



# Land-System Change

## *Minimising Deforestation of the Amazon Rainforest in Response to Increasing Meat Consumption*

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## ***Executive Summary***

**The Amazon, the largest rainforest in the world, has been impacted by massive deforestation over the past few decades as farmers and cattle ranchers burn down large parts of the forest to make space for pastures for the highly polluting beef industry, which continues to threaten the entire planet by accelerating the march of global warming. The majority of the Amazon Rainforest, approximately 60%, is currently under the control of the Brazilian Ministry of the Environment, but the current conservation strategies that they have implemented are severely inadequate, showing an inability to accurately monitor and conserve the ecosystem, largely due to insufficient funding, which was already small before the current Bolsonaro government came into power and cut the funds even more. In order to preserve the Amazon rainforest, as well as the cattle ranching industry, which is crucial to its economy, the Brazilian Government must redirect their efforts towards conserving the rainforest, with a focus on reducing deforestation due to cattle farming practices by properly enforcing the laws and guidelines currently in place under the 2012 Forest Code, punishing breaches of laws, and increasing funding to the organisms responsible for their enforcement. In addition, they must focus on making the cattle farming industry itself more sustainable by providing incentives for sustainable practices and afforestation, as well as both financial and educational aid to farmers so that the whole industry can become more sustainable, with the overall objective of slowing**

**deforestation and the march of climate change.**

## ***Foundational Science: Discussion & Analysis***

As the global middle class continues to grow larger and larger, communities who previously did not eat meat, or certain types of meat, due to socio-economic or cultural reasons, are starting to see a drastic increase in meat consumption, with a global increase of 58.7% from 1990 to 2009 (*see table 1*) (FAO, 2014). This could be potentially catastrophic for the environment, as beef requires over 326m<sup>2</sup> of land for each kilogram produced, leading to large scale destruction of rainforest to make space for grazing pastures (OWID, 2020). With global meat consumption projected to double by 2050 (FAO, 2019), the need to make beef production in the Amazon rainforest far more sustainable is becoming increasingly urgent. In 2008, cattle ranching was responsible for 80% of total deforestation in the Amazon, causing a release of 340 million tons of CO<sub>2</sub>/year, or 3.4% of total global emissions (Nepstad et al., 2008). Despite the link between meat consumption and economic well-being in developing countries ( Berežnicka et al., 2018), as well as the benefits of meat consumption in the fight against malnutrition and other threats, the release of GHGs (*Greenhouse Gases*) into the atmosphere and destruction of the rainforest means that in its current form, the beef production process is unsustainable and will lead to an acceleration of the global warming process.

	1990	2009	% change
Bovine meat	54,065	63,835	18.1
Mutton and goatmeat	9100	12,763	40.2
Pigmeat	68,692	105,503	53.6
Poultry meat	40,173	90,664	125.7
Other meats	3634	6098	67.8
Aggregate	175,665	278,863	58.7

*Table 1: Global Meat Consumption, 1990-2009, in 1000 tonnes (source: FAO, 2014)*

In 2020, Brazil was the world’s largest exporter of beef (FAS, 2021). It is a large and very important part of the Brazilian economy, totalling \$149 billion, or 8.7% of its GDP in 2018 (Amnesty International, 2019). Many of the cattle farms are found in the Amazon, where large scale deforestation has taken place to create pastures for the almost 90 million cows born and bred for slaughter. The industrial farming practices that they use are devastating to the environment, not only due to the highly polluting practice of slashing and burning the forest to create pastures, which releases GHGs into the atmosphere, but also due to the massive amounts of methane that cattle produce over their lifetime. On average, one cattle produces approximately 100kg of methane every year (Pearce, 2017), which is worsened by the fact that methane (CH<sub>4</sub>) is 84 times more efficient at trapping heat in the atmosphere than CO<sub>2</sub> in the short term (EDF, 2021). Recently, a study conducted by environmental researchers discovered that the Amazon rainforest has been damaged so much by human activity that it is now releasing more GHGs into the atmosphere than it can store through carbon capture, meaning it is actively contributing to climate change rather than slowing its progress. Additionally, the Amazon supports approximately 10% of all known species of fauna and flora on the planet (Da Silva et al., 2005), but due to deforestation, the biodiversity conservation

value of the Amazon has been cut by 39-54% (Barlow et al., 2016).

Lastly, the large-scale deforestation of the Amazon rainforest will have an impact on human health and social life. The Amazon controls the population of animals that transmit diseases such as malaria, and studies conducted found that in degraded areas of the forest, malaria cases were 300 times higher than in areas where the forest cover was still largely intact (Greenpeace, 2009). Additionally, recent estimates put indigenous tribe populations at around 200 000 people, who rely on the forest for everything. Deforestation threatens their way of life.

## *Assessment of Existing Governance*

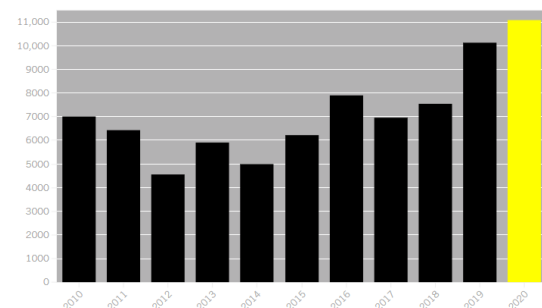
For the past several decades, the Brazilian Government’s policies have been geared very heavily towards actively supporting and incentivising deforestation and land-system change, through tax breaks/policies, a lack of accountability for illegal deforestation, and land ownership laws that are exploited by large farming corporations (Binswanger, 1991).

Firstly, the Brazilian government has failed to stop deforestation in the Amazon due to a lack of enforcement of conservation laws and other laws that stop the exploitation of the land and people in the rainforest. The Brazil Forest Code, recently revised in 2012, states that all private landowners in the forest must maintain at least 80% of their land as dense forest, and is supposed to reinforce punishment for illegal deforestation, through a system of tracking and registration of privately owned land. The registration of land with the SICAR (*Sistema Nacional de Cadastro Ambiental*

*Rural*) database is optional, and incentivised by financial compensation, and as of August 2016, 387 of the 394 Mha of private land has been registered. However, beyond registration of the land, there has been very little effort since then to monitor the adherence of landowners to deforestation boundaries, and only 6% of registered producers have reported to be taking steps to restore the forest that they had already previously cleared, whilst the lack of enforcement has meant that over ¾ of farmers have said that they would only follow these laws if forced by government authorities. (Azevedo et al., 2017). This lack of adherence is partially due to the wave of pardons granted by the Brazilian government to farmers for deforestation that took place prior to 2008, meaning landowners have very little incentive to renew the forest they cut down as there is no repercussions. Additionally, despite continued efforts by inhabitants of the rainforest to protect their land, cutbacks on protections provided by the government and a refusal to act against illegal farming has meant that TNCs have been known to hire armed militias, known as *grileiros*, to forcibly evict tribes from protected nature reserves. Because of the benefits that TNCs bring to the Brazilian economy, as well as the recent push to ‘modernise’ the indigenous population of the rainforest, the government turns a blind eye to these illegal and often violent practices (HRW, 2019)

Secondly, the Brazilian government and the climate change sceptic President Jair Bolsonaro have been cutting funding to deforestation monitoring agencies, granting tax breaks, and passing new policies that favour profits over the many environmental concerns of cattle farming and deforestation. Since Bolsonaro’s right-wing government took office in January 2019, there has been a

sharp spike in deforestation. In 2012, when the new Forest Code was implemented, 4571km<sup>2</sup> of rainforest were destroyed, the lowest number since recording started in the 1980s, and since then it has more than doubled to a staggering 11 088km<sup>2</sup> destroyed in 2020 (*see graph 2*) (Amnesty, 2020). The government has cut the budget of Ibama (*Institute of the Environment and Renewable Natural Resources*), the department responsible for monitoring deforestation from \$3.24 million in 2019 to a little over a \$1 million in 2020, halved the number of forest inspectors, cut the funding to their national climate change plan by 40%, and refused international aid from the USA and major European powers (Reuters, 2020).



*Graph 2: Rate of Deforestation in km<sup>2</sup>/year (source: Amnesty, 2020)*

Lastly, land allocation laws have played a role in the rapid deforestation of the Amazon. In Brazil, as in many other countries, there are squatting rights, in this case, the *direito de posse*, means that if an individual or company lives or operates on an unclaimed piece of public land and uses it effectively for at least one year has the right to claim up to 100 hectares of this land as private property (Binswanger, 1991). Once this private land has been established, the owner has the right to destroy the rainforest in accordance with the Forest Code, or to ignore it to make space for pastures. Although *direito de posse* would appear to favour small farms,

TNCs exploit these rules and have been known to suddenly claim thousands of hectares of land at once, increasing the impact of squatting rights on deforestation dozens of times over.

## ***Governance Recommendations***

### **1. Provide loans and incentives for better, more sustainable cattle farming practices**

By providing an incentive to use more sustainable practices, such as subsidies or progressive tax breaks based on the cattle farms level of sustainability, as well as loans to implement these strategies, large cattle farming operations would no longer need to continue deforesting large areas of land. With more sustainable farming, the farmers could increase the longevity of each patch of land multiple times over. These tactics were previously used in Asia during the 1970s, in what is now known as the “*Green Revolution*”, which led to an extraordinary boom in crop production, whose success can be attributed to “the combination of high rates of investment in crop research, infrastructure, and market development and appropriate policy support that took place during the first Green Revolution” (PNAS, 2012)

### **2. Provide education/financial aid on sustainable cattle farming to keep land usable for longer**

Currently, cattle farmers use the land that they have deforested for a few years before all the nutrients have been depleted from the ground and the pasture becomes useless, at which point they simply

move on and burn more forest. By implementing sustainable land practices, such as rotational grazing, which would allow the pastures some time to become fertile once again. Through this, each hectare of land would remain usable for far longer, reducing the need to deforest as frequently.

### **3. Allocate more government funds towards the monitoring and conservation of the rainforest**

The government funding cuts under the current administration have had a noticeable impact on the rate of deforestation, as can be seen in Graph 2. Increasing the funds available to the organisms responsible for the monitoring and conservation of the Amazon would help reduce illegal deforestation and potentially lead to enforcement of the Forest Code’s afforestation policies, which have been largely ignored by farmers.

### **4. Legal/political reform to hold farmers and TNCs accountable (evictions, illegal deforestation, etc...)**

Legal reform to hold farmers accountable for illegal practices, from eviction of indigenous people to illegal farming and deforesting practices would help reduce deforestation using the threat of heavy fines or prison sentences. This would have to be paired with political reform to decrease the risk of corruption which often allows large conglomerates to get away with their illegal practices with at most a relatively small fine. Increased accountability would lead to a decrease in socially and

environmentally damaging practices.

5. **Provide support to non-industrial farmers who would see their livelihood destroyed**

Small-scale cattle ranchers in the Amazon rainforest often do not have the funds necessary to begin employing more sustainable farming practices, opting to continue with their slash and burn tactics, which provide them with enough pasture for all their needs. By providing support to the thousands of small farms across the country, the Brazilian government could reduce deforestation and significantly reduce the risk of wildfires that often ravage extremely large parts of the Amazon every single year.

6. **Reverse pardons given to pre-2008 deforestation**

The wave of pardons granted in 2012 with the reformed Forest Code has meant that cattle ranchers have no incentive to renew the percentage of the forest they destroyed above the 20% limit, as they will not face repercussions and they can continue to use the land as pasture. Implementing the threat of heavy sanctions into the production process would incentivise farmers to follow the guidelines set by the Forest Code.

7. **Provide protection to inhabitants of the Amazon who protect the rainforest**

The Forest Defenders are crucial to the prevention of illegal deforestation, yet over the past few

years, there have been at least 28 killings that have been concluded to have been committed by people involved in illegal deforestation. Because of the danger that these people put themselves in to protect the environment, it is recommended that the government ratify more policies protecting them. A good example would be for Congress to ratify the Escazú Agreement, which would require the state to protect these defenders and investigate crimes committed against them.

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