Fueling our crises

How Europe's move to soy in biofuels contributes to our climate crisis, food insecurity and the collapse of the Amazon.

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Front Cover: Rainforest destruction through soya plantation in the state of Mato Grosso along the Highway 163. © Markus Mauthe / Greenpeace

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Executive Summary

The expansion of cattle ranching and soy farming drives the Amazon ever closer to its 'tipping point' - a point of no return towards a climate catastrophe of global impact. Europe is complicit in this with many countries in the EU increasing the use of soy oil in biofuels.

The speed at which the Amazon is losing its forest cover is accelerating. **According to the most recent annual data set, Amazon deforestation jumped to a 15 year high in 2021.** A trend continuing in 2022, with deforestation between January and August being higher than any time after 2008. The carbon emissions from the dying rainforest will increase climate heating, making it next to impossible to stay within the 1.5°C warming range.

Driving this real time drama is the relentless conversion of nature into industrial farmland, for cattle grazing and cropland. This study explores the role of the growing use of soy in so-called 'sustainable' biofuels in Europe. Europe's support for this fake solution to decarbonise the transport sector is doing more harm than good. In recent years, the use of soy in the EU's biofuels mix has more than doubled. This is set to increase even further once palm oil will start to be reduced next year and fully phased out by 2030, following changes in the EU's Renewable Energy Directive that governs which feedstocks are eligible to count against the block's emission targets.

Globally, as T&E's new analysis shows, nearly a fifth of all soy oil produced in 2020 went into biofuels, a threefold growth in this sector since 2005. In the same period, soy oil production for food has increased by only half that rate. A precious resource that could be used in food, in soaps, or in chemicals is increasingly being burned.

This increase in demand also contributed to strong price increases for soy oil - nearly doubling from 2020 to 2021 - outpacing price increases for the second main product from soybeans, soy meal used for animal feed. **As a result, the contribution of soy oil to the bean processing industry's revenues has been rising from 30% (2015-2019) to over 40% in the first 8 months of 2022.**

What is great business for soy processors and traders, wreaks havoc on the most vulnerable. As the markets for all vegetable oils are highly interconnected, not only prices for soy oil, but the entire FAO food price index for vegetable oils reached an all time high in 2021, increasing by over 60% compared to the previous 5 years. Food price inflation has dire consequences for low income households.

Investment incentives for soy expansion, originally driven by the feed demand for industrial livestock, are now more and more driven by skyrocketing prices for soy oil, in large part due to increased demand for soy oil from the biofuels sector. The cultivation of soybeans is most rapidly expanding across Brazil, followed by corn and sugarcane - two other crops heavily used in the production of biofuels. Staple foods on the other hand are cultivated less and less.

As cattle pastures are established first after forest clearance, these are seen as the dominant direct driver of deforestation. However, the expansion of cropland into existing pastures plays a major role in pushing cattle ranchers to clear more and more natural lands, including precious rainforest in the Amazon.

The expansion of soy and pasture also **impacts heavily on indigenous peoples**, through the destruction of the forests they depend on, as well as fires, conflict and pollution from pesticides. Indigenous territories are still often islands of green in an ever expanding sea of farmland expansion, but their future existence is under threat.

Deforestation in the Amazon is not only a big risk for our future climate, but also a major threat to our planet's biodiversity. **The jaguar for example, one of South America's most iconic animals, has lost half its original habitat, mainly driven by conversion of natural areas into farmland**. The jaguar is now included on the Red List of Threatened Species. Continued fragmentation of its remaining habitat, including by soy expansion into the Amazon, the Jaguars stronghold, poses an ever growing risk to its survival.

What can be done?

The expansion of soy farming contributes to bringing an entire ecosystem to the brink of collapse, The EU adds to the demand for this very commodity by increasing its use in its biofuels mix. The European Parliament has sent a strong signal in its recent vote on the revision of RED II, that next to palm also soy should not be seen as a sustainable feedstock, its use in biofuels stopped. **T&E calls on the European Commission and the European Council to follow the Parliament in the current negotiations (RED III/IV trilogue) and support an immediate phase out of soy and palm from EU biofuels.**

To avoid soy and palm simply being replaced by other food commodities, T&E also calls for a rapid phase out of all crops in the EU's biofuels, the latest by 2030.

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1. Introduction

The war in Ukraine has shown how vulnerable our global food system is. The disruption of supplies of grains and vegetable oils from both Russia and Ukraine has sent prices for those to new heights. The most impacted by such price hikes are those people and entire countries already struggling with adequate food supplies. Yet, the European Union and other countries continue to incentivise the burning of food to fuel their cars and trucks. Transport & Environment provided an in-depth analysis on this matter in recent reports published in March [1] and June 2022 [2].

In this short study, we will take a closer look at the use of soy oil in biofuels, with a focus on South America as a main supplier. The impacts on food security, climate change and biodiversity loss are deeply intertwined challenges that cannot be dealt with in isolation. The EU contributes to the expansion of soy farming by increasingly using it in the production of biofuels. On the other hand, the EU decided to phase out palm oil from biofuels, classifying it as a commodity with a high risk of leading to indirect land use change in areas with high carbon stocks. In more simple terms, this means the loss of forests and peatlands, both critical for mitigating the climate crisis we are facing. For soy, the EU failed to recognise this link, despite the science on this being very clear (see Infobox: The 'high ILUC risk' regulation).

The speed at which the Amazon is losing its forest cover is accelerating. The tipping point that would mark irreversible change from lush rainforest into a dry savannah is coming ever closer, with catastrophic impacts predicted on nature, climate and water supply throughout much of the southern part of South America and beyond. The loss of the Amazon rainforest is one of a few 'tipping points' with global repercussions (see infobox Amazon 'Tipping Point'). The carbon emissions from the dying rainforest would increase climate heating, making it next to impossible to stay within the 1.5°C warming range [3].

Driving this real time drama is the relentless conversion of nature into industrial farmland for cattle grazing and for growing soybeans to supply feed to industrial livestock and biofuels to the transport sector. The situation has become so severe that leading Brazilian scientists are calling on the international community to 'switch to other sources until Brazil eliminates export-driven deforestation' [4].

The EU has the means to put brakes on this immediately, but it fails to act.
In the EU, the fuel sector is governed by the Renewable Energy Directive (RED) that amongst other things sets quotas for biofuels. These have increased the use of vegetable oils like palm, soy and others with a devastating impact on the environment.

In acknowledgment of the directives failings, the EU introduced a mechanism to exclude some of the feedstocks that drive deforestation from the list of supported biofuels - the 'high Indirect Land Use Change (ILUC) risk' regulation (see box 'The 'high ILUC risk' regulation'). However, so far, the EU has only classified palm oil as such a high ILUC risk commodity and mandated its phase out by 2030, unless suppliers comply with certain criteria. Much of the gap this partial phase out creates will likely be filled with soy, simply moving deforestation from Southeast Asia to South America. To an ecosystem that cannot bear any further forest loss either.

In mid 2021, the European Commission was due to review the data about agricultural crop expansion and deforestation and to decide whether soy should be classified as a high ILUC risk commodity, too. Up until now it has not come to any conclusions. A presentation from July 2022 by the consultancies tasked to conduct this data review, however, tells a clear story. Palm oil remains in the high ILUC category, while soy misses the arbitrary set threshold of 10% by half a point. Even sugar cane expansion, increasingly a source for ethanol to be mixed with EU gasoline, now shows a worryingly high penetration into high carbon lands [5].

The removal of soy from the EU's biofuel mix would not immediately end all deforestation in the Amazon, but it would reduce incentives for further soy expansion, hence the further clearance of forests, peatlands and savannahs. It will allow for fixing other key drivers of deforestation like the expansion of cattle ranching or mining, that are much more challenging to harness.

In this study, we outline some of the major impacts Europe's demand for soy biofuels is having on the Amazon and hence our climate, people and biodiversity.

And how EU policy makers can change this.

Infobox: The 'high ILUC risk' regulation

EU law requires biofuel feedstocks to be certified as grown in areas that have not been deforested since 2008. However, indirect deforestation effects of feedstock expansion are not prevented by this regulation. When such indirect effects are considered, aside from the biodiversity loss most biofuels typically used in Europe have very high greenhouse gas (GHG) emissions, sometimes higher than the fossil fuels they replace. This is particularly the case for palm, soy and rapeseed oil [6].

In an attempt to tackle this gap, in REDII the Commission introduced a category of biofuels called "high Indirect Land Use Change (ILUC) risk biofuels" [7]. These are made from crops for which a significant part of the expansion of the crop's cultivation area led to the conversion of high carbon stock areas - mainly forests and peatlands. Biofuels under this category will need to be phased out gradually by 2030. Palm oil is currently the only biofuel feedstock considered to be high ILUC risk under REDII.

Major deforestation increase in key soy growing regions

There is strong evidence that soy should also be part of this category [8]. Consequently, the European Commission tasked a group of experts in January 2020 [9] to review scientific data on biofuel feedstock expansion. The outcome for each crop studied hinges on one single figure. In a delegated act to REDII, the EU stipulated an arbitrary threshold of 10% for the global expansion of any given crop into high carbon stock areas. That is, the spatial expansion of a crop - globally, across all supply regions - must not overlap with more than 10% of land with high carbon stocks prior to 2008, i.e. forests or peatlands. At the time of implementation, only palm exceeded this threshold. Soy stayed just below with 8%. The experts tasked by the Commission with the data review have not yet released their report, but results presented in a webinar in July 2022 list soy with 9.5%, i.e. just below the threshold.

The threshold of 10% as such is of real concern - it accepts massive deforestation related to crop expansion. Soy farming, e.g., showed an annual expansion globally of over 2.4 million hectares in the last 10 years [10]. The EU would hence accept 240,000 ha of deforestation and still consider soy as not coming with a high risk of being linked to the destruction of carbon rich lands. This stands in stark contrast to the recent pledge made at the COP26 in Glasgow, now signed by 141 nations, including the EU and Brazil, to end deforestation by 2030 [11].

There is therefore much need for the experts to publish their work and the Commission to act on it. The Amazon is about to collapse, while the EU delays action on slowing down at least one of the drivers of this disaster. **With palm oil to be phased out, soy is set to become an even more important feedstock in the EU's biofuel mix** [12]**.**

2. Biofuel mandates are driving food prices up

The prices for virtually all vegetable oils have been soaring to record highs in 2021 even before the war, with the demand for biofuels being a major driver.

In the US, bakeries are increasingly concerned about soaring prices of their key ingredient, soy oil, and even access to it [13]. More recently they got support from the countries' entire food and consumer goods sector, calling on policy makers to lower the mandated share of biofuels to bring the soy oil prices down and to avoid supply shortages [14]. Meanwhile, ADM, one the world's largest traders of soy, posted recorded profits amidst the global pandemic based on rising biofuels demand [15].

What makes life difficult for consumers in wealthier countries, turns into a vital threat in countries with a high share of people barely able to afford enough food in 'normal times'. India, for example, relies heavily on imports for its domestic cooking oil supplies [16], Indonesia being a major supplier [17]. In response to surging prices in 2021, Indonesia reduced import taxes, imposed stockpile limits and suspended futures trading in edible oils and oilseeds, to keep cooking oil prices down [18]. These measures were virtually erased in February 2022, following the announcement of the Indonesian government to restrict exports of palm oil, as consumer prices for cooking oil also in this country became unaffordable for low income families [19]. This move, aiming at bringing local prices down, lifted palm oil prices globally to a new record, making what was once the cheapest vegetable oil the priciest. **Globally, according to the World Food Programme (WFP), the number of people facing acute food insecurity rose by over 200 million since 2019 to now 345 million** [20]**.** The increasing costs for fuel and food commodities also has an impact on the WFP's ability to provide direct food aid. In June 2022, it had to announce the suspension of food assistance to South Sudan, as it was running out of funding [21].

The markets and hence prices for all types of vegetable oils are highly connected globally [22]. The increase in one invariably leads to an increase in prices across all vegetable oil types. More expensive vegetable oils and dairy products have been identified by the FAO to be the main drivers of global food prices jumping towards new records [23] [24]. The FAO Food Price index for vegetable oils reached an all time annual high in 2021, forcing buyers to pay 1.65 times more for vegetable oils compared to the reference period 2014-2016. This trend continued in 2022, peaking in March when buyers had to pay even 2.5 times more.

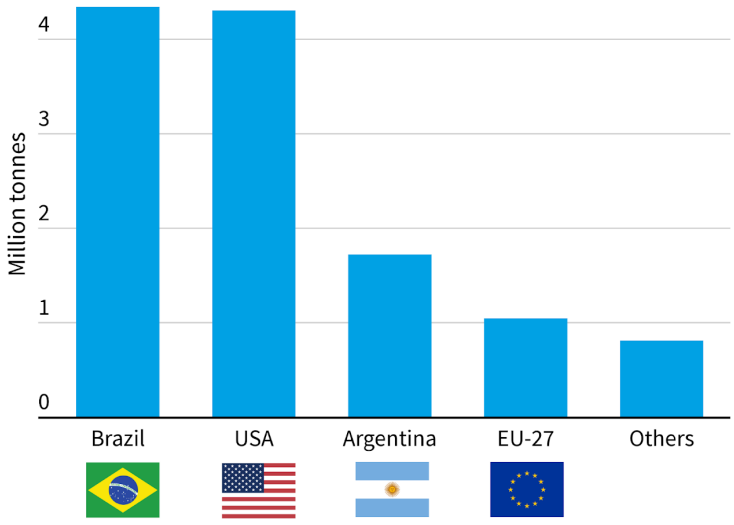
More recently, global prices for vegetable oils have come down again. However, by August 2022, they still hovered above the levels of the earlier food crisis in 2008 and 2011 [23]. Future prospects are not necessarily promising. Extreme weather events will become more frequent, harvests ever more unpredictable.

The prices of the major vegetable oils are strongly linked to the demand for biofuels [25] where '*mandates increase price volatility*' as '*buyers must continue to purchase grains and oilseeds to meet the biofuel mandate, regardless of current grain prices or availability*' [26]. These mandates are entirely driven by policies. The good news is that policy makers can mend this right away. Ending the use of crops in biofuel is a ready-to-use emergency measure with almost immediate effect, as it frees up enormous amounts of

feedstocks on the global commodity market. **It would bring prices down and remove the key incentive for investors to invest in further farmland expansion into natural areas for the foreseeable future.**

3. EU biofuel mandates are a driver of soy expansion

Biofuel mandates in several countries and regions have created a new and insatiable market for soy and many other vegetable oils, but also starch rich crops, such as corn, sugar cane, grains and many more. Soy oil has become the third largest feedstock for biodiesel produced in the EU and also countries like Brazil, Argentina and the US rely on it for much of their biodiesel production [27] (see Figure 1).



Source: Oilworld (2022)

Figure 1: The use of soy oil for the production of biodiesel in 2021 (Source: Oilworld 2022). The main soy producing countries account for the bulk of soy oil used in biofuels, but the EU is catching up.

And its use in the EU is rising. It more than doubled between 2015 and 2021 [27] and could easily quadruple with palm oil being gradually phased out towards 2030, according to T&E analysis [12]. This analysis from 2020 might even be a gross underestimate. Part of the soy oil supplies for biodiesel might be exempt from the cap on food and feed based biofuels that was introduced in the RED II. Soy is commonly grown in rotation with corn in Brazil and could hence be classified as an 'intermediate crop', a category not subject to this cap [28]. The same product, the same type of farming, same land use implications, but escaping limitation through a legislative loophole.

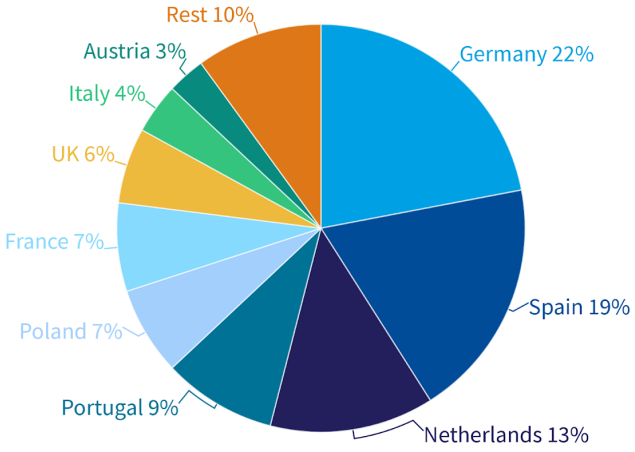
Without changes to current policies, the phase out of palm oil would hence 'at best' lead to shifting deforestation partially from Southeast Asia to South America, but even that is not to happen. The four major vegetable oils are part of one global market, as their properties are similar enough to use all of them for nearly all the same types of end uses. If Europe consumes more soy and less palm oil in its transport sector, it creates a soy oil supply gap elsewhere, like in the food, detergents and oleochemical sectors. Palm oil no longer in

demand for EU biofuels will be used by those sectors instead. No solution, just a shift in commodity supply streams. Getting both feedstocks out of the EU's biofuels mix at the same time, on the other hand, would have the potential to make a difference. Some EU member states have already taken steps in this direction, beyond what the EU requires: France, Denmark [29], Belgium [30] and the Netherlands [31] introduced measures to ensure a limitation or earlier phase out of palm and soy oil.

The same principle also applies to the interaction with other feedstocks. Without reducing or even eliminating the use of all crops in biofuels, any supply gap from the phase out of some, like soy and palm, might well be filled with other vegetable oils, like rapeseed or sunflower oil, as can be already observed in France [32]. As the transport sector has one single emission target, there could even be such substitution effects between biodiesel and bioethanol feedstocks, leading to higher demand for corn, wheat or sugar crops.

Those decisions do not mean, though, that those countries no longer produce biofuels from palm and soy. Operators within their jurisdictions actually continue to do so, for export to other countries. For example, in Belgium it is Cargill using soy, its trading arm in Brazil only recently being exposed for being linked to soy driven deforestation in the Amazon (see Infobox 'Deforestation risk soy in EU biodiesel'). For an overview of the use of soy oil in the production of biofuels in Europe (see Figure 2).

Under the provisions of the RED II, each member state can take action ahead of the EU as a whole, to limit the use of crops in its biofuels mix.



Source: Oilworld data (2017-2021)

Figure 2: Average use of soy oil for biofuels production in EU27+UK between 2017 and 2021 (Source: Oilworld 2022)

The lack of action at EU as well as at member state level, however, aggravates the situation in forested regions, for its wildlife and people, and heavily impacts on the livelihoods of people depending on affordable staple foods.

Infobox: Deforestation risk soy in EU biodiesel

Cargill is one of the world's largest commodity traders [33] and the second largest trader of soy from Brazil [34]. It has a long track record of being linked to deforestation from soy expansion in Brazil [35], and has recently been identified by a French government initiative as the trader of Brazilian soy with the second highest risk of sourcing from deforestation [36]. This contrasts sharply with the company's own claims to have 95% of the soy it purchases in Brazil certified 'deforestation- and conversion-free' [37].

In 2006 it signed up to the Amazon Soy Moratorium, committing to no longer source soy from areas in the Amazon deforested after July 2008 [38].[1] Up until today, the company refused to extend this commitment to include the Cerrado, a savannah landscape rich in biodiversity south of the Amazon [35]. Commitments are only as good as their controls. In January 2022, a group of investigative journalists - including our partner Reporter Brasil - revealed how soy from a farm operating in breach of the Amazon Soy Moratorium, clearing 800 ha of forest since 2013, entered Cargill's supply chain [39].

Despite the EU's Renewable Energy Directive excluding feedstocks from areas deforested after January 2008, soy from such farms can easily find its way into biodiesel sold at EU petrol stations. Cargill, in their reply to T&E about this case, pointed out one loophole allowing for this: they did not deny buying from this farm, but to source soy only from the farms' areas cleared prior to 2008 [31, 40]. The company did not provide any details on how they can ensure this. The EU's certification system for biofuel feedstocks does not require keeping compliant feedstocks separate from those that are not. Such 'segregation' is only one option next to the so-called 'mass balance' certification, where feedstocks are kept separate only in bookkeeping, but not in the physical world [41][2].

In 2018 [34], Cargill's second largest destination for soybeans from Brazil has been the EU with direct shipments of soybeans also going to Belgium. In 2021, Cargill Brazil shipped 55,000t of soybeans to Belgium from Santarem [43], located in the very heart of the Amazon. In Belgium, Cargill operates an oilseed crushing mill with an affiliated biodiesel refinery processing rapeseed and soy oil. Soybeans have made up for an increasing share of the crushing mills' raw material supply between 2018 and 2020, while it reduced the use of rapeseed in the same time period [44]. This mill has chosen the 'mass-balance' approach for its certification under the RED [45].

Soy based biodiesel will soon no longer comply with Belgian's renewable energy mandates [46]. As long as other member states do not follow this example, Cargill might simply sell its deforestation risk biodiesel to other countries.

[1] Adjustments in the new Forest Code of 2012, led to the Moratorium reference date changing from July 24, 2006 to July 22, 2008

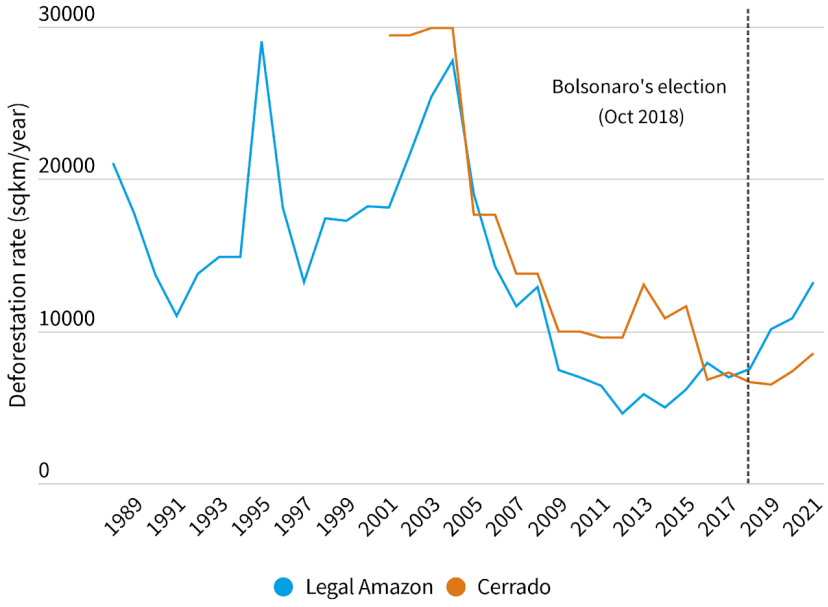
[2] For a more detailed critique of certification systems under the RED, see Destruction: Certified from Greenpeace International [42]

4. Soy as a driver of deforestation

In the growing season of 2020/2021, Brazil accounted for over a third (37%) of the world's total production of soybeans, the US for another third (32%) and Argentina for 12% - together over 80% [16]. The conversion of forests into farmland is rampant in both Brazil and Argentina, driven by ever expanding commodity production - mainly cattle and soy [47].

4.1. Deforestation on a rise

Deforestation rates in the Brazilian Amazon instantly jumped upwards after Jair Bolsonaro was elected president of Brazil in October 2018. In 2020, the Brazilian space agency INPE recorded an increase in the rate of deforestation of 7% compared to 2019, with an increase of another 20% to 2021, lifting deforestation in the Amazon to a 15-year high (see Figure 3) [48]. A trend that continued in 2022, with deforestation rates between January and August being higher than any time since 2008 [49]. The increasing loss of forest cover in the Amazon will have dramatic global consequences (see box 'The Amazon Tipping Point'). Also for the savannah landscape south of the Amazon, known as Cerrado, the deforestation trend points upwards again [50].



Source: Instituto Nacional de Pesquisas Espaciais (2022)

Figure 3 : Annual deforestation rates in the Brazilian Legal Amazon & Cerrado (Source: INPE, 2021) [48]. Under the Bolsonaro government, a long period of declining deforestation has turned heading towards the disastrous heights of the 90s and early 2000s.

Infobox: The Amazon 'Tipping Point'

The Amazon rainforest creates its own water cycle. Winds constantly bring moist air from the Atlantic onto land. If not for the Amazon, this moisture would provide life supporting rain only to the coastal areas. The trees of the Amazon, however, constantly transport this moisture through their roots to their leaves and back into the air, for the wind to carry it ever further westwards towards the Andes. This mechanism has been coined 'flying rivers' for its transport of water to otherwise dry areas.

Decades of deforestation have started to interrupt these 'rivers', and have put the Amazon on a path towards ecological breakdown [51], also known as its 'tipping point'. Increasing floods [52], droughts [53]and fires [54] are a clear warning sign of the Amazon being very near this point of no return or even right at it [55]. If this vicious cycle is allowed to continue, up to two thirds of the Amazon will turn into savannah [56]. The savannah now located south of the Amazon, the Cerrado, will turn into desert [57]. This will cause an enormous loss of biodiversity and the carbon released from the dying vegetation will accelerate our climate crisis. And not only the Amazon region itself, but also much of the southern part of South America depends on the Amazon for its fresh water supplies. If these supplies diminish, millions of people - as far away as Argentina - will be at risk of losing access to water to drink, to grow their food, to sustain their livestock [58]. Energy supplies from hydro dams won't be secure anymore and also the very industries that drive much of this destruction - cattle and soy production - will be stripped of their key resource: water [3].

To restore the ecological balance in the region, deforestation in the Amazon and other landscapes urgently needs to end and large areas need to be restored to their natural state [59].

4.2. Cropland expansion leads to the loss of nature

When forests or other natural areas are being cleared, most often the land is initially being used for cattle grazing, to a lesser extent it is used directly or soon after for soy farming [60]. This is why cattle production is generally given as the main driver of deforestation in the Amazon [61]. However, soy continuously expands into pastures, pushing cattle farming deeper and deeper into the forests. The common distinction between direct and indirect drivers of deforestation is an arbitrary one. Any expansion of the farming of a crop, if not balanced out by decreased cultivation of other crops, ultimately leads to the conversion of valuable natural ecosystems and often forests, as there are hardly any other areas available. This also leads to a continued loss of species from the web of life, and threat to the survival of key stone species such as , e.g., the jaguar (see Infobox 'The plight of the Jaguar)

Infobox: The plight of the Jaguar

The jaguar is a keystone species throughout the Americas, and can today be found from Mexico's North to as far south as Argentina. It thrives in a wide variety of habitats ranging from rainforest to savannahs, grasslands and wetlands. Despite its flexibility, the jaguar has lost about half of its original range, with the rainforests of the Amazon Basin being considered its stronghold, harbouring over half of its total estimated remaining range, according to the last assessment published in 2018 [62]. With its population in steady decline, the jaguar became listed on the IUCN Red List of Threatened Species.

The main threat to the jaguar's survival remains habitat loss, with its remaining range area increasingly being fragmented, isolating its populations. For species occurring in such low densities as the jaguar, isolated populations are at a high risk of extinction. Brazil is one of the hotspots of such habitat loss, driven by agricultural expansion, mainly for cattle and soy. Many areas identified in 2006 as priority conservation units for the jaguar [63] have been lost by now, including to soy expansion (see map).

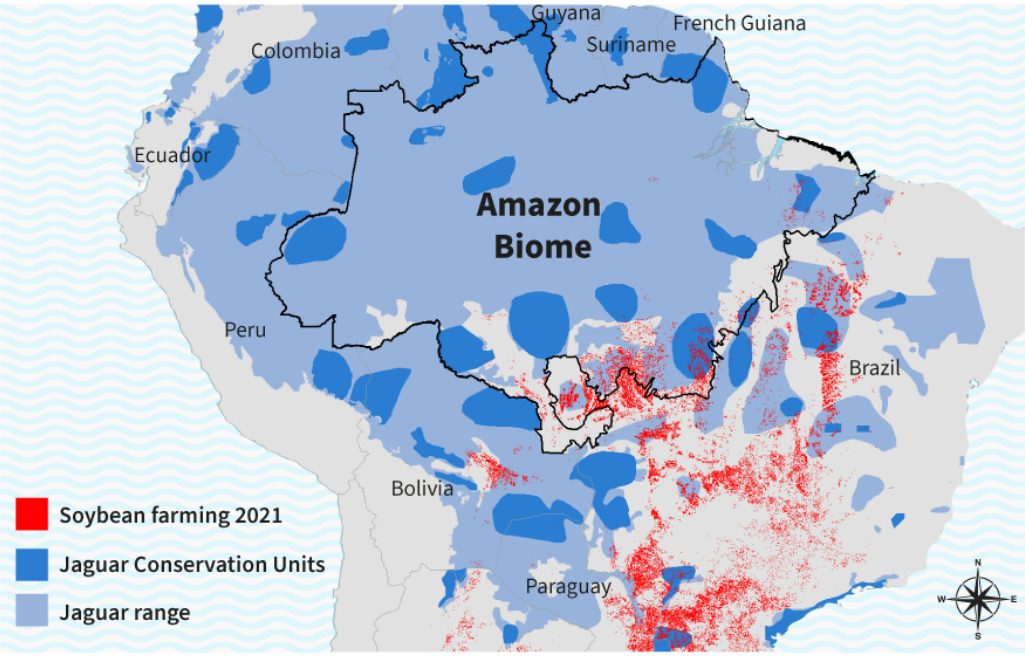


Figure 4: Jaguar habitat and priority conservation units are heavily impacted by soy expansion. Soybean farmland shown for 2021, conservation units have been identified in 2006, the range was published in 2017. Sources: Zeller (2007) [64], Quigley (2017 [62]), Song (2021) [60].

4.3. Soy driving agricultural expansion in Brazil

In Brazil, the expansion of soy farming comes at the expense of forests and food supplies.

The country continues to lose its forests with accelerating speed, because more and more land is converted into pasture and cropland. According to the most recent FAO data, the extent of cropland is currently at its highest level in Brazilian history. The area of land used as pasture, however, has decreased since the mid '80s. Also in the last two decades, there has been virtually no change in pasture extent in Brazil [10]. The area of cropland, however, has increased by 8.6Mha since the year 2000[3]. This expansion is mainly down to three crops - soy, corn and sugarcane. Since 2000, their farming has expanded by 23 Mha, 6.4 Mha and 5.2 Mha respectively (see Figure 5)[4].

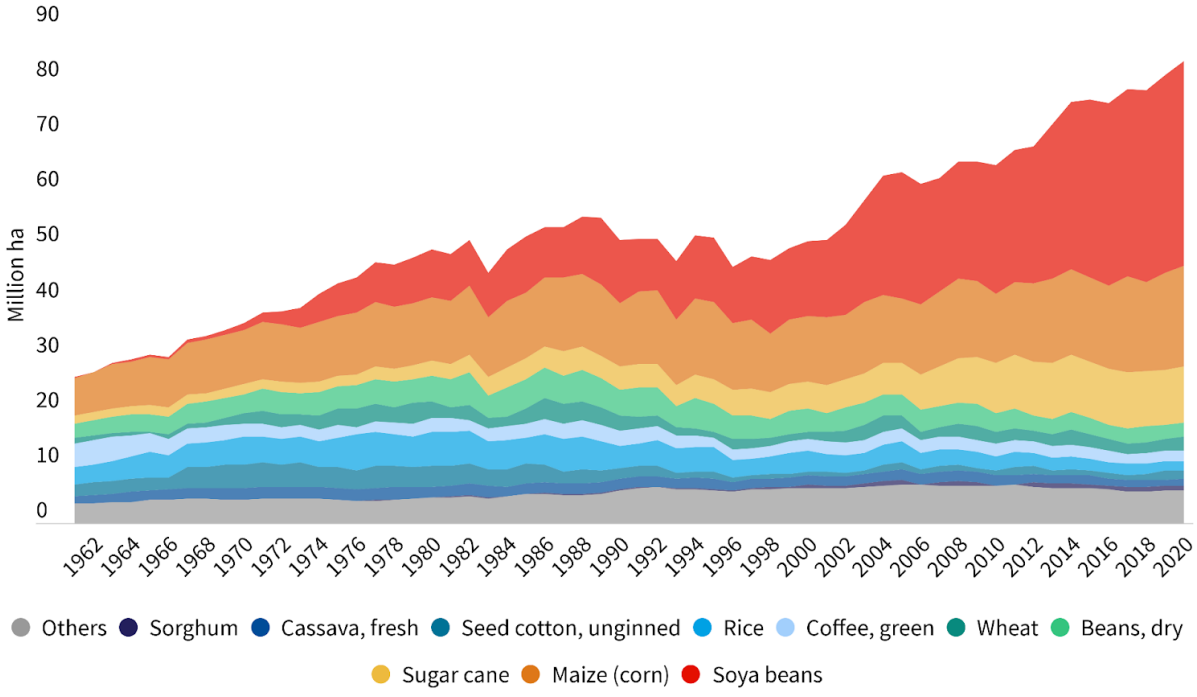


Figure 5: Harvest area of the top 10 crops in Brazil (Source: FAOstat, 2022)

[3] Note: This FAO figure seems to be a very conservative estimate. MapBiomas recorded an increase in total area under temporal croplands of 27.7Mha for the same period and also Potapov et al (2022) provide a much higher figure with 23.1 Mha for a similar period [65].

[4] These figures from FAOStat cannot be added to a total, as having two harvests from two different crops on the same area of land ('intermediate cropping') is common in Brazil, in particular for the combination of soy with corn.

Amongst all regions of South America, soy expansion occurred the most rapidly in the Amazon, with the area for growing soybeans had increased tenfold between 2000 and 2019, according to recent study [60]. Corn and soy are used to a large extent for animal feed [66], while all three are major feedstocks for biofuels [67]. A part of the expansion in the farming of soy, corn and sugar cane came at the expense of other crops, farmed on 2.5 Mha less than in 2000. In particular the areas for growing important food crops like beans and rice, decreased strongly - by 3.6 Mha[5]. It was only due to yield increases that harvest levels did not decline, too [10]. Most of the difference to the 8.6 Mha total increase came at the expense of pasture. As there had been no decrease in the total area of pasture over this time period, cattle ranching must have moved on into new areas - deeper into the Amazon and also other biomes, such as the Cerrado [10, 60].

This kind of indirect deforestation resulting from crop expansion is not taken into account by the EU's high ILUC risk delegated act, as the ILUC impact of any given biofuel crop is here restricted to indirect effects only within that crop. This creates a major accounting gap.

The wasteful use of precious land

Crop expansion in turn is driven by demand. Contrary to often touted arguments, the demand for agricultural products is not driven by a growing global population. It is driven by flawed policies leading to a broken food system that is leaving hundreds of millions of people either undernourished or with unhealthy diets [68]. According to the FAO, two thirds of farmland globally is occupied with pastures for grazing livestock [69]. Adding land used to produce feed crops, like soy, is estimated to raise this figure to nearly 80% [70]. According to industry estimates, biofuels based on food and feed crops alone require 7% of what could otherwise be used for food production [71]. This does not even include areas used for non-edible energy crops, or forests increasingly being stripped of enormous amounts of wood to replace coal in power plants [72].

This allocation of land might not be very wise. It is a result of unhealthy levels of meat consumption in large parts of the world [73], and the flawed belief that crop based biofuels can help mitigate climate change [6]. Reducing meat consumption and correcting policies on biofuels would free up enormous areas of land. Land needed to provide sufficient and nourishing food to the planet's people. Land needed to restore nature, for our climate, but also to restore ecosystem health and stem species loss. It would also result in healthier diets in large parts of the world, and, by preferencing e-mobility over continued reliance on combustion engines - cleaner air in particular in urban areas.

[5] Figures for the cultivation of individual crops do not add up to the total crop land area of Brazil, as there is substantial farming of two crops in one year on the same plot of land, in particular for soy and corn.

Infobox: The impact of soy expansion on indigenous peoples

A short overview compiled by the Rainforest Foundation Norway and their Brazilian partners

The expansion of agribusiness and industry in Brazil has frequently found itself at odds with indigenous and traditional communities[6] and their territorial rights. Historically, the rise of agroindustry in Brazil has been marked by the dispossession of lands and violence. Today, territories are under strain, and there has been a surge in violence and attacks. Invasions and land grabbing of indigenous territories rose by 180% from 2018 to 2021, according to a recent report on violence against indigenous peoples in Brazil [74].

"Agribusiness initiatives are impacting indigenous territories directly. They often disrespect indigenous peoples' right to consultation," states Ianukula Kaiabi. He is the president of ATIX, the Xingu indigenous territory association that represents 16 indigenous peoples.

The indigenous territory Xingu is a green island in Mato Grosso, the main soy-producing state in Brazil. It was the first extensive indigenous territory [75] that was recognised in the country. Today, it is threatened by escalating fires [76], deforestation [77] and the expansion of soy [78], as well as illegal activities [79]. Xingu's inhabitants feel mounting pressure from economic groups and government rhetoric.

"Today, we are dealing with what has happened around the indigenous territories, with the advance of monocultures. The discourse of the current Brazilian government is that indigenous territories should be opened up," Ianukula Kaiabi explains. "The riparian forests are being destroyed, and we risk water contamination due to pesticides and monocultures. Deforestation aggravates the situation since woods next to waterways have naturally served as a filter for such chemicals. With the lack of implementation [of laws and policies] by environmental authorities, the situation deteriorates further," says Kaiabi.

The pressure of a growing soy industry is also felt in the north of Brazil. Plantations encircle islands of indigenous lands in the state of Roraima. "In the past year, soy production has increased significantly here", says Jabson Nagelo da Silva from the indigenous council of Roraima, CIR. He is a leader of the Macuxi people, living in the Morcego community in the Serra da Moça indigenous territory, which borders a soy plantation. The planted area of soy is increasing steadily [80] in Roraima and is projected to expand significantly [81] in the coming years.

"The expansion of soy in Roraima has brought increased deforestation, fires, conflict and pollution," Nagelo da Silva explains. "In the indigenous territory where I live, it is already very visible. Today, the people living near the plantations suffer," he says, pointing out that his community has already

[6] A diversity of traditional peoples and communities exist in Brazil, for example quilombos (settlements of formerly enslaved people), riverine communities and babassu coconut breakers

denounced the company that produces soy next to their territory four times for aerial spraying of pesticides over their community.

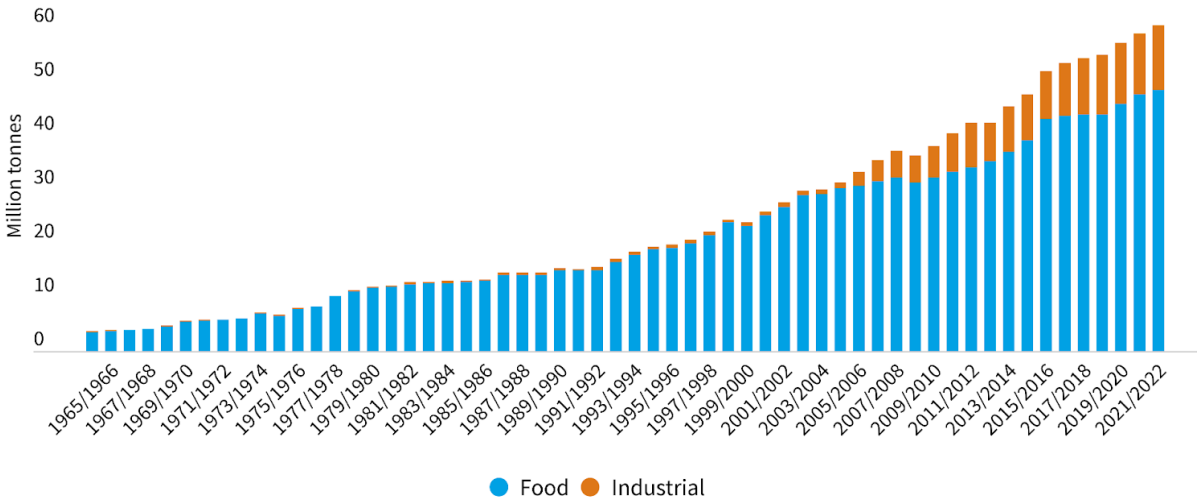
Nagelo da Silva is concerned about pesticides contaminating water sources and affecting health in Serra da Moça. The worry is only increasing because the territory has few permanent water sources, and they fear that access to water will decline further. Da Silva is concerned about the threat of drought and worries that the soy plantations will aggravate the situation since the neighbouring soy producers are digging drainage trenches to avoid flooding in their plantations.

Both Lanukula Kaiabi and Jabson Nagelo da Silva are concerned that soy expansion is causing dissonance in indigenous communities. “Although they are a minority, some indigenous groups adhere to the government idea, that our territories need to be exploited in a conventional form, by planting monocultures and mining to generate profit,” Ianukula Kaiabi says. Jabson Nagelo da Silva attributes this to propaganda about soy being lucrative, which he believes leads people to stop criticising the industry and its effects on the community. “So, we see that they are not only destroying the environment but also the cultural and social [foundations] of indigenous society,” he concludes.

4.4. Biofuels as new driver of land conversion

On a volume basis, only some 20% of soy is used for direct human consumption [82]. The biggest share of a soy bean goes into animal feed, with its soy oil part increasingly going into biofuels. Before 2005, the amount of biofuels made from vegetable oils was very small (Figure 6). In 2005, only 6% of total soy oil production globally went into biofuels [83]. **By 2021, this share had more than tripled to over 20%, with total absolute use of soy in biofuels increasing nearly 6 fold (from 2.1 to 12.2 Mt, see Figure 6).** Over **40%** of the growth in soy oil consumption since 2005 can be attributed to its use in biofuels[7]. A precious resource that could be used in food, in soaps, in chemicals to replace fossil fuels, we are increasingly burning right away.

[7] Soy oil production increased from 34.9 million tonnes in the growing season 2005/2006 to 59.2 million tonnes in 2020/2021, an additional volume amounting to 24.3 million tonnes (USDA PSD [16]). Over the same period soy oil demand for biofuels increased by 10.1 Mt from 2.1 Mt in 2005 to 12.2 Mt in 2021 (Mielke [27]). This equals 20.6% of total production in 2020/21 used in biofuels. The growth in soy oil use in biofuels (10.1 Mt) accounted for 41.5% of the overall production increase since 2005 (24.3 Mt).



Source: U.S. Department of Agriculture - Production, Supply and Distribution

Figure 6: The use of soy oil for food and technical purposes, mainly biofuels (Source: USDA PSD (2022) [16])[8]. This chart omits an insignificant amount of soy oil used in animal feed.

The strong increase in demand for soy oil from the biofuels sector also shifted the revenue balance for producers. When this increase clashed with reduced output in many grower regions, prices for soy oil started to rise in 2021 [22] [84] [85], nearly doubling compared to 2020 and reaching a first all time high in June 2021, a record broken again, when the war against the Ukraine started [86]. This had a profound impact on the revenue stream for soybean processors. **While soy oil contributed on average 30% of the revenue of soy cake and oil exporters in Brazil in the years 2015 - 2019** [10]**, this had jumped to over 40% in the first 8 months of 2022** [87]**.**

Had it previously been primarily feed demand from the industrial livestock sector that has driven soy expansion**, it is now increasingly the demand for soy oil from the biofuels sector that is providing investment incentives for further soy expansion** [88]**.**

[8] The figure for soy oil used for technical purposes given by PSD for 2021/2022 (12.1 Mt) is even lower than the Oil World (2022) [27] estimate for soy oil used in biofuels (12.2 Mt for 2021)

5. Conclusions and recommendations

The EU has measures at hand to immediately ease the pressure on the Amazon and other ecosystems and the people depending on those.

The Amazon is at the verge of collapse, putting the survival of countless species and even our global climate at risk. Indigenous People, too, are increasingly threatened in their survival by commodity expansion, pushed by a rogue government and congress. The recent election of Lula da Silva as new president of Brazil can bring about positive changes. The conservative congress hasn't changed, though. Emergency measures need to be taken that have immediate impact. The EU has such measures at hand via its legislation governing the support for biofuels.

The European Parliament has sent a strong signal in its vote in September on the revision of the Renewable Energy Directive (RED II), that next to palm also soy should not be seen as a sustainable feedstock, but a high ILUC risk commodity and its use in biofuels stopped.

T&E calls on the European Commission and the Council to follow the Parliament in the current negotiations (RED III/IV trilogue) and change the RED and its delegated acts to allow for an immediate phase out of soy and palm from EU biofuels.

To avoid soy and palm being replaced by other food commodities, T&E also calls for a rapid phase out of all crops in EU biofuels.

Also the **EU's member states** can take immediate action.

T&E welcomes that some EU member states unilaterally decided to end support for palm and soy in their national biofuels mix and **calls on the remaining Member States to also adopt this approach.**

T&E also calls on Member states to use their option under RED II to reduce the share of crop based biofuels to zero.

Taking these measures would provide time for more comprehensive solutions to deforestation, in particular the phasing out of industrial livestock farming, driven by unhealthy and environmentally unsustainable levels of meat and dairy consumption in regions like North America and Europe.

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