Illegal Deforestation for Forest Risk Commodities Dashboard: Brazil

Drafted as of: June 2022

SUMMARY OF RISKS

- Governance Risk Score: 61.3 (High risk)[1,a]
- Conflict State: NO
- Deforestation has soared since 2016, with illegal conversion of primary forests for agriculture reported across the Amazon and Cerrado biomes, and increasingly in Caatinga. Reports indicate that at least 95% of the deforestation for agriculture is illegal.
- Expansion of commodity agriculture development often stands in direct opposition to conservation efforts, but this already delicate balance is tipped by perverse incentives within Brazil's legislative framework that give little value to land not in "production," thus leading to extremely high rates of forest conversion.
- The main illegal agro-conversion risk associated with commodity production in Brazil involves operators failing to obtain the necessary permit issued by the Environmental Agency for clearing native vegetation.
- Land grabbing is highly associated with violent conflicts in rural and indigenous communities and is often driven by organized criminal networks.
- Forest loss is highest in the cattle industry (beef/leather), mainly for the domestic market.
- Around 20% of Brazil's land-use sector-driven deforestation is for export-oriented cash crops, primarily soy and maize and, to a lesser extent, sugar and coffee.[b]
- There have been widespread reports about weakened environmental laws and requirements over the last few years, and enforcement capacity is limited.
- Brazil's forest-risk agricultural commodities are exported globally, with all markets exposed to illegal deforestation risk.
- While it has signaled some high-level support for reducing future deforestation at the 2021 United Nations Climate Change Conference of the Parties (CoP26), efforts continue in Brazil to legalize land grabbing and illegal deforestation.

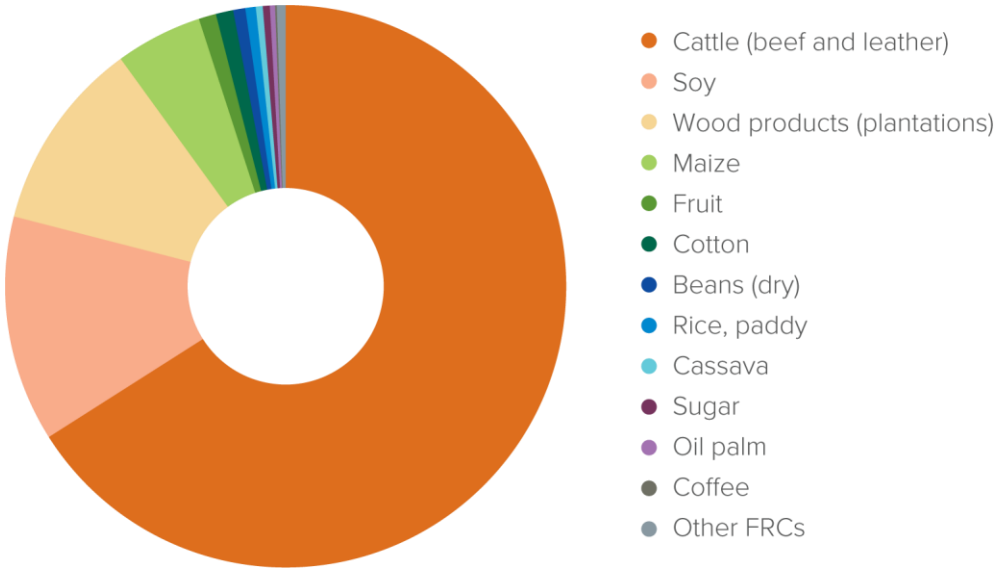
[a]The overall country governance risk scores reflect Forest Trends' 2021 updated assessment of national-level independent political, governance, business, economic, and corruption indices which draw on a broad range of relevant underlying data from the World Bank, African Development Bank, Asian Development Bank, Inter-American Development Bank, International Fund for Agricultural Development's programming criteria, United Nations and governmental aggregated data, as well as independent surveys and other primary data to provide an average relative governance and corruption risk score for 211 countries globally. Countries scoring less than 25 are considered "Lower-Risk," countries scoring between 25 and 50 are "Medium-Risk," and countries scoring above 50 are "Higher-Risk." The risk scores can only give an indication of the likely level of illegal deforestation in a country and ultimately speaks to the risk that corruption and poor governance undermines rule of law in the land sector. A full methodology is available on the IDAT Risk website: https://www.forest-trends.org/fptf-ilat-home/.

[b] The reliability of import and export trade data in sources such as FAOSTAT and UN COMTRADE depends on the reliability of the reporting country and/or international organization.

SUMMARY OF FRCs

- Main forest-risk agricultural commodities (FRCs) tied to illegal deforestation (production):[2]
  - Cattle (beef and leather)
  - Soy
  - Wood products (plantations)
  - Maize
  - Fruit
  - Cotton
  - Beans, dry

BRAZIL'S FRC PRODUCT-LINKED DEFORESTATION AS A PROPORTION OF TOTAL LAND-USE SECTOR-LINKED DEFORESTATION (%)[3]



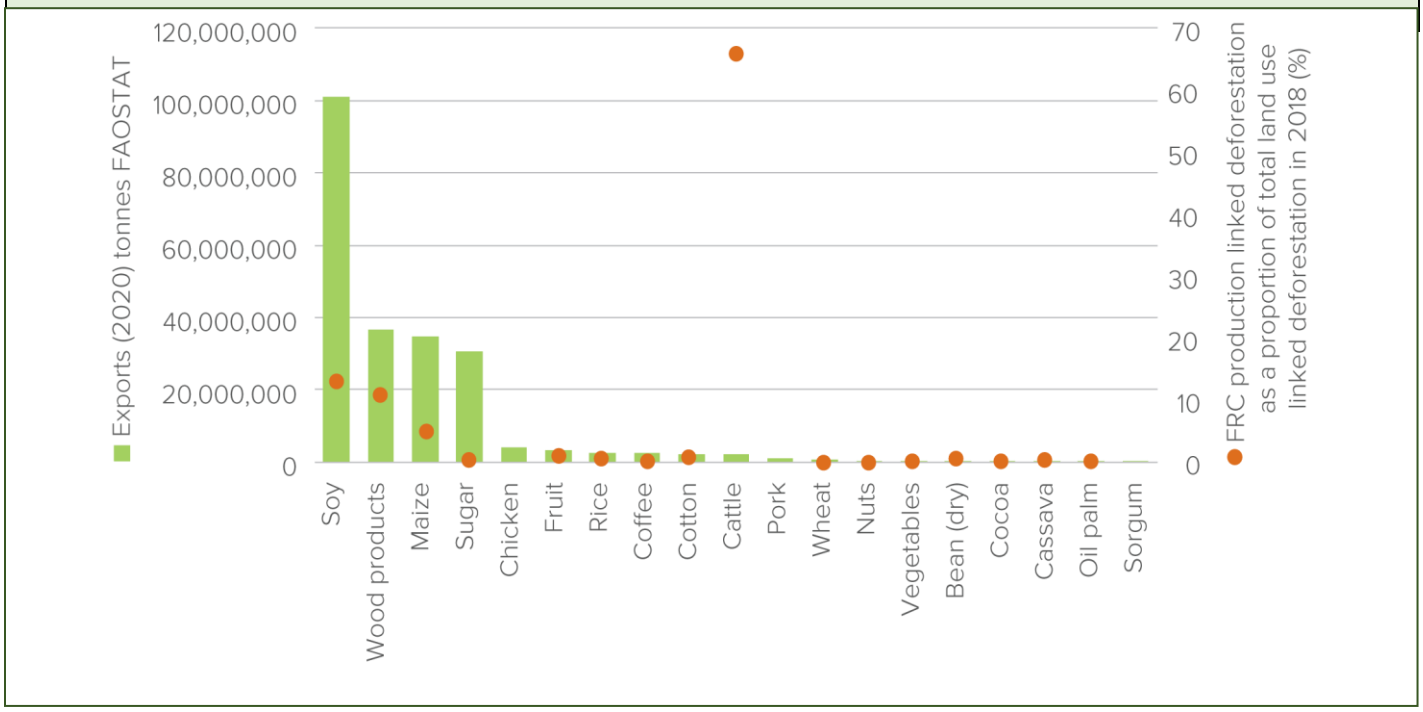
- FRC-related Moratorium on Forest Conversion in Effect: YES[c]

- Main FRCs exported to international markets:
  - Soy
  - Wood products[d]
  - Maize
  - Sugar cane
  - Rice
  - Coffee
  - Cattle (beef and leather)

[c] The Amazon Soy Moratorium was signed in 2006 as voluntary commitment by traders to stop buying soybeans grown on land deforested after 2006, revised to 2008; originally renewed annually and now in place indefinitely. Zero-Deforestation Commitments by Bunge, Cargill, Amaggi, Louis Dreyfus, and Archer Daniels Midland (the five largest global soy traders), and Glencore, the 13th largest trader. The 2009 Cattle Agreements include the Ministério Público Federal – Terms of Adjustment of Conduct (MPF-TAC) signed by meatpackers and the zero-deforestation agreement between the Big Four ("G4") and Greenpeace.

[d] While wood products are driving deforestation in Brazil and are sold to international markets, this dashboard will not specifically detail the illegal logging and trade risks associated with wood products from Brazil. Instead, there is a timber-specific legality-risk dashboard for Brazil that covers these risks in detail available on IDAT Risk at https://www.forest-trends.org/idat_countries/brazil/.

BRAZIL'S 2020 FRC EXPORTS AND PROPORTION OF LAND USE LINKED DEFORESTATION IN 2018 (%) [4]



- Related Export Restriction in Effect: YES
  - Rubber – personal protective equipment to be used in the health area, including latex gloves.[5]

LAND-USE SECTOR

- Forested area:
  - 496.6 Mha in 2020[6]
  - 11.2 Mha of plantations in 2020[7]
- Global ranking for forest loss:[e]
  - 2nd globally in total forest loss in 2020
  - 1st in forest loss in the tropics in 2020
- Total gross emissions from deforestation[:f]
  - 1.9 $GtCO_2e$ in 2020[8]
- Deforestation area:
  - 1.7 Mha of primary forest in 2020[9,g]

[e] Forest loss is defined as the complete removal of forest cover. Forest cover is defined as areas with greater than 50 percent tree cover greater than five meters tall.

[f] This dashboard quantifies the amount of greenhouse gas emissions (expressed in mega-tonnes (Mt) of carbon dioxide-equivalent emissions) from deforestation and other disturbances (forest fire and drainage of organic soils), as reported by Global Forest Watch (using methodology from Harris et al. 2021).

[g] Primary forests are naturally regenerated forests of native tree species, where there are no clearly visible indications of human activities and ecological processes are not significantly disturbed (FAO, "Global Forest Resources Assessment").

- 3 Mha of forest cover (>50% tree cover) in 2020[10]
- 1.8 Mha of primary forest from August 2019 – July 2020[11]

- **Rate of expansion of land for relevant commodities:**[12,h]
  - Soy 59% increase in harvest area, 2010-2020
  - Maize 44% increase in harvest area, 2010-2020[i]
  - Sugar 10% increase in harvest area, 2010-2020
  - Plantations 36% increase, 2010-2020
- **Forest Ownership:**[13]
  - Public ownership 281.1 Mha in 2015
  - Private ownership 221.2 Mha in 2015
  - Indigenous and tribal 1.6 Mha in 2015
- **Domestic Production by FRC in 2020:**[14]
  - Soy: 121,797,712 tonnes
  - Maize: 103,963,620 tonnes
  - Sugar cane: 757,116,855 tonnes
  - Rice, paddy: 11,091,011 tonnes
  - Coffee, green: 3,700,231 tonnes
  - Cattle (meat): 10,100,000 tonnes
  - Cattle (hides/leather): 1,010,000 tonnes
  - Wood products: 76,465,490 tonnes
- **Rates of likely illegal forest conversion for agriculture:**[j] 95%[15]
- **Proportion of FRCs exported:** 25% of commodities linked to deforestation exported in 2019[16]
- **Risk that forest-risk commodities exported were grown on illegally converted land:** 95%[17]

RISKS ASSOCIATED WITH ILLEGAL FOREST CONVERSION

Illegal deforestation has soared since 2016, particularly in natural forests. In 2020, deforestation in Brazil's Amazon rose to its highest level in more than a decade, and recent reports for January-March 2022 indicate that forest clearances in the region are the highest ever recorded. While Brazil saw dramatic reductions in deforestation and illegal clearances in the period between 2000 and 2012 due to strong political commitment, conservation measures, and enforcement efforts, there have been well publicized concerns about the scale of forest destruction (deforestation and forest degradation caused by logging) over the last few years.
Illegal land grabbing has been found to be highly correlated with conversion of forest land for agricultural commodities, particularly for cattle and soy, the largest drivers of deforestation in Brazil. At least 88 percent of

[h] Data is sourced from FAOSTAT. Limitations exist around production and expansion data, and reliability depends on multiple factors, including the type of crop (permanent or temporary). For additional information on FAO's methodology, see https://fenixservices.fao.org/faostat/static/documents/QCL/QCL_methodology_e.pdf.

[i] Most of the maize grown in Brazil is double cropped (grown on the same land) with soy, planted and reaped after the soy has been harvested. As a result, there is some overlap on harvest area estimates. For more information, see the following article in Land Use Policy: https://doi.org/10.1016/j.landusepol.2021.105591.

[j] Illegal deforestation is defined in this dashboard as conversion of forest that takes place in contravention of each country's legislative framework (laws, regulations, instructions, and any other legal instrument that penalizes non-compliance) at the time the deforestation took place. For purposes of this dashboard, conversions that were "legalized" after the fact (through amnesties or legal amendments, for example), after prosecution, or by paying a fine, are not considered to have been conducted in compliance with the rule of law. This dashboard does not include breaches of international law or customary law unless they are included in national statutory or case laws. This definition encompasses two general categories: illegalities in licensing and illegalities in forest clearance.

deforestation is due to commercial agriculture, of which 95 percent is likely illegal, often in violation of the Legal Reserve (LR) forest conservation quotas established by Brazil's Forest Code. [18]

- **Deforestation has soared since 2016, with illegal conversion of primary forests for agriculture reported across the Amazon and Cerrado biomes, and increasingly in Caatinga. Reports indicate that at least 95% of the deforestation for agriculture is likely illegal.**

Brazil has the second largest area of forest in the world at nearly 500 million hectares (Mha) (59 percent of its territory) of both natural and planted forests.[19] Natural forests occupy around 485 Mha in Brazil or 98 percent of the forest area.[20] Although it is most famous for the tropical forests of the Amazon, Brazil also has vast areas of semi-deciduous forest and the Cerrado—the most biodiverse savannah in the world, which includes both open field (*campo limpo*) and tall closed forest.[21]

Brazil has historically done more than any other country to protect its forests: 150 Mha are under some form of protected status – three times more than any other country, and this area accounts for 22 percent of protected forests worldwide.[22] Starting in the 21st century, strong actions were taken with the implementation of the National Plan to Combat Deforestation, which included greater enforcement of logging laws, moratoria on deforestation adopted by soy producers in 2006 and meatpackers, slaughterhouses, and cattle ranchers in 2009, and support for agricultural intensification rather than expansion.[23] The results were impressive. Annual deforestation rates in the Brazilian Amazon[24] decreased by 70 percent from 2005 to 2013 while simultaneously increasing agricultural production, and significantly reducing hunger and poverty. [25,26,27,28,29]

However, deforestation has soared since 2016, particularly in natural forests. According to Global Forest Watch (GFW),[30] deforestation across Brazil peaked in 2016, and the Government of Brazil reports that annual deforestation in the Legal Amazon (which includes part of the Cerrado in Mato Grosso, Tocantins, and Maranhão) reached 1.2 Mha in 2021, 170 percent more than the 2012 historic low of 0.44 Mha. According to GFW,[31] Brazil's forest loss in 2020 accounted for 28 percent of all loss in the tropics, with more than 3 Mha of tree cover cleared. Over half (57 percent) of Brazil's forest loss in 2021 was from primary forests (1.6 Mha). Over 90 percent of Brazil's 2020 loss in natural forests took place in the Amazon and Cerrado biomes according to Mapbiomas, with an increase in detection of deforestation in the Caatinga biome (4%, detected by a new system, SAD Caatinga). The majority of deforestation was reported in Pará, Mato Grosso, Maranhão, Amazon, Rondônia, and Bahia, with deforestation in Pará more than double that of Mato Grosso.[32] In the Cerrado, deforestation is increasing in Matopiba, including the states of Maranhão, Tocantins, Piauí, and Bahia.[33,34]

Commercial agriculture has been the primary driver of deforestation in Brazil; Mapbiomas estimates that agro-conversion was responsible for 88 percent of all forest loss between 2012 and 2019 (Table 1). This includes clearing forest for pasture to graze livestock (mainly cattle), which accounted for 77 percent of all forest loss, and to grow soy, which accounted for 6 percent of Brazil's total forest loss. Conversion of forestland for other agricultural purposes was responsible for 3 percent of Brazil's total forest loss in the period, while conversion to forest plantations accounted for 1 percent.[35] Global Forest Watch reported slightly lower estimates in 2020, suggesting that 73 percent of forest loss was driven by commodities and forestry (which includes the harvest of plantation timber), with an additional 26 percent by shifting agriculture, some of which may be commercial.[36]

Illegal agro-conversion is reportedly widespread in Brazil.[37] Forest Trends suggests that at least 95% of deforestation for commercial agriculture was likely illegal in Brazil, using data from MapBiomas and Global Forest Watch as well as interviews and literature.[38]

Table 1. Land-use change from natural forest to agriculture in the Cerrado and Amazon, 2012–2019[39]

To / From	Natural forest (secondary vegetation + primary forest) to agriculture (ha)	% of all deforestation
Pasture	11,437,101	77%
Soy	885,924	6%
Forest plantation	159,351	1%
Other agriculture	473,584	3%
Total agriculture	**12,955,960**	**88%**
Other land uses	1,842,514	12%
All land-use change	**14,798,474**	

Source: MapBiomas Land Cover Transitions Database 5.0, 2020

- **In Brazil (as in many countries), expansion of commodity agriculture development often stands in direct opposition to conservation efforts, but this already delicate balance is tipped by perverse incentives within Brazil's legislative framework that give little value to land that is not in "production," thus leading to extremely high rates of forest conversion.**

Brazil's legislation on land ownership and access rights is complex and continues to create uncertainty and conflict. Brazil's legislative framework[k] grants ownership to people who occupy, deforest, and cultivate "unoccupied" public lands, thereby incentivizing individuals to move into forested areas and clear them.[40] There are reports that land occupations and deforestation in the Brazilian Amazon are correlated.[41] It is common for land to be improperly recorded in the property registers or for documents to be fraudulently obtained, resulting in more than one ownership document relating to the same area.[42] While the overall rate of land grabbing is not fully known, it was estimated that in 1999, 55 million of the 157 Mha in the state of Amazonas were thought to be appropriated illegally. Although these numbers have likely declined, the practice of land grabbing persists.[43] Demand for increased production of agricultural commodities is also reportedly driving deforestation in regions where law enforcement is weaker and where public lands can be "grabbed" or purchased at low prices, such as in new frontier regions in Pará and Mato Grosso.[44]

Conflict between large landowners and landless squatters is common and often violent as both groups seek formal ownership of this "unproductive" land.[45] Landless people can claim squatters' rights on unproductive forest and sometimes mobilize large groups and move onto the land they wish to expropriate. The landowners deforest the land to demonstrate that it is "productive" and to increase its value, which increases compensation should it be expropriated. Every year, there are more people moving into the Amazon, and more investment in agriculture and ranching, requiring increased infrastructure.[46] Land speculation and money laundering are additional driving forces of deforestation.

[k] Brazil's Land Statute of 1964 reinforced the principle of *direito de posse*, or recognition of the right to land if it was undesignated public land that was peacefully occupied and put to productive use.

Since 2012, following the rise of a strong coalition of landed elites (the *ruralistas*) in Brazil's National Congress, there has reportedly been a systematic dismantling of Brazil's environmental protections in favor of infrastructure development and agribusiness.[47,48,49,50,51,52] In 2017, a law granted amnesty for forest cleared illegally between 2005 and 2011. Regularization of illegal land grabs encourages a cycle of invasion, deforestation, and titling that drives forest loss.[53]

The *ruralistas'* influence on legislation has reportedly increased substantially since President Bolsonaro took office in January 2019.[54,55,56,57] The Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), credited for reducing forest loss after 2004, as well as the government's environmental licensing system, have reportedly been "effectively dismantled" along with the environmental agencies.[58] There have been concerns that these actions signal impunity for illicit appropriations and also encourage further expansion of holdings, both licit and illicit.[59,60] Bolsonaro's proposed "land grabbers law" (PL-2633/2020), which passed the lower house in 2021, would, if passed by the upper house, legalize private ownership of deforested land, even in the 277 indigenous territories that have not yet had protection formally confirmed (see also Illegality section, below).[61,62] There is a risk that resulting land conflicts could impact agricultural supply chains in the future. As such, programs that grant land titles to illegally seized public or indigenous lands are at the heart of the problem of deforestation.[63,64,65,66]

- The main illegal agro-conversion risk associated with commodity production in Brazil involves operators failing to obtain the necessary permit issued by the Environmental Agency for clearing native vegetation.

The Brazilian Forest Code of 2012 (BFC) requires that the Environmental Agency issue a deforestation permit to authorize forest clearance (Authorization for Vegetation Suppression) for all areas unless it is a case of national security or accident prevention (Law 12.651/2012 art. 8, item 3).[67] This means that virtually all deforestation must have this permit to be considered legal, noting both the location and the area allowed to be cleared, and verifying that they are within the legal limits. Almost all deforestation is done without this permit and is therefore illegal. Other legality risks relate to the requirement to conserve natural vegetation on certain areas of private land. There should be no deforestation in Permanent Preservation Areas (APP), which include buffer zones alongside water bodies, rivers, creeks, springs, steep slopes, hilltops, and others, unless specifically for public interest or national utility. There should also be no deforestation in Legal Reserves (LR), which are the minimum proportion of private properties that must be kept under natural vegetation cover. This minimum varies according to the biome: for Amazonia it is 80 percent, Cerrado 35 percent, and 20 percent in other biomes.[68,69,70]

When the 2012 Forest Code was introduced, it reportedly weakened the remit of the Brazilian Legal Reserves (LRs) (the proportion of the property landowners had to maintain as native vegetation). The old Forest Code (1965) required the restoration of native vegetation cleared illegally from both APP and LR areas. However, the Forest Code of 2012 not only removed the requirement to restore areas cleared before 2008, but also excludes small and medium landholders from the requirement to restore forest illegally removed from LRs, representing 25 percent of the total area of farmland.[71] Thus, the 2012 BFC reduced Brazil's environmental debt (requirement to reforest) by 58 percent, and pardoned 90 percent of landowners.[72] Reports indicate that the 2012 Forest Code has decreased illegal conversion in LRs and that while some limited illegal conversion still

takes place in LRs, only 2 percent of properties (mostly the largest farms) are responsible for 62 percent of the illegal deforestation.[l,73]

The main risk associated with illegal forest clearance for agriculture in Brazil is reportedly tied to operators failing to obtain the necessary permit issued by the Environmental Agency for clearing native vegetation. In addition, illegal logging on permitted properties within LRs that does not meet the BFC-mandated forest cover threshold is common.[74] Other risks are related to illegal land tenure and land acquisition. These risks apply to all forest conversion for agriculture.

- **Land grabbing is highly associated with violent conflicts in rural and indigenous communities and is often driven by organized criminal networks.**

Land grabbing is highly associated with violent conflicts in rural and indigenous communities and is often driven by organized criminal networks. There was an average of 30 homicides per year related to land conflicts, with a total of 723 homicides between 1994 and 2014.[75] The Pastoral Land Commission (Comissão Pastoral da Terra) has estimated that land conflicts in Brazil hit 1,576 cases in 2020, the highest number ever recorded since tracking began in 1985.[76] Many of these cases have involved indigenous people and rural activists in the Brazilian Amazon. At least 182 indigenous people were murdered in Brazil in 2020, and there were 263 recorded cases of land invasion.[77] Recent court cases further reveal violent crimes against members of communities using the forests for subsistence, aimed at driving them off the land or discouraging them from invoking their rights.[78]

Illegal land grabbing and deforestation occur across the 110 Mha claimed by indigenous peoples.[m] In 2020, 7 percent of deforestation was illegal because it occurred within protected areas and indigenous territories.[79] Global Forest Watch (2021) reports that between 2010 and 2020, 6 percent of forest loss (1.8 Mha) took place in indigenous and community territories, many of which were invaded by land grabbers after the process of regularization of indigenous land was stalled. Clearing without a legal title is illegal.[80]

Brazil does not have legislation that governs free, prior, and informed consent (FPIC), but traditional and indigenous communities have the right to access forest resources. Decree 419/11 requires environmental-license applicants to declare if there are indigenous or Quilombola (descendants of Afro-Brazilian slaves) lands in the vicinity of the license area, so that the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) may consult those concerned. The large number and scattered nature of the traditional communities in Brazil leads to a low level of compliance with this legislation.[81]

In the Brazilian Amazon, there are still 50 Mha of public lands that have not been designated, making them extremely vulnerable to illegal deforestation and land grabbing. Former public lands now registered to private owners have questionable legal claims.[82] Reydon et al. (2019) estimate that more than half (56 percent) of claims may be based on fraudulent documentation, and another 24 percent are claimed by landowners without

[l] Most of Brazil's agricultural properties are reportedly free from deforestation. A small number of farms tarnish the sector with illegal deforestation: roughly 20 percent of properties are responsible for 80 percent of potentially illegal deforestation (Rajão et al. 2020).

[m] Brazil has 51 indigenous reserves either already established or in the process of being established. Organizations such as the New Social Cartography Institute, FUNAI, and The Palmares Foundation have mapped the 110 Mha of traditionally occupied indigenous lands (Preferred by Nature 2017).

the actual title (for these, regularization is only possible on a case-by-case analysis based on their size, history, and location). [83]

- Forest loss is highest in the cattle industry (beef/leather), mainly for the domestic market.

Cattle (beef and leather) has reportedly been responsible for over 15 Mha of deforestation between 2005 and 2018 and accounts for roughly two-thirds of Brazil's land-use sector-driven forest loss.[84] The majority of cattle products are consumed on the domestic market: only 22 percent of beef is exported and 48 percent of leather.[85,86,87]

Historically, over the last thirty years, reports have suggested that Brazil's area of pastureland has grown from about 136 Mha in 1990 to around 167 Mha by 2019, although 30 Mha of the 1990 pastureland had been converted to other uses (60 percent for crops, like soy). Of the 2019 pastureland, 59.8 Mha had been natural forest in 1990.[88] Forest Trends reported in 2021 that about 36% of Brazil's cattle production is likely associated with forest loss that occurred over the last 30 years.[89]

A moratorium on deforestation for cattle pasture has been in place since 2009 under the beef producers' G4 zero-deforestation agreement. The moratorium was signed after the Federal Public Prosecutor's Office of Pará started to sue ranchers and the four largest meat-packing companies for illegal deforestation.[90] Although illegal deforestation related to cattle ranching for direct suppliers might have been reduced between 50 to 75 percent by 2013, loopholes in the tracking system and the scattered supply chain across small properties make it difficult to track indirect deforestation.[91,92,93]

The cattle supply chain involves a series of complex trades where calves are moved between multiple properties before they are slaughtered and sold. Beef exporters rely on buying calves from smallholders who might be using pastures in areas that were recently deforested. Cattle from ranches associated with illegal invasions of public lands may be laundered into the export supply chain by moving them to deforestation-free ranches. Illegalities are hidden behind fraudulent transportation documents, the use of middlemen to deliver cattle to slaughterhouses, and other subterfuges.[94,95]

Using data from Trase, PRODES, the Cadastro Ambiental Rural (Rural Environmental Registry of Brazil or CAR), and Guide to Animal Transport data (GTA)[96] tracked cattle entering export supply chains from illegally deforested areas in 2020. Their findings indicate that in Pará and Mato Grosso states, the leading beef-exporting states, 60 percent of slaughtered cattle came from properties that carried out potentially illegal deforestation. Of this amount, 12 percent were directly from suppliers who deforested after 2008, and the remainder from indirect suppliers. They estimate that since 2008, 2.36 Mha of deforestation linked to cattle ranches in these biomes was illegal.

Cattle ranching is illegal in indigenous reserves and territories. Nevertheless, Amnesty International (2019) documented cattle grazing on two reserves and three indigenous territories in Brazil's Amazon. In five sites, the illegal land seizures were accompanied by threats and intimidation, or the locals were directly forced off the reserve. The four sites in Rondônia (Karipuna and Uru-Eu-Wau-Wau indigenous territories, and Rio Ouro Preto and Rio Jacy-Paraná Reserves) held almost 100,000 cattle from more than 700 properties.[97]

JBS is the biggest meat processor in the world, and it operates 37 meatpacking plants in Brazil. JBS shifted its deadline for eliminating illegal deforestation in its supply chain to 2030 and all deforestation to 2035.[98] JBS' deforestation footprint since 2008 was estimated to be 200,000 ha in its direct supply chain and 1.5 Mha in its

indirect supply chain.[99] Brazil's two largest supermarket chains, Carrefour and Grupo Pão de Acucar (GPA, Casino), both subsidiaries of French retailers, have been accused of sourcing beef from deforested land.[100] Brazil's National Bank for Economic and Social Development (BNDES) reportedly financed farms that have been illegally deforested, that overlap with indigenous lands or conservation units, and that used slave labor, despite this being prohibited according to their regulations.[101] Meanwhile, Brazil's revenue from beef production is projected to face net losses of $180.8 billion due to reduced rainfall and climate change, if weak environmental governance continues.[102]

Leather is an important product from cattle pastured on former forest. The leather industry in Brazil is worth over $50 billion and leather is an important part of the meatpacking business, contributing to 26% of large meatpackers' incomes and making the difference between profit and loss.[103,104] JBS has its own tanneries and profits from the value of the processed hides.[105] The majority of leather is exported, with the European Union as the main market.[106]

- Around 20% of Brazil's land-use sector-driven deforestation is for export-oriented cash crops: primarily soy and maize and, to a lesser extent, sugar and coffee.

Despite reported reductions in the rates of expansion into forest land, agricultural production continues to rise steadily in South America, relying on increasing productivity and substitution of extensive pastureland by crops. Brazil's production of export-oriented cash crops accounts for around 20 percent of attributable land-use sector-driven forest loss. Wood plantations are also driving an additional 11 percent of Brazil's land-use sector attributed deforestation.[107,n]

Soy production accounted for over 3 Mha of deforestation between 2005 and 2018.[108] Between 60 and 70 percent of soybeans produced in Brazil are exported annually to international markets. Soybeans from Pará in the Amazon, the Cerrado and Caatinga regions carry the highest risks of illegal deforestation.

Over the last thirty years, reports have suggested that the area under soy production in Brazil has increased from 13.7 Mha in 2000 to 37.2 Mha in 2020.[109] At least 23.2 Mha of this area is in Amazonia and the Cerrado. In 2021, Forest Trends estimated that at least 49 percent of this area was converted illegally from forestland from pre-1995 to 2019, based on an assessment of studies and land-use data. Rajão et al.[110] also estimate that at least 20 percent of all soy exported from the Amazon and the Cerrado between 2014 and 2017 was potentially linked to illegal deforestation on the basis that deforestation without permits after 2008 (the deadline year for granting amnesty) was likely illegal. Because their analysis was based on properties registered on Brazil's environmental registry of rural properties (CAR), which covers only 80 percent of the soy planted in the region, illegal deforestation could potentially be higher.[111] Furthermore, cattle ranching and soy cultivation are inextricably linked in a cycle of deforestation; soy cultivation is often carried out on land that had previously been cleared for ranching, thus pushing cattle ranchers to clear more forest.[112]

The declining rates of soy expansion into forest (Table 2) have been widely reported to be a result of the soy moratorium in 2006, agreed to by large soy exporters, collectively trading 90% of the soy in the Amazon biome.[113] For example, 30 percent of soy expansion reportedly occurred through direct deforestation in the two years preceding the moratorium, but by 2014, only 1 percent of soy expansion was from clearing.[114] As

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such, the risks associated with illegal deforestation for soy production in the Amazon declined significantly between 2006 and 2019. However, the future of the Amazon Soy Moratorium is uncertain. In 2019, the government of Brazil joined the soybean farmers' association, Aprosoja, in campaigning against it.[115] The Brazilian government has suggested that the moratorium violates national sovereignty by sanctioning producers who deforest legally. Soy traders have continued to defend the moratorium, suggesting that cancelling it could lead to reduced access to export markets. The Amazon experienced 356,000 ha of direct deforestation for soy between 2001 and 2005, and the same amount in ten years from 2006 to 2016.[116] Central Mato Grosso successfully reduced deforestation for soy, while municipalities in eastern Pará saw increases (e.g., in Paragominas where deforestation increased from 1,000 ha/yr between 2006 and 2008 to 3,300 ha/yr between 2014 and 2016).

Soy yield in Brazil is projected to increase by 33% by 2050 (with 2012 as the baseline year).[117] While there is an opportunity for this to happen on cleared land in Mato Grosso, Pará, and Rondônia without causing new deforestation, there is a risk that this will drive further forest loss for new pasture.[118,119]

While there may currently be a low risk of illegal deforestation tied with soy production in the Amazon biome, deforestation reportedly continues apace in the Cerrado, where there is no moratorium. More soybeans are cultivated in the Cerrado than in the Amazon, and it is more often a direct driver of deforestation.[120] Between 2004 and 2014, up to 30 percent of the soy expansion in the Cerrado replaced native vegetation. At least 50% of the expansion that resulted in forest loss took place in Matopiba.[121,122] The Caatinga region in northeastern Brazil is experiencing rapid growth in soybean cultivation: 87% of new land for soy was previously semi-arid woodland.[123]

Table 2. Soy expansion into forest in Brazil, pre-1995-2019 (Mha)

Time period	Prior to 1995 [124]	1995–2005[125]	2005–2012 [126]	2012–2019		Total
				Cerrado[127]	Amazon[128]	
Deforestation caused by soy (Mha)	7.6 (11.7 x 65%)	7.2	2.2	0.64	0.25	17.89

More than 160 consumer goods companies signed a 2017 call for soy and meat traders to eliminate deforestation in the Cerrado from their supply chain.[129] In 2019, members of the Soft Commodities Forum (who purchased 56% of soy exported from the Cerrado from 2006-2017) pledged to eliminate deforestation from their supply chains, with a focus on 25 priority municipalities in the Cerrado. By 2017, Zero Deforestation Commitments (ZDCs) covered 46.5% of soy exported from the Cerrado, up from zero four years earlier. However, the ZDCs have "systematic weaknesses," and there has been no reduction in deforestation exposure since ZDC commitments were made.[130] This means that soy produced in the Cerrado biome remains at an elevated risk for illegal deforestation entering supply chains.

In addition, the Cerrado still has more than 20 Mha of native vegetation and another 31.9 Mha of land suitable for soy already cleared (especially in Matopiba).[131] As such, if a soy moratorium is not adopted to include the Cerrado, reports have suggested that over the next few decades, soy could replace an additional 3.6 Mha of

native forests. An additional 2.3 Mha may be deforested by ranching, which would ultimately be displaced by soy expansion.[132] Based on current best estimates, all would likely be illegal.[133]

Soy farming is therefore also associated with a risk of driving indirect land-use change, including indirect illegal deforestation, where cattle ranches in states such as Mato Grosso, Pará, and Rondônia are displaced by soy plantations, causing the ranchers to clear forests for new pastures elsewhere.[134,135,136,137,138] The ranchers often follow loggers, who have reportedly created access to the Amazon with logging roads searching for high-value timber species such as ipê.[139] MapBiomas[140] estimates that between 2012 and 2019, ranchers cleared 11.4 Mha of forest in the Amazon and Cerrado, while only increasing the total area under pasture by 1.9 Mha. That difference is due to 7.17 Mha of pasture being converted to cropland (65 percent for soy) over the same period. Furthermore, soy farmers cleared almost 1 Mha of forest themselves, but were able to expand into at least 4.64 Mha of pastures originally cleared of forests by cattle ranchers.

Average maize productivity in South America increased from 2.0 t/ha in 1990 to 5.0 t/ha in 2015.[141] Despite this increase in crop productivity, yields have not reached a level that can meet the current and growing demand for cereals and oilseeds. This has meant that farmers in the region have continued to expand their land area under cultivation. Most of this new land conversion has happened on grasslands rather than natural forests.[142] However, direct and indirect deforestation still occurs, and deforestation rates have recently escalated in the region. In South America, Argentina and Brazil account for more than 90 percent of the total maize trade, with most of the maize grown in the Cerrado in Brazil intercropped with soy. Approximately 25% of the global tropical forest destruction associated with maize took place in Brazil, with 3.2 Mha of tropical forest cleared between 2005 and 2018.[143,144]

Patterns of forest loss over the last fifteen years indicate that Brazilian forest clearance for maize declined between 2005 and 2009, before increasing between 2010 and 2013 and exponentially growing after 2013.[145] In fact, half of Brazil's forest loss associated with maize production took place between 2013 and 2018. While Pendrill et al. (2022) have only estimated the extent of tropical forest loss tied to agricultural commodities up to 2018, the area of maize production has reportedly continued to increase up to 2020.[146]

Maize production in Brazil has reportedly shifted from the traditional South-Southeast regions, principally in the States of Minas Gerais and Paraná, to the frontier Center-West region, principally the State of Mato Grosso.[147] Soybean and maize double-cropping is increasingly common in Brazil, with about 72% of Brazilian maize planted as a second crop in 2020, up from 39% in 2010.[148] The Paraná and Mato Grosso states have the highest soybean production and rates of double cropping: 48% of Brazil's soybeans were produced in these two states, and 65% of maize production was as a second crop in 2013.[149]

Double cropping systems make it hard to understand the role that maize specifically plays in driving either legal or illegal deforestation. Zalles et al. (2019) report, using satellite analysis, that the area of intensive row cropping in Brazil nearly doubled from 2000 to 2014, mainly from repurposing existing pastureland (80 percent of new cropland), with around 20 percent of the new cropland a result of conversion of natural vegetation. At the same time, the Cerrado savannas, where maize is mostly produced, experienced 2.5 times the natural vegetation conversion of the Amazon biome.[150]

Sugar production accounted for around 194,000 ha of deforestation between 2005 and 2018.[151] Around 42 percent of the raw sugar produced from sugar cane in Brazil was exported annually to international markets in 2019.[152]

Brazil accounts for roughly 38% of the global tropical forest destruction for sugar production between 2005 and 2018.[153] However, around 4% of Brazil's sugar production is estimated to be associated with deforestation since 1985.[o]

Brazil is the world's leading producer of sugar cane and is second only to the US in bioethanol production.[154,155] In 2021, 45% of Brazil's sugarcane was used to make sugar and 55% to make ethanol.[156] The number of sugar plantations increased until 2016, after which there has been a slight decline.[157] Forest loss for sugarcane production peaked early in 2010, where 19,656 ha of forest was cleared for sugar production.[158,159]

Cultivation of sugar cane was prohibited in the Mato Grosso wetlands (*pantanal*) and Amazonia regions between 2009 and 2019 (under presidential decree No 6.961), but this ban was overturned in 2019. Sugarcane is not suited to the Amazon, so reversing the ban is not likely to lead to direct deforestation for sugar in the Amazon. However, expansion in the Pantanal could increase the pressure on forest that is already under threat, particularly since the Forest Code (2012) only requires 35% of native vegetation in the Pantanal to be conserved as its Legal Reserve.[160] It could indirectly affect the Amazon by increasing the value of land and drive further land speculation in the Amazon.[161]

Lifting the ban was criticized for bringing reputational risk to the sugar industry, tainting the supply chain with increased deforestation risk, when more than 90 percent of Brazilian sugarcane is grown in the drier central-southern and northeastern regions of the country.[162,163] Brazil's 2017 national biofuels policy, RenovaBio, has a voluntary zero-deforestation commitment, and the European Union (EU) has expressed concern that lifting the land zoning ban leaves insufficient safeguards for deforestation-free bioethanol supply chains.[164,165]

Brazil is the world's largest producer of coffee, reporting production of 3.7 million tons in 2020.[166] In 2018, 51% of production was exported as unprocessed beans, and a further 28% was exported as roasted or other processed forms. Deforestation linked to coffee production was estimated at 26,000 ha from 2005-2018, of which 65% was exported.[167] The EU was the biggest market for coffee beans, followed by the US and Japan. Coffee cultivation is concentrated in four states: Minas Gerais, Espírito Santo, Bahia, and Rondônia. Arabica coffee production is mostly in the Cerrado in the southeast, while conilon coffee is grown predominantly in Espírito Santo and Rondônia.[168]

- There have been widespread reports of weakened environmental laws and requirements over the last few years, and enforcement capacity is limited.

There has reportedly been a "deepening of measures adopted since 2019 to eliminate environmental regulations, on the one hand, and to abdicate from environmental management, on the other."[169] At least 57 pieces of legislation have been approved since 2019 that weaken environmental laws, from relaxing forest protections to declassifying the toxicity of pesticides. Almost half of the legislation, 27 bills, were passed during the height of the COVID-19 pandemic in Brazil, from March to September 2020.[170]

The positions of Secretary of Climate Change in the Ministry of Environment, and Secretary of the Environment in the Ministry of Foreign Affairs have been removed, and the Forestry Service, responsible for the registry of rural properties, has been moved to the Ministry of Agriculture.[171] Key positions in IBAMA (the national

[o] According to Mapbiomas (Transitions), since 1985, 367,040 ha of forest has been converted to sugarcane cultivation. Brazil had 10 Mha of sugar cane under cultivation in 2019, so 367,040 ha of forest destruction accounts for 4% of the total (FAOSTAT).

environmental law enforcement agency) have been either been left vacant or filled by political allies to the current administration. IBAMA's budget has been reportedly cut by 24% in 2021 compared to the previous year, despite a pledge to double it.[172] The participation of civil society in the national council for the environment has been reduced and international funding for NGOs blocked.[173] INPE's (the national space agency) monitoring of deforestation has been criticized and discredited. The National Association of Environmental Careers, which represents staff from the Environment Ministry and its enforcement agencies, filed a case with the federal prosecutors accusing senior officials of "collective psychological harassment."[174] This has effectively reduced the tools available and the ability for enforcement officials to tackle illegal deforestation.

In addition, very little deforestation that is identified is also inspected: only 5% of the area thought to be illegally deforested between 2019 and 2020 had been inspected, fined, or embargoed by IBAMA by April 2021. State-level agencies have started to ramp up their enforcement efforts. For example, in Mato Grosso, the state environment agency inspected four times more land at risk of illegal deforestation than IBAMA between 2019 and 2020, but only 50% of the deforestation found to be illegal in the inspections has been fined.[175]

- Brazil's forest-risk agricultural commodities are exported globally, with all markets exposed to illegal deforestation risk.

China is the main export market for Brazilian soybeans, accounting for 70 percent of Brazilian soy exports in 2018, up from 59 percent in 2013, while the EU's imports decreased from 23 percent to 13 percent.[176] These trends reflect China's growing demand for agricultural products, as well as several US several trade actions against China (and other countries) in early 2018 that precipitated retaliatory trade actions. As a result of the trade war, US agricultural exports to China declined 53 percent in value to $9 billion in 2018 from $19 billion in 2017, which led China to look for other source markets like Brazil. As Brazil's exports shifted towards China, soy producers began demanding the end of the soy moratorium. The US-China trade agreement signed in 2020, which requires China to increase its purchases from the US, may see another shift as China switches back to US sourcing.[177,178]

While Brazil's soy exports to the EU have decreased over the last decade, the EU still sources 41 percent of all imported soy from Brazil. France is the main EU Member State export destination for Brazilian soy. Mighty Earth has suggested that Bunge and Cargill are the largest importers of high-risk soy into France.[179] Between March 2019 and March 2020, Bunge was linked to the deforestation of almost 60,000 ha in Brazil.[180] In 2020, Carrefour and seven other supermarkets in France pledged to use deforestation and conversion-free soy, but Carrefour is accused of continuing to source from Cargill and Bunge.[181]

Brazil's rapid increase in exports of maize has been driven by rising demand from all major export markets, particularly Japan and Vietnam. They have increased their maize imports from Brazil by more than 1,000 percent since 2010, and together bought a quarter of Brazil's maize exports in 2019. Iran has remained a major buyer of Brazilian maize over this period, importing 13 percent of Brazil's 2019 exports. EU and EFTA (European Free Trade Association) countries increased maize imports from Brazil by over 400 percent since 2006, with the EU27 Member States sourcing around 11 percent of their imported maize from Brazil in 2020.[182,183]

Brazil's raw sugar exports were valued at $5.3 billion (bn) in 2019, with the top destinations: Algeria, Bangladesh, Nigeria, Saudi Arabia, and China. Ethanol exports were worth $1 bn, of which nearly two-thirds went to the US (62 percent), followed by South Korea (24 percent).[184] Brazil's ethanol only accounted for 5 percent of EU purchases in 2016, when it was subject to the high tariff of 0.19 euro/L.[185] The EU-Mercosur

trade deal, agreed in June 2019, awarded an in-quota duty of one-third of the most-favored-nation (MFN) rate for 450,000 tons of ethanol for chemical use and 200,000 tons of ethanol for all uses, including fuel, which made up 78 percent of EU imports in 2019.[186]

While only a small percent of Brazilian cattle (meat and leather) products are exported, the main markets for Brazilian beef are China, Hong Kong, the Russian Federation, Egypt, and Chile. Brazil was the source of 43 percent of China's beef imports in 2018, up from zero from 2013–2014.[187] Live cattle exports are destined for the halal markets of Turkey, Lebanon, Jordan, and Iraq, and are associated with nearly five times more deforestation risk per ton than processed beef and offal.[188]

Trase[189] estimates that in the three years between 2015 and 2017, 6.16 Gt of beef were exported, of which 68 percent came from the Amazon and Cerrado biomes.[190] When compared with FAOSTAT data for total production (28.3 Gt), exports represent 22 percent of production, considerably higher than the 11 percent of beef exported according to COMTRADE global import data. The Trase data is preferred in this case, as it combines customs, shipping, tax, logistics, and other data.

Brazil is one of the world's largest leather exporters, trading primarily with China, Vietnam, Italy, and the US. Leather from Brazil is used in car seats manufactured in the US and Europe. The New York Times reported that Lear, a company based in Michigan, is the largest importer of hides from JBS, Vancouros, and Viposa (the latter two process hides for Marfrig, while JBS owns its own tanneries). These companies track back only to the farm they sourced cattle from, which is not necessarily the cattle's origins. Selling to a middleman is a strategy used by farms to disguise the origin of cattle grazed on illegally deforested land. The New York Times investigation identified that nearly 650,000 ha of JBS supplier ranches were likely illegal.[191] This follows prosecutions in which JBS was fined $970 million for fraudulent loans in 2019, $8 million for illegal deforestation, and $3.2 billion for bribing politicians in 2017.[192,193]

The Brazilian Tracking Service of Bovines and Bubalus (SISBOV) is mandatory for farmers wishing to export to the EU and other countries requiring traceability, but many animals are entered into the system only 90 days before slaughter and only 0.5% of Brazilian farms are registered. To trace deforestation, it would need to track animals from birth until they reach market weight, which can take several years.[194,195] In 2021, Sainsbury, Lidl Netherlands, and other European supermarkets announced they would stop selling some or all beef products originating in Brazil because of links to deforestation.[196]

Table 3. Brazilian forest-risk commodity statistics

BRAZILIAN FOREST RISK COMMODITY STATISTICS					
Commodity	Average Annual Production Volume (2010-2020)[197]	Major Areas of Production	Total Associated Forest Clearing (2005-2018)[198]	Average Annual Associated Emissions (2005-2018)[199]	Average % Exported (2010-2020)[200]
Soy	102,096,296 tonnes	Mato Grosso, Paraná, Rio Grande do Sul[201]	3,110,628 ha	87,040,000 tCO_2e	69%
Maize	79,834,349 tonnes	Mato Grosso, Paraná, Goiás[202]	1,185,500 ha	34,260,000 tCO_2e	31%

Sugar	793,036,502 tonnes	São Paulo, Goiás, Minas Gerais[203]	193,540 ha	4,690,000 tCO_2e	3%
Rice	19,530,758 tonnes	Rio Grande do Sul, Santa Catarina, Tocantins[204]	286,130 ha	9,810,000 tCO_2e	10%
Coffee	3,003,194 tonnes	Minas Gerais, Espírito Santo, São Paulo[205]	25,739 ha	400,000 tCO_2e	66%
Cattle (beef and leather)	11,761,784 tonnes	Mato Grosso, Goiás[206]	15,427,525 ha	568,120,000 tCO_2e	11%

- **While it has signaled some high-level support for reducing future deforestation at the 2021 United Nations Climate Change Conference of the Parties (CoP26), efforts continue in Brazil to legalize land grabbing and illegal deforestation.**

Brazil joined 140 other countries in signing the "Glasgow Leaders' Declaration on Forests and Land Use," and joined the Forests, Agriculture, and Commodity Trade (FACT) dialogue's roadmap for action at the 2021 United Nations Climate Change Conference of the Parties (CoP26), which aims to reduce deforestation, support smallholders, and increase transparency in supply chains.[207,208] It remains to be seen what impact these commitments will have on forest conservation in Brazil. The "landgrabbers bill" passed Brazil's lower house of Congress in August 2021, shortly before CoP26, and is criticized as a form of amnesty for land invasions that rewards illegal land grabbing with land deeds. As of this writing, the bill still needs to pass in the Senate.[209] Indigenous lands, covering 23% of the Legal Amazon, have been important in protecting forests, but are threatened by another proposed law (PL 191/2020). This would allow mining and hydropower development inside indigenous lands, undoing protections enshrined in articles 176 and 231 of the constitution.[210,211]

CoP26 also saw more than 30 financial institutions, managing over $8.7 trillion in assets, commit to stop investing in high deforestation-risk agricultural commodity supply chains.[212] Eight financial institutions and agribusiness companies launched Innovative Finance for the Amazon, Cerrado, and Chaco (IFACC), and committed $3 billion to cleaning up the soy and cattle supply chains in South America. This followed a report by Reuters in 2020 stating that seven major European investment firms, including Nordea and Legal & General Investment Management, will divest from beef producers, grains traders, and government bonds if their environmental policies are inadequate.[213]

At CoP26, Brazil's new climate action plan was criticized for failing to increase the ambition of the Nationally Determined Contributions submitted in 2016, and for lacking an operational plan to back up the promise to end deforestation. A month earlier, Brazil had announced the "National Green Growth Program," which sets out objectives to protect biodiversity and reduce emissions, but not to stop deforestation.[214] Brazil's emissions from forest disturbances were 1.9 Gt CO2e in 2020, a 13% increase from 2019.[215]

REPORTS & ADDITIONAL RESOURCES

A list of relevant reports and additional online tools to complement this country report is available at: https://www.forest-trends.org/fptf-idat-home/.

Key Reading

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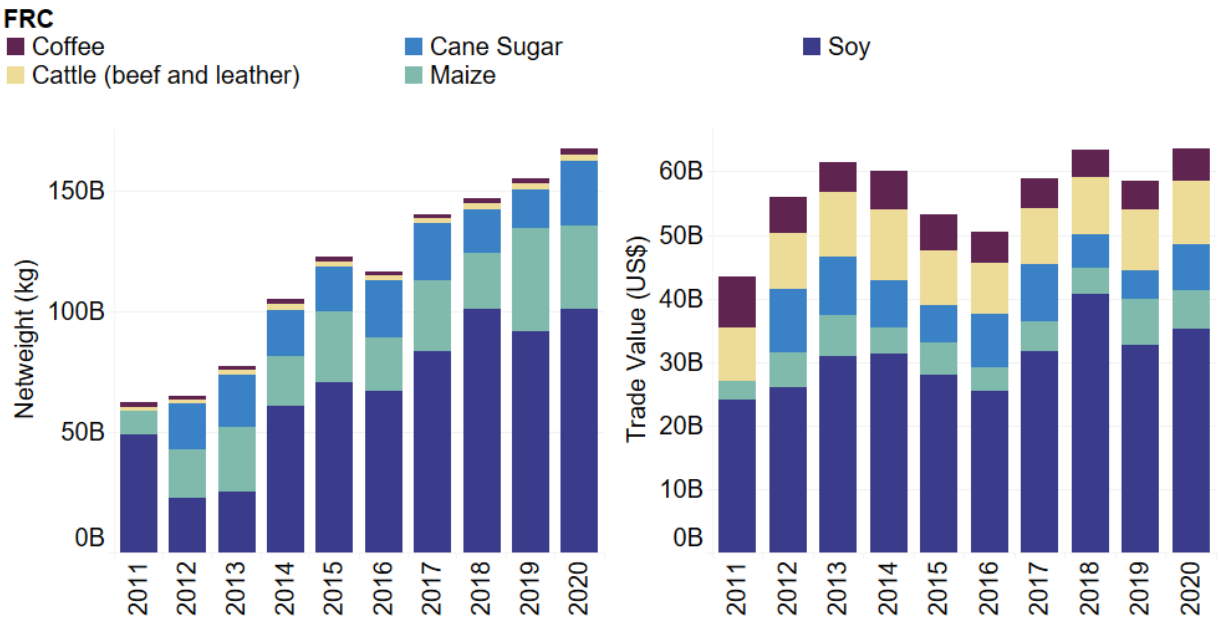
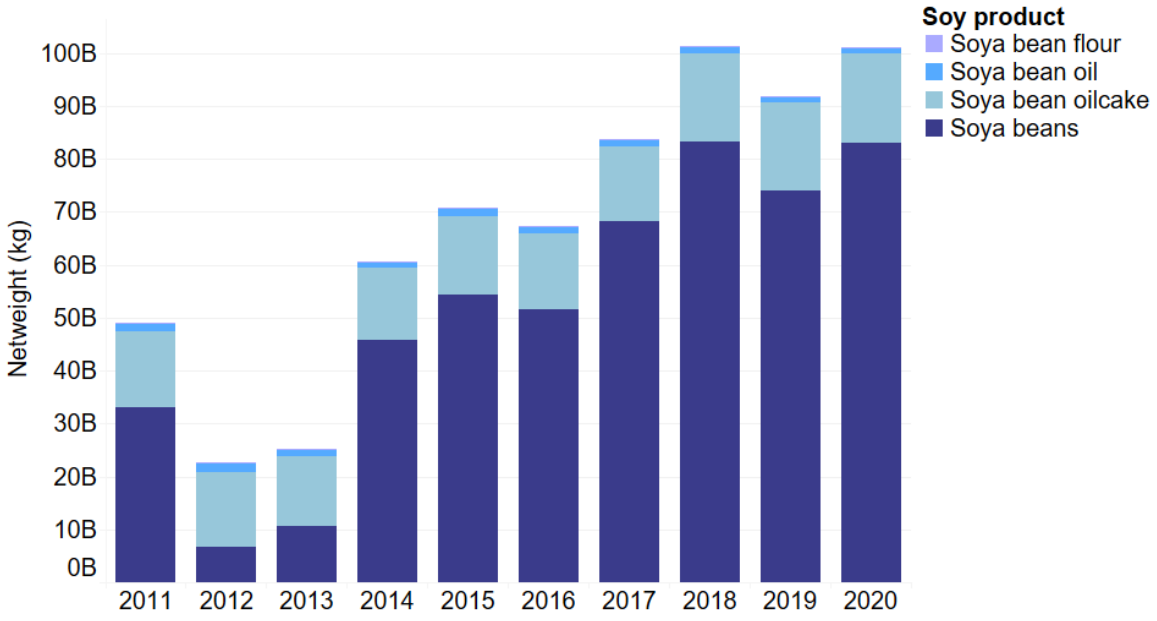
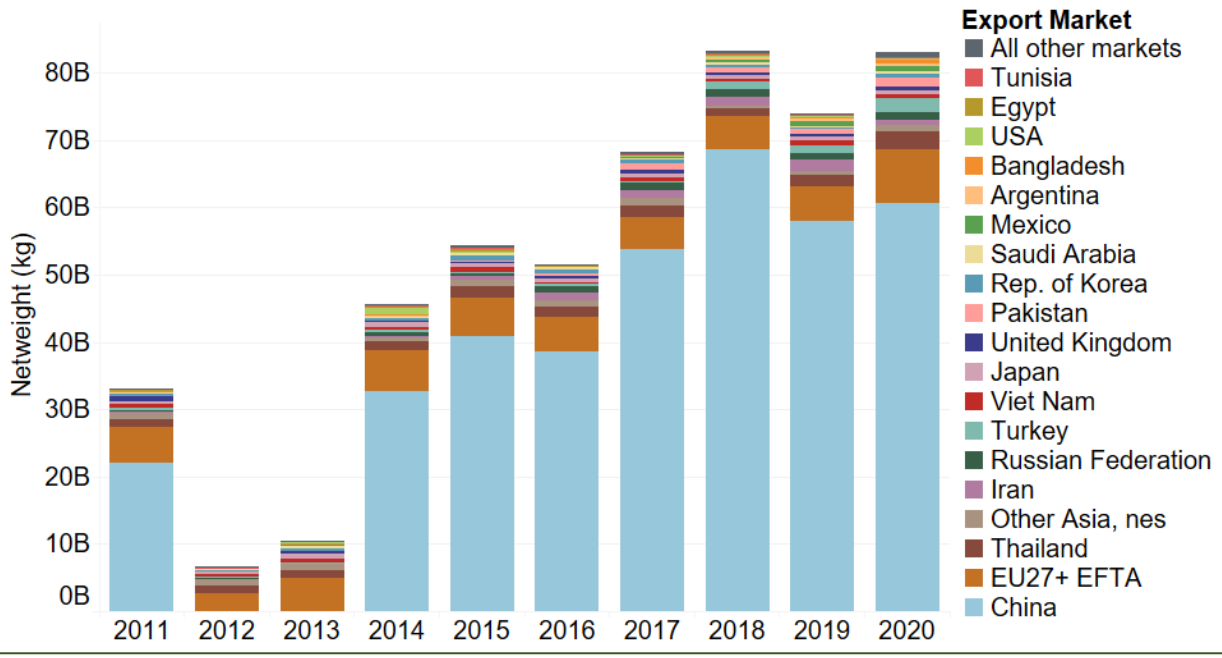
BRAZIL'S EXPORTS OF TOP FIVE FRC PRODUCTS[216]



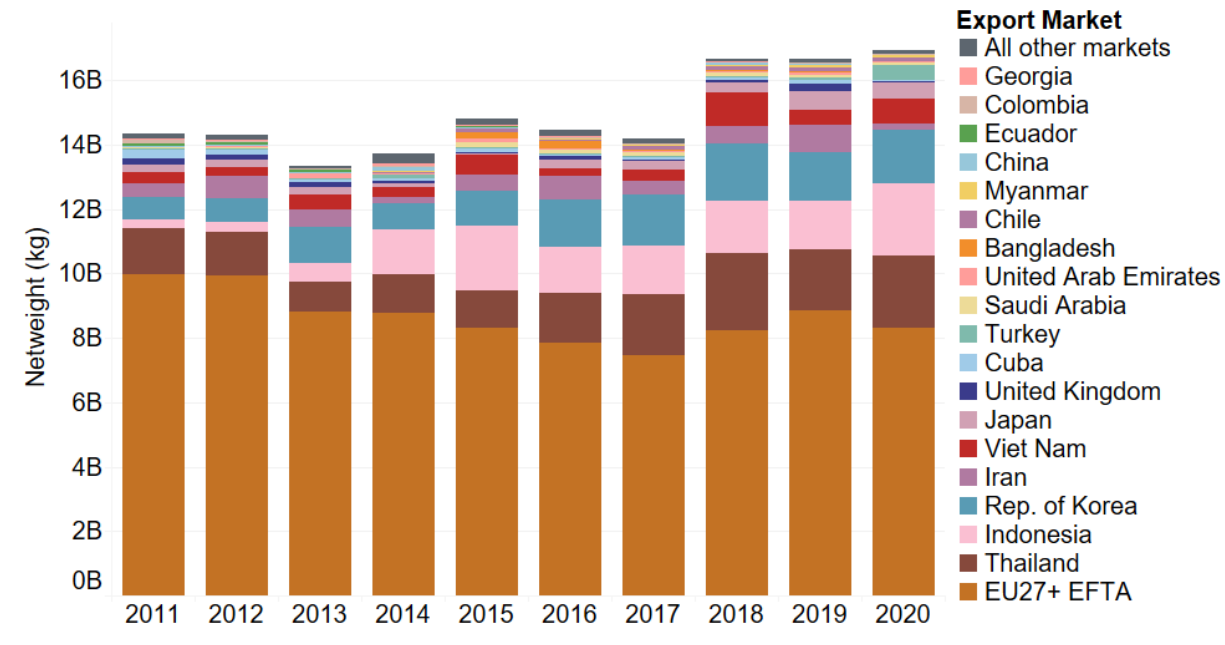
BRAZIL'S SOY PRODUCT EXPORTS[217]



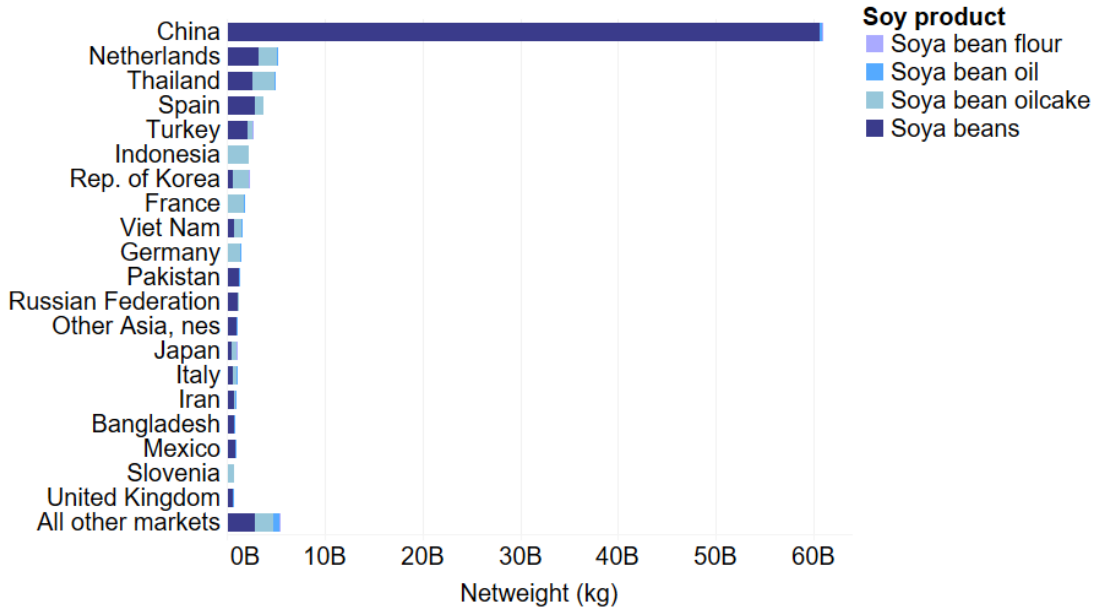
BRAZIL'S SOYBEAN PRODUCT EXPORTS BY IMPORTING MARKET[218]



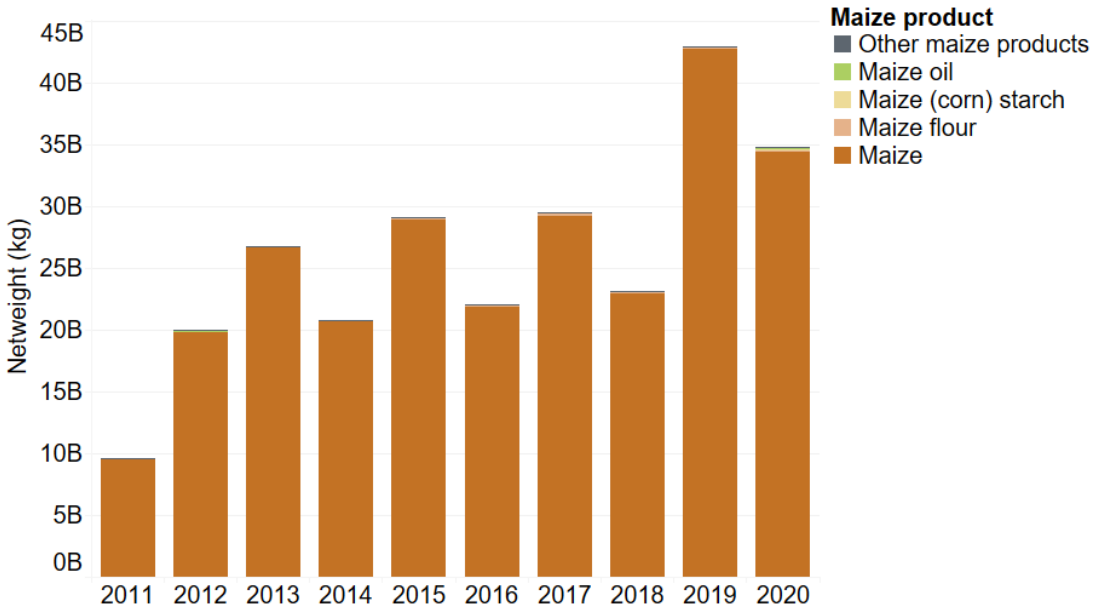
BRAZIL'S EXPORTS OF SOYBEAN OILCAKE BY IMPORTING MARKET[219]



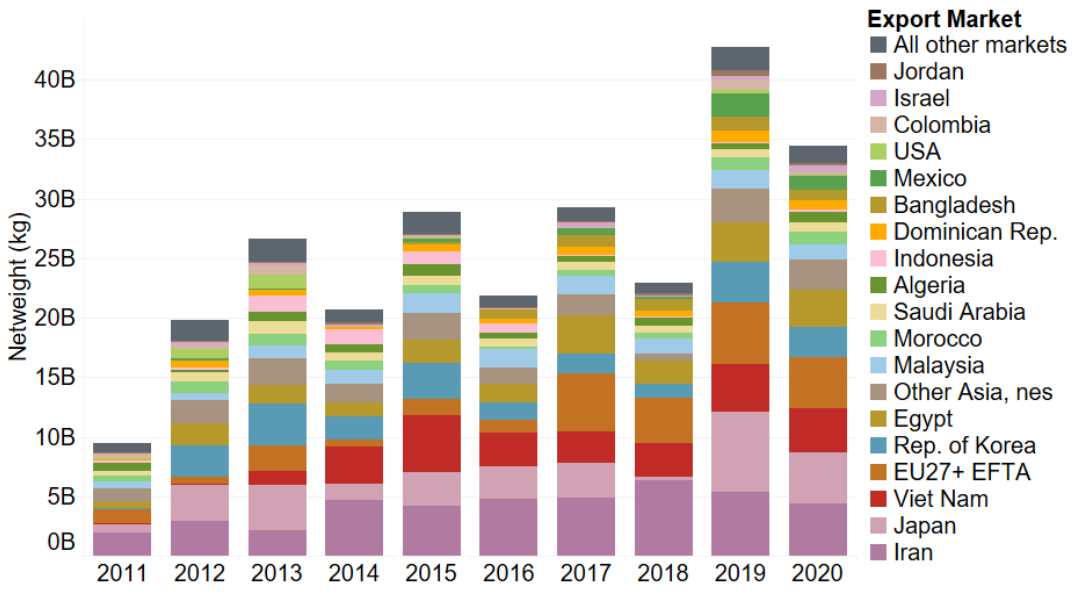
BRAZIL'S EXPORTS OF SOY PRODUCTS IN 2020[220]



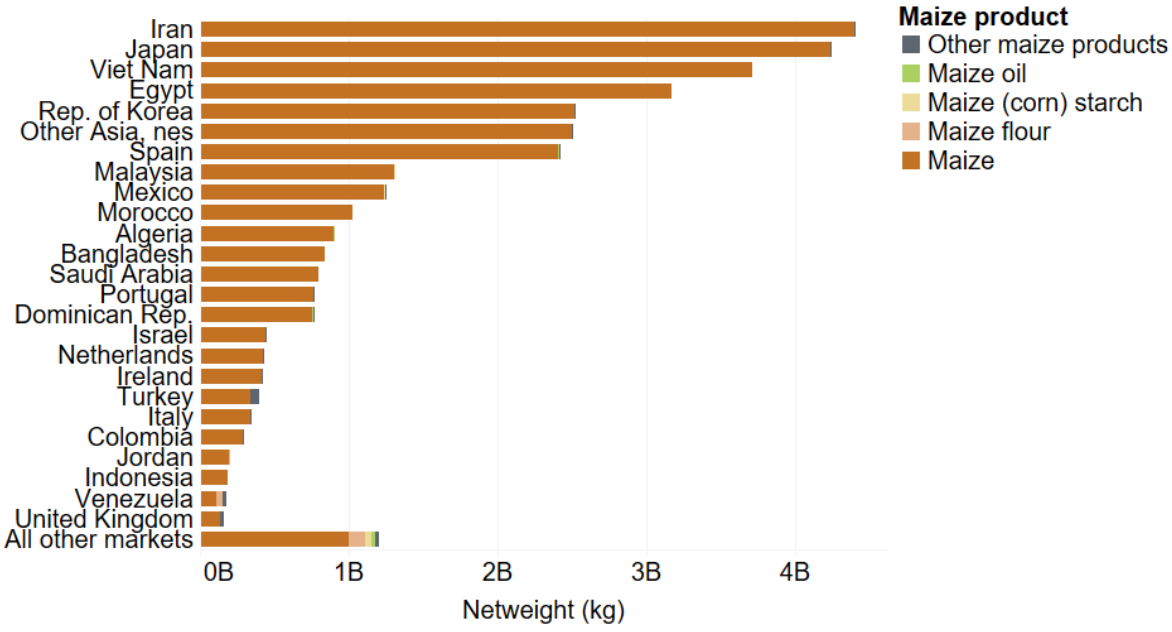
BRAZIL'S MAIZE PRODUCT EXPORTS[221]



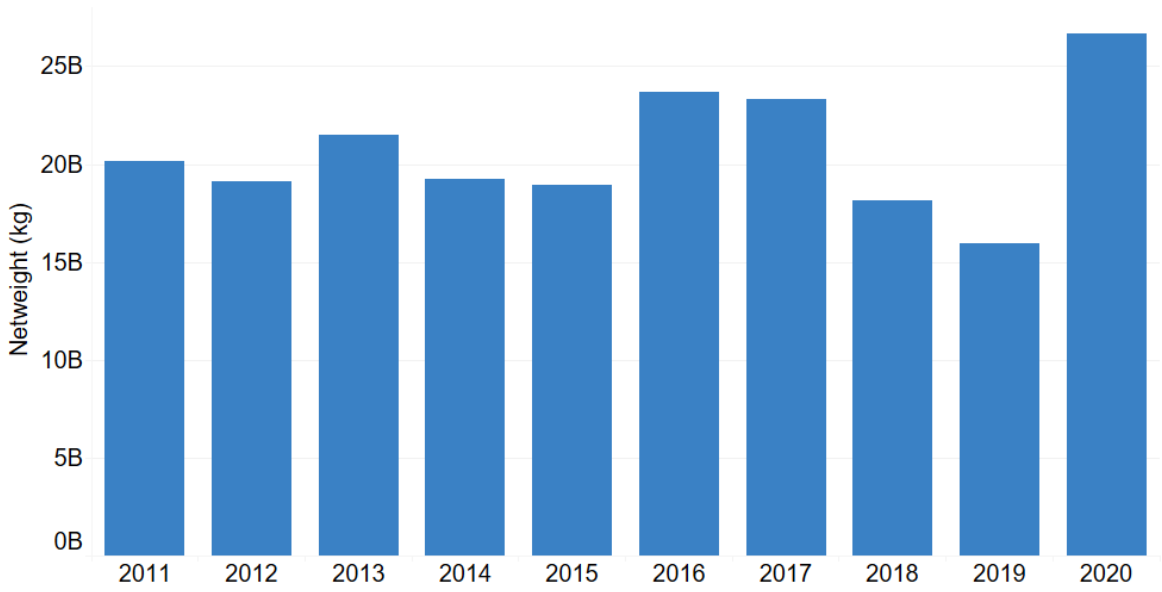
BRAZIL'S MAIZE PRODUCT EXPORTS BY IMPORTING MARKET[222]



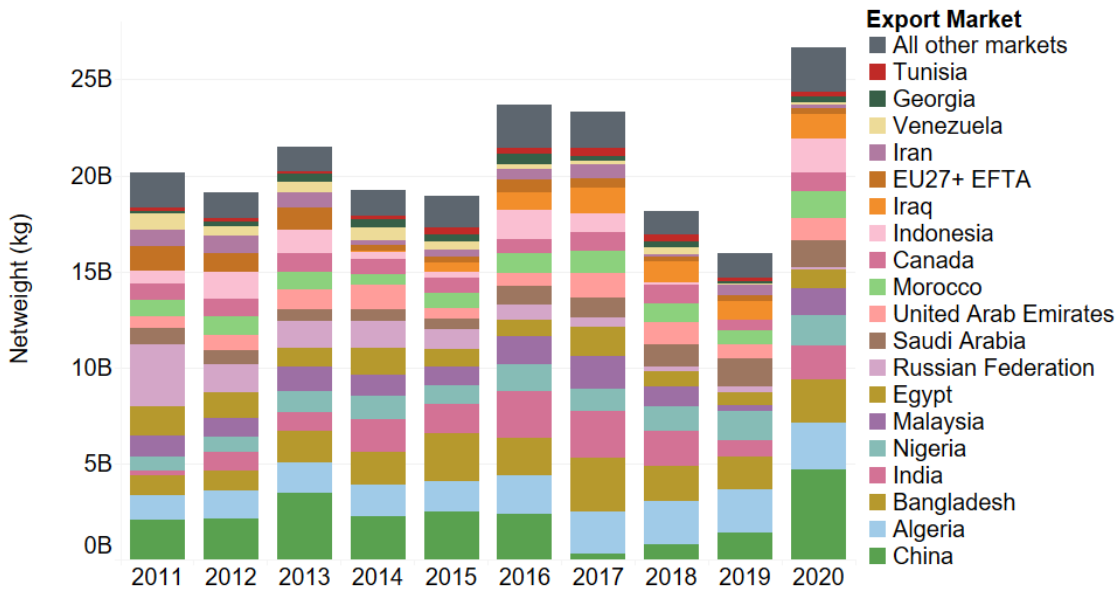
BRAZIL'S EXPORTS OF MAIZE PRODUCTS IN 2020[223]



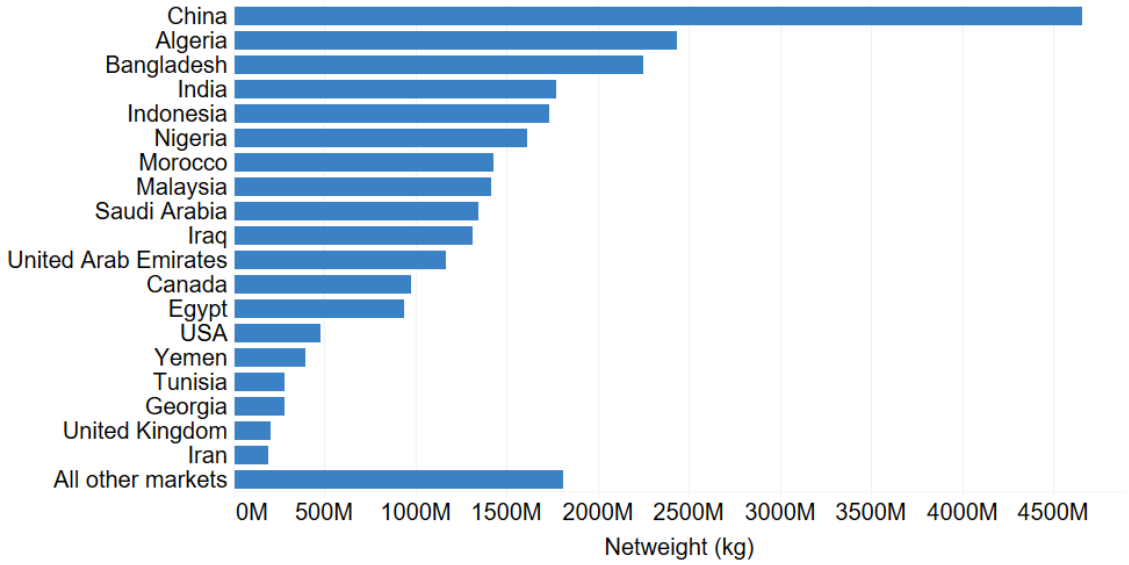
BRAZIL'S SUGAR CANE PRODUCT EXPORTS[224]



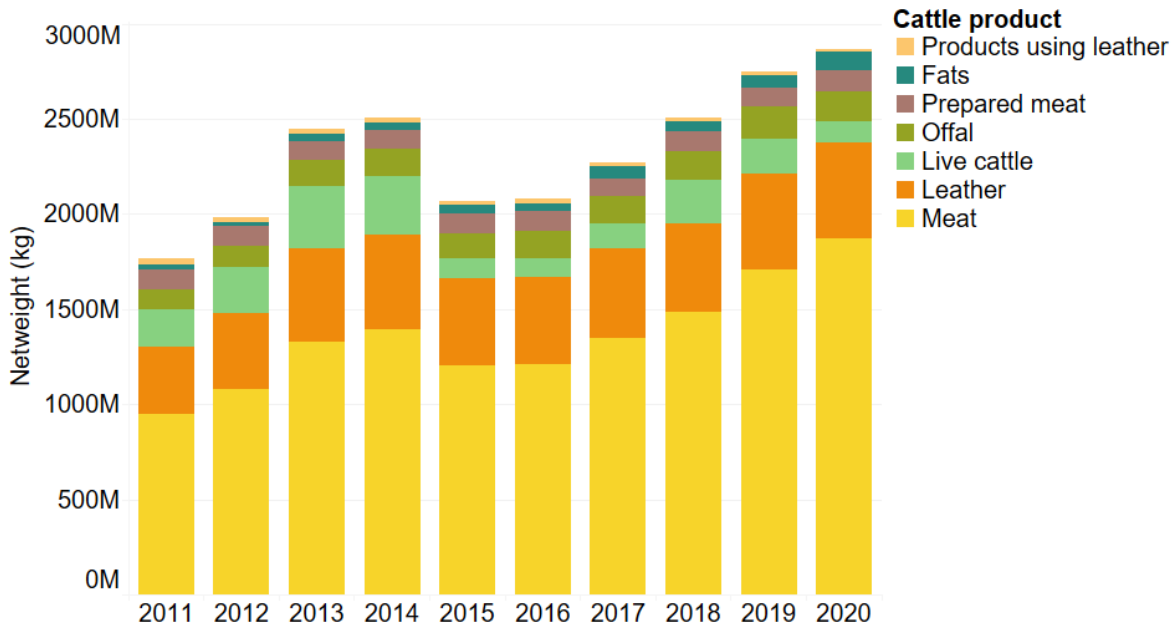
BRAZIL'S SUGAR CANE PRODUCT EXPORTS BY IMPORTING MARKET[225]



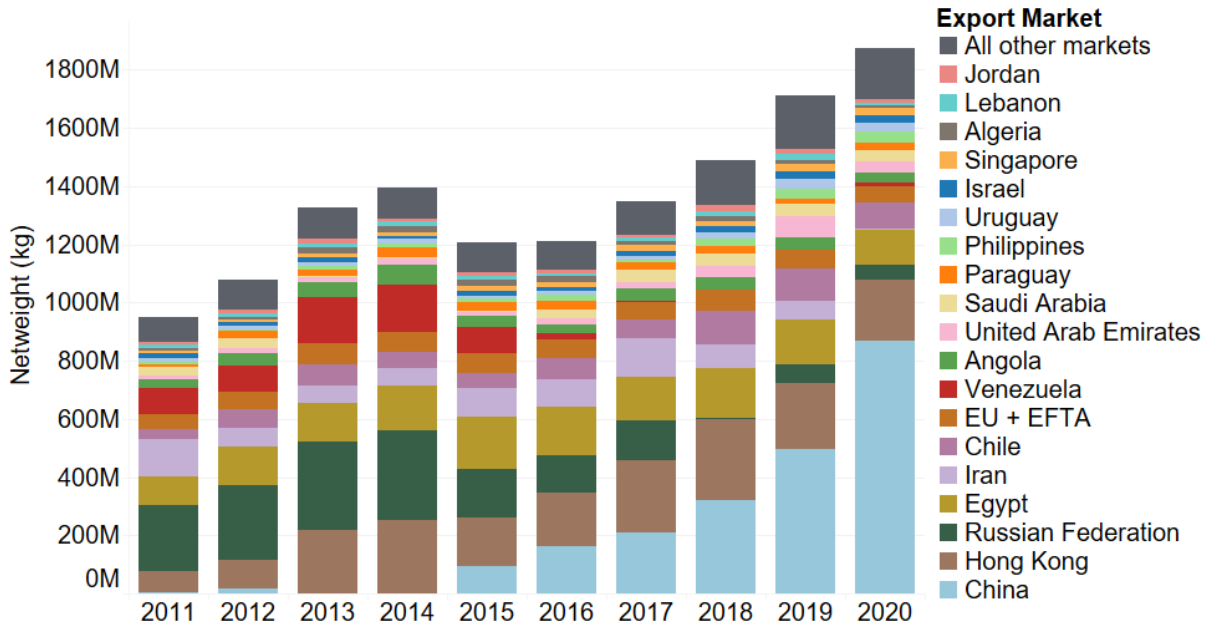
BRAZIL'S EXPORTS OF SUGAR CANE IN 2020[226]



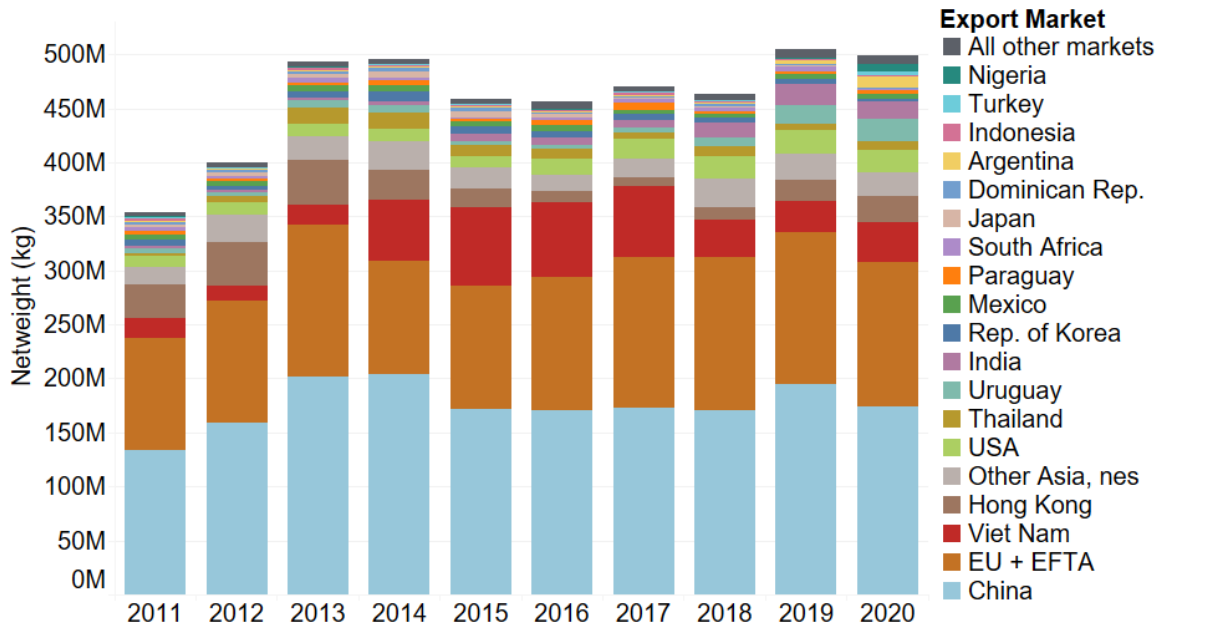
BRAZIL'S CATTLE (BEEF/LEATHER) EXPORTS[227]



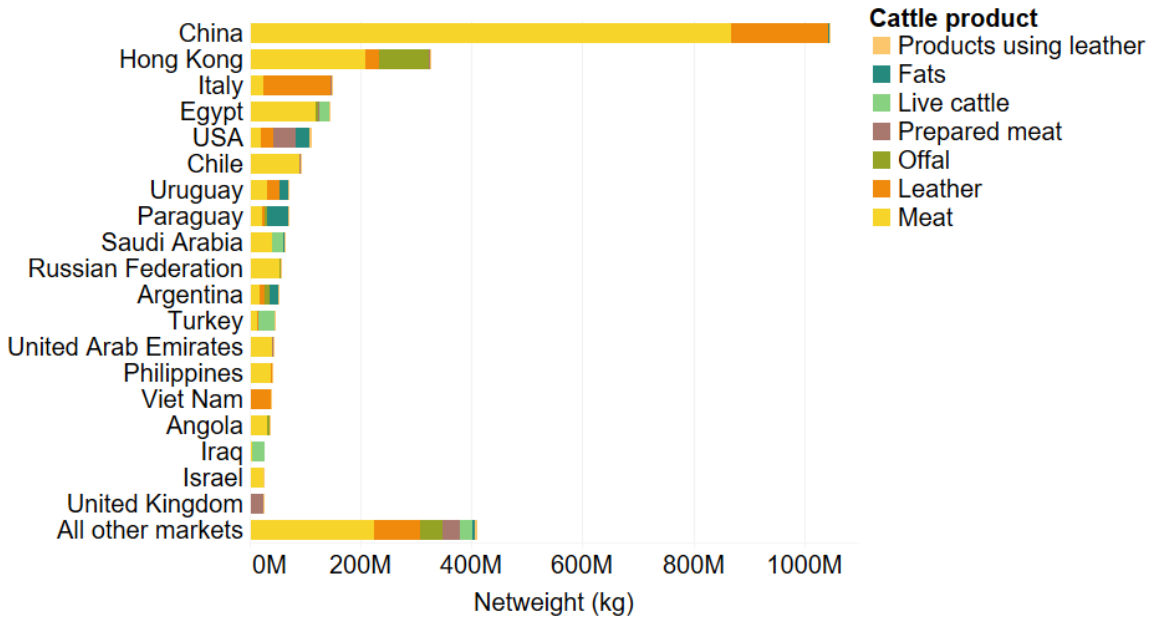
BRAZIL'S CATTLE (MEAT) EXPORTS BY IMPORTING MARKET[228]



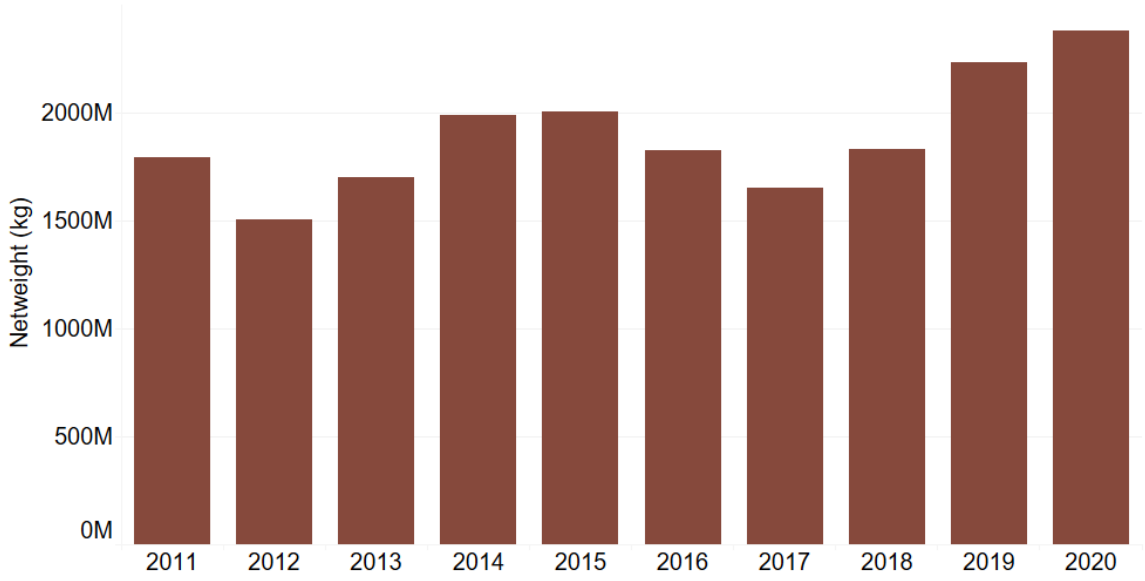
BRAZIL'S CATTLE (LEATHER) EXPORTS BY IMPORTING MARKET[229]



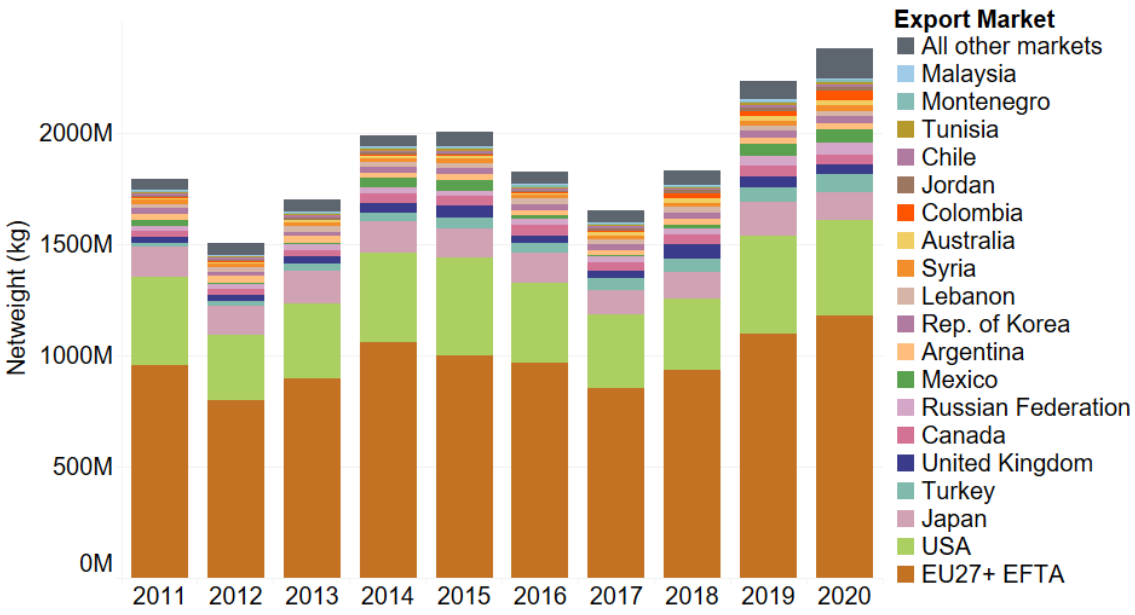
BRAZIL'S EXPORTS OF CATTLE (BEEF/LEATHER) IN 2020[230]



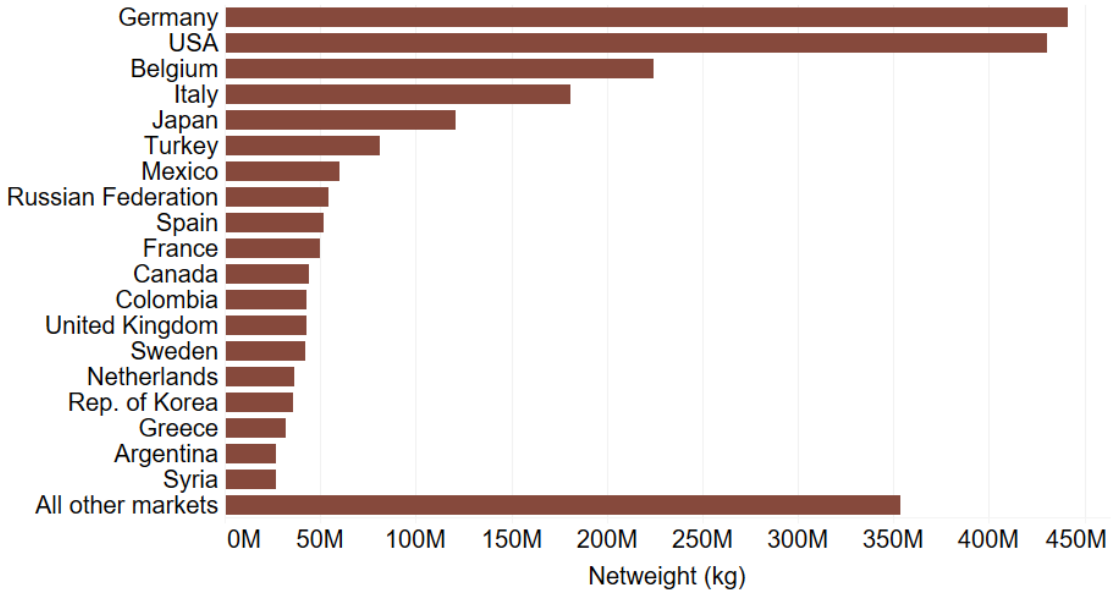
BRAZIL'S COFFEE EXPORTS[231]



BRAZIL'S COFFEE EXPORTS BY IMPORTING MARKET[232]



BRAZIL'S COFFEE EXPORTS IN 2020[233]



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[1] The overall country governance risk scores reflect Forest Trends' 2021 updated assessment of national-level independent political, governance, business, economic, and corruption indices, which draw on a broad range of relevant underlying data from the World Bank, African Development Bank, Asian Development Bank, Inter-American Development Bank, International Fund for Agricultural Development's programming criteria, United Nations and governmental aggregated data, as well as independent surveys and other primary data to provide an average relative governance and corruption risk score for 211 countries globally. Countries scoring less than 25 are considered "Lower-Risk," countries scoring between 25 and 50 are "Medium-Risk" and countries scoring above 50 are "Higher-Risk." The risk scores can only give an indication of the likely level of illegal deforestation in a country and ultimately speaks to the risk that corruption and poor governance undermines rule of law in the land sector. A full methodology is available on the ILAT Risk website: https://www.forest-trends.org/fptf-ilat-home/.

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[3] FAO, "FAOSTAT;" Pendrill et al., "Deforestation risk embodied in production and consumption of agricultural and forestry commodities 2005-2018."

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