TAC agreements, as this is the biggest hole found in the system. A very simple way to support this would be facilitating an interconnection between databases of different governmental agencies, such as the land registries, sanitary institutions and environmental institutions.

Lastly, an effective way to generate cooperation among different actors would be a firm change in consumer demand, both national and foreign. The simple rules of economics say that a change in demand will cause a change in supply, therefore, if consumer companies and end users start asking for deforestation-free beef and demand proof of it, producing companies will have no other option than changing their practices.

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5. ANNEX

Green Climate Fund

A good resource to combat climate change, especially in developing countries, is the previously mentioned “Green Climate Fund” (GCF).
This fund is a key part of the Paris Agreement and it is also mentioned in the 2030 Agenda since it is considered the largest climate fund in the world. Its goal is to help developing countries achieve their NDCs by providing financial resources and guiding through project creation, as well as giving them decision making power so they can turn “ambitions into climate action” (GCF, 2020).
The fund invests in different categories of transition such as energy, human security, ecosystems, technology and climate innovation… It aims to create new business models based on sustainable development and low emission investments, by converting climate risks into opportunities to “capitalize on new growth” and creating a “new normal” that protects the planet (GCF, 2020).

It obtains the funding from both public and private actors, and it works with more than 200 “Accredited Entities” like commercial banks, multilateral development finance institutions, equity funds and other organizations to assist on “project design and implementation”. GCF is required to invest half of its resources to mitigation -fighting climate change- and the other half to adaptation -adapting to new climates-; in addition, “half of the adaptation resources must go to the most vulnerable countries” (GCF, 2020).

Nonetheless, while it may sound like a great idea, reality is sadly different from theory. When the GCF was created, countries approved to mobilize $100 billion annually by 2020; that deadline was later postponed to 2025. But as of April 2023, the goal has never been reached; a recent report by the Organization for Economic Co-operation and Development (OECD) in 2022 showed how big is the climate finance gap and how uneven is the distribution between countries causing climate change and countries suffering from it.

In 2020, $83 billion were mobilized in climate finance, from which 68 billion were given by bilateral and multilateral financers of developed countries in the form of public grants or loans (OECD, 2022). Even though the tendency is rising, it is still far from the agreed target. Between 2013 and 2020, an estimate of $381 billion were not provided (Achampong, L., 2022), as shown in “Figure 1”, in relation to the $100 billion annual goal, and there are different reasons for it.

One of the reasons is that countries never agreed on how to control if Parties are fulfilling their part and there is not even a written deal on how much each of them has to provide, so in some way it is based on good faith from the Parties (Timperley, 2021).
Consequently, many countries do not deliver enough in comparison to how much they pollute. The US is arguably the one who has failed the most in giving an appropriate amount, since it has provided an average of $7.6 billion while it should have given between 40 and 47 billion compared to its level of GHG emissions (Bos, J., & Thwaites, J., 2021).

Another reason for the finance gap is that countries tend to contribute more to plans for mitigation rather than adaptation -twice as much-, probably because it is easier to measure their effects, while impacts of adaptation plans are more difficult to define as people are “never fully adapted because new climate risks keep emerging”. As a result, private finance normally goes just for mitigation projects that may have an economic return, such as solar farms. (Timperley, 2021). Another result is that “debt-generating instruments have increased” and the “repayment of loans imposes an unjust burden on developing countries”, so funds for “vulnerable low-income countries remain low” (Achampong, L., 2022).
Meanwhile, countries keep spending billions on fossil fuels and military, and the Covid-19 pandemic has put a stronger focus on public health investing as well. Therefore, the need for climate finance keeps growing bigger while the polluting countries stay unbothered (Timperley, 2021) because they do not have urge for resources to survive the climate crisis and since there is no actual individual requirement for each of them to contribute, they simply do not do it.