Is soy the new palm oil?

An analysis of the impacts of soy oil for biodiesel

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Summary

According to the Renewable Energy Directive, palm oil is the only biofuel feedstock that will be phased out of the EU renewables target by 2030. However, there is vast evidence about deforestation and land use change linked to the cultivation of soy in several parts of (mainly) Latin America.

Based on the most recent estimates, soy biodiesel is the second biggest GHG emitter, after palm oil biodiesel. Now that the use of palm oil biodiesel in Europe is expected to decline due to the latest policy measures, there is a risk that the gap left by the phase-out of palm oil biodiesel in the EU biofuels market will be filled up with soy.

An analysis of recent data suggests that there may be a higher expansion of soy into high carbon-stock areas compared to what was previously estimated. In this case, soy oil would meet the EU threshold to be considered a high-ILUC risk feedstock and phased out, like palm oil. If no action is taken, the EU could see a dramatic increase in the use of soy based biodiesel to meet EU renewable targets in 2030, from two to about four times the current levels. These additional volumes of soy oil could require between 2.4 and 4.2 million hectares of extra cropland to be produced - an area between the size of Slovenia and the size of The Netherlands.

1. Introduction and context

The recast Renewable Energy Directive (REDII) sets a limitation for the use of food and feed biofuels, favouring instead the incorporation of advanced fuels into the EU market[1]. This is a step in the right direction, but biofuels continue to be promoted and used despite negative environmental, climate and social effects.

The promotion and use of crop biofuels leads to expansion of the agricultural frontier because more land is needed to grow crops to feed two main markets, i.e. food and fuels. Besides the effects on food

1 https://www.transportenvironment.org/publications/how-member-states-can-deliver-sustainable-advanced-transport-fuels

prices[2], expanding the agricultural land can occur at the expense of natural areas rich in carbon stocks. This may happen directly or indirectly (the so-called ILUC impacts). The EU law requires biofuels feedstocks to be certified as grown in areas that have not been deforested since 2008; however, the indirect expansion and its effects are not taken into account in the current legislation. But when the indirect effects are considered, most biofuels typically used in Europe have very high greenhouse gas (GHG) emissions, sometimes higher even than fossil fuels. This is particularly the case for palm, soy and rapeseed oil[3].

The current EU legislation tries to limit these impacts by limiting the use of crop biofuels, although they can still count towards EU targets until 2030. In an attempt to tackle the most unsustainable biofuels, the REDII includes a category of biofuels called "high-ILUC risk biofuels"[4] for which a significant expansion into high carbon stock areas is observed. Biofuels under this category will be phased out by 2030 (i.e. will not count towards the targets), after a gradual reduction. Based on land expansion data, palm oil is the only biofuel feedstock considered to be high ILUC risk under REDII. There is, however, strong evidence[5] that soy should also be part of this category. T&E has commissioned a new study to Cerulogy which looks into the latest data on the expansion of soy production with a particular focus on Latin American countries.

2. Deforestation trends in relevant areas

2.1 Review of deforestation data

Amazon biome

The latest data published by the Brazilian government (based on the PRODES deforestation monitoring system) shows that deforestation rates in the Amazon reduced significantly between 2004 and 2009, and have been rather stable for several years. This suggests that the Amazon soy deforestation moratorium and other anti-deforestation measures (since 2008) have been partly effective. However, the PRODES data shows deforestation rates going upwards again since 2014. Alternative data from the Global Forest Change (GFC) observatory confirms that deforestation rates have increased again in recent years, and suggests that deforestation may have reduced at the end of the last decade by less than is shown by PRODES (see figure 1 below). A potential explanation of such differences might be linked to the resolution of the two tools/datasets (i.e. GFC captures data of smaller areas of land than PRODES) - some experts have suggested that deforesters may be actively taking advantage of limitations in the PRODES system to avoid detection. In any case, both datasets show that the deforestation reduction trends in the Amazon are currently being reversed.

[2] https://www.transportenvironment.org/news/biofuels-policies-drive-food-prices-say-over-100-studies
[3] https://www.transportenvironment.org/publications/globiom-basis-biofuel-policy-post-2020
[4] https://ec.europa.eu/energy/topics/renewable-energy/biofuels/sustainability-criteria_en
[5] https://www.transportenvironment.org/sites/te/files/2019_01_Cerulogy_Risk_management_study.pdf

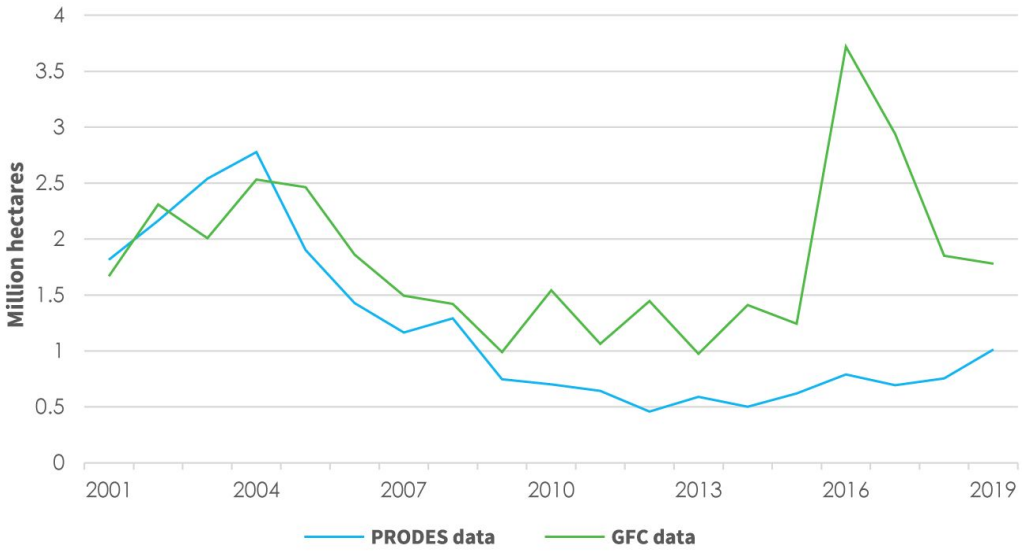


Figure 1: deforestation data in the Amazon. Cerulogy, 2020

Other areas

In the Cerrado[6] biome deforestation rates have remained rather stable over the past years, but agricultural statistics show that this biome has become increasingly important for soy cultivation, with 60% of the soy expansion in Brazil occurring in the Cerrado in the past two years. In the Chaco[7] area (including parts of in Argentina, Bolivia and Paraguay), deforestation rates are also relatively steady and more forest loss has been registered in Bolivia and Paraguay in 2019[8]. This suggests the existence of a deforestation leakage to areas where forests may be less protected, suggesting as well that forest loss is highly dependent on stable and clear political action.

2.2 Causes of deforestation

Despite some policy measures to halt deforestation in Latin America (such as the soy moratorium), agricultural expansion is still a major driver for deforestation and habitat destruction in tropical areas. Agricultural expansion is led by expansion of both pastureland for cattle and cropland for soy production. The land dynamics are complex and it is challenging to identify the specific proximate driver of deforestation in a given area, but the evidence shows that pastureland and cropland expansion should be understood as interlinked proximate causes of deforestation.

While cropland expansion can be directly occurring onto high carbon stock areas, it is also important to acknowledge and understand how *indirect* expansion and deforestation occur. The increased

[6] https://wwf.panda.org/knowledge_hub/where_we_work/cerrado/
[7] https://www.worldwildlife.org/places/gran-chaco
[8] https://earthenginepartners.appspot.com/science-2013-global-forest

interest in soy crops increases the demand for new cropland. This may lead pastureland owners to sell their land to soy farmers, pushing their activities and the agricultural frontier somewhere else. While in this case soy is not directly deforesting, it is pushing the cattle somewhere else, adding extra pressure to the available land and potentially at the expense of high carbon stock areas like forests. This example explains the complexity of the ILUC effects[9], which are not taken into account in the current EU legislation. These direct and indirect negative impacts linked to soy expansion could be worsened if there is an increased demand for soy for biofuel production coming from the EU.

2.3 A review of the soy expansion data

The research conducted by Cerulogy reviews the latest data on land expansion linked to soy as a commodity, similar to what the EU Commission's research department did in 2019[10] to understand the deforestation rates linked to commodities used for biofuel production.

The below table shows the revised values of soy expansion rates into high carbon stock areas. The higher values are due to increased expansion of soy that has occurred since the assessment of the EU Commission in early 2019. Also, there's recent evidence that more expansion has occurred on high carbon stock areas than previously estimated.

		Fraction of global soy expansion[11]	Expansion associated with deforestation (reviewed data)	Expansion associated with deforestation (European Commission, 2019a)
Brazil	***Caatinga***	3.1%	7.5%	3.0%
	Cerrado	21.6%	26.0%	14.0%
	Mata Atlântica	7.1%	7.5%	3.0%
	Pantanal and Pampa	6.6%	7.5%	3.0%
	Amazônia	7.4%	3.5%	2.2%
	Total	***45.8%***	***15.6%***	***10.4%***
Argentina		0.0%	9.0%	9.0%

[9] https://www.transportenvironment.org/news/video-why-are-most-biofuels-worse-climate-fossil-fuels
[10] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52019DC0142
[11] Represents soy global **net** expansion, i.e. considering expansion and recession of soy cultivations.

Paraguay	3.0%	57.0%	57.0%
Uruguay	1.0%	1.0%	1.0%
Bolivia	1.0%	60.0%	60.0%
Total Latin America	**49.7%**	**18.6%**	**14.0%**
USA	24.6%	3.0%	2.0%
Rest of world	24.9%	2.0%	2.0%
Global total	**100.0%**	**10.5%**	**8.0%**

Table 1: reviewed estimates of soy expansion into high carbon stock areas in comparison with EU Commission, 2019. Source: Cerulogy 2020.

The Commission's methodology sets a threshold of 10%, above which expansion of the cultivation land into high carbon stock areas is considered "significant"[12]. As shown in table 1, the Commission estimated in 2019 that, since 2008, 8% of soy expansion had occurred into high carbon stock areas. However, Cerulogy's review of the latest data suggests that soy expansion may be higher, reaching up to about 10.5%. In that case then, according to the threshold set by the EU Commission, **soy oil should be labelled as a high ILUC risk biofuel feedstock** and be phased out just like palm oil.

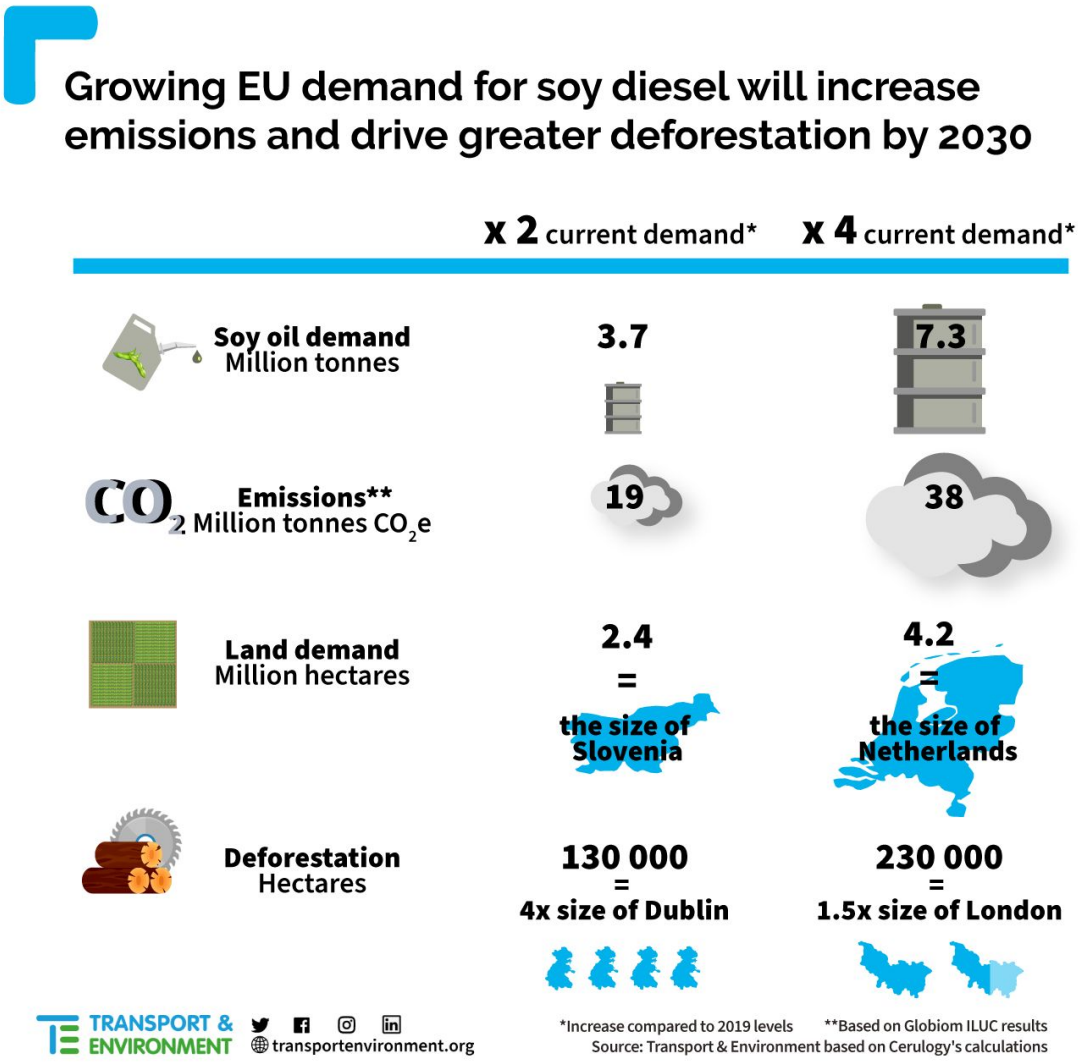
3. The EU must take action to avoid an increased use of soy oil

Since the adoption of the RED in 2009, Europe has seen a constant increase in the use of vegetable oil for the biofuels market, with a particular increase in palm oil. While rapeseed oil has remained rather stable, since 2016 the EU has seen a slight increase in the demand for soy oil to produce biofuel in Europe[13], while the volumes of soy biodiesel imported into the EU have fluctuated over the years, mostly due to changes in trade policies. In total, in 2019 the EU consumed about 1.8Mt of soy oil in biodiesel.

Based on the current regulatory framework, we could expect the demand of vegetable oil for biodiesel in Europe to remain more or less the same as we see today (a bit less than 15Mt of vegetable oil[14]). Due

[12] As per the definition in the REDII: "high indirect land-use change-risk feedstock for which a significant expansion of the production area into land with high carbon stock is observed"
[13] https://www.transportenvironment.org/publications/more-palm-oil-and-rapeseed-oil-our-tanks-our-plates
[14] Calculated on the basis of about 7.8 Mt demand for biofuel (FAME) and about 6.5 Mt for "renewable diesel" (HVO) - which present the same risks as biofuels if unsustainable feedstocks are used (such as soy oil and palm oil derived products)

to the phase-out of palm oil as biofuel feedstock - foreseen in 2030 and potentially earlier based on some EU Member States positions - we can expect that the demand of soy oil will continue increasing in the coming years.
Based on Cerulogy's analysis, the range of increase of the demand of soy biodiesel in Europe can be between two and four times what the EU consumes today.



In the context of the EU Green Deal, the commitments to become carbon neutral, reduce deforestation and protect and restore global biodiversity, the use of soy oil (and other food and feed feedstocks) for biodiesel production should not have any room in Europe.

4. Conclusions

In view of the upcoming policy review(s), we conclude the following:

- The most recent deforestation data in Latin America shows that deforestation keeps occurring today in areas of high importance such as the Amazon, the Chaco and the Cerrado. Pasture (for cattle) and croplands (for soy) are the main responsible for this deforestation. These drivers are very much interlinked, usually starting with **the expansion of pastureland which is subsequently "pushed away" by croplands,** adding extra pressure on the land.
- While anti-deforestation measures in the Brazilian Amazon seem to have partly worked, there might have been a **leakage effect in other areas and countries.** Furthermore, the available data on deforestation are sometimes inconsistent, and the effectiveness of the policies and the measures is highly dependent on the political direction taken by the country.
- Revised data suggests that expansion of soy into high carbon stock areas may be higher than previously estimated - 10.5% compared to 8% estimated in early 2019, which is higher than the minimum threshold (10%) set by the EU Commission. In that case, the EU should label soy **as a high ILUC risk feedstock under the REDII and phase it out by 2030 at the latest. Member states should already start limiting & phasing out as soon as possible** the share of soy biodiesel in their country.
- If no regulatory action is taken in Europe, we can expect **an increase in demand for soy oil for biodiesel of 2 to 4 times until 2030 compared to 2019 levels,** contributing between 19 and 38MT CO2e extra and up to 230000 Ha of extra deforestation. In the context of the carbon neutrality goals, the **EU must restrict and eliminate the use of food and feed biofuels in the upcoming policy reviews**.

Further information

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