

ABIOVE Contributions to the project “ILUC – High and low ILUC-risk fuels” conducted by Guidehouse in request of the European Commission on Soybean Expansion and Land Use Change (September 14th, 2022)

1. Introduction

In July 2022, Guidehouse hosted a webinar to present the results of phase 1 of the project on High iLUC risk fuels, in which it is proposed a review of all relevant aspects of the report on feedstock expansion, including the estimations of iLUC risks of agricultural commodities used for the production of biofuels, under the review process of the EU Renewable Fuel Directive.

Since ABIOVE, the Brazilian Association of Vegetable Oil Industries, representative of companies that produce meal, vegetable oils and biodiesel, couldn't participate in the event, we present in this document our technical contributions to the project.

We ask that the information presented here should be considered by Guidehouse to review the results released in phase 1.

2. Allocation of soybean on expansion into forests

Reading through the slides presented during the July webinar, and also considering the exchange of emails we had with Guidehouse's team (which we appreciated very much the attention), ABIOVE analyzed the results and came across some inconsistencies that require revision to guarantee accurate results for soybean, in our view.

First of all, looking at the soybean expansion into forest number (slide 31), when we calculate the absolute number of each country considered in the study, according to the percentages on slide 33, and compare with the gross expansion of the soybean area (FAOSTAT) to see how those numbers relate to each other, we get the numbers found in the table 1:

Table 1. Expansion into forest area by country

<i>Country</i>	<i>Increase of planted area (2008 2019) (kha)</i>	<i>Expansion into forest area (kha)</i>	<i>Share of expansion forest</i>
Brazil	14,649	1,368	9.3%
Paraguay	1,101	62	5.7%
Bolivia	602	456	75.7%
Argentina	188	456	242.0%
Indonesia	78	17	21.5%
RoW	8,663	41	0.5%
Total	25,282	2,400	9.5%

Source: High ILUC-risk fuels review. Guidehouse, July 11th, 2022. Adapted by ABIOVE

The 1,368 kha of soybean expansion into forest area obtained for Brazil has similar order of magnitude of some analysis made specifically for Brazil. One of these, made by Agrosatelite, indicates 1,624 kha

of soybean expansion for the 2008-19 period. A second one, that could be calculated from MapBiomass Collection 6, achieves a total of 1,597 kha for the same period.

The analysis made by Agrosatelite was requested by ABIOVE. To generate those results, the following data from Global Forest Change version 1.8 (Hansen et al, 2013) were used: tree canopy cover for year 2000 (treecover2000) and year of gross forest cover loss event (lossyear), being necessary to perform a few modeling steps in order to make it equivalent to FAO's forest definition (2001i) and FAO's deforestation definition (2007); Agrosatelite's soy area mapping for Brazil (2020-21 crop year base) and MapBiomass data collection 6 (Souza et. al, 2020).

In the Google Earth Engine (Gorelick et al., 2017) platform, the treecover2000 layer was excluded from all cells with canopy cover lower than 10% and all polygons smaller than 0.5 ha. The second step was to exclude all areas of commercial forest using MapBiomass layer (Souza et al., 2020), also applying the 0.5 ha filter. After these steps, the treecover2000 data were adjusted to mirror FAO's forest definition (2001). In order to make the lossyear data compatible with FAO's deforestation definition (2007), only areas with intersections with treecover 2000 reference data were selected for the period of the study (2009-2019). MapBiomass data were used to exclude areas where the lossyear deforestation of a given year overlaid areas with commercial forests, given that they are not part of the FAO deforestation definition. The layer resulting from the previous steps were overlaid with biome maps and soy map for the 2020-21 crop.

MapBiomass (mapbiomas.org/) is a public database that has a tool presenting land use transitions from 1985 to 2020 (collection 6). It computes these transitions year by year or by pre-defined periods. As the yearly information moves the reference date forward, we decided to use two predefined periods in our calculations, 2008-18 and 2008-20. We calculated the annual expansion of soy into Forest and Savanna formations and estimated them for the period 2008-19, obtaining 1,597 kha (442 kha for forest and 1,155 for savanna).

Although the data for soy expansion into forest in Brazil are correct, the results for Bolivia and Argentina raised a few concerns. The number for Argentina is almost impossible to be explained given that the expansion into forest is even higher than the increase in planted area. In our view, the calculated expansion into forest for both countries requires revisions and is overstated. Those distortions should explain why Guidehouse has found an iLUC risk for soy (9.5%) much higher than the 8% calculated by the European Commission study of 2019ii.

In ABIOVE's understanding, those results are explained by two methodological choices made by the project: (i) the understanding that the entire analysis of deforestation and occupation of deforested areas by cropland was made at global level, not country specific; (ii) the procedure to allocate cropland expansion into forest to specific commodities.

The choice (i) might have generated unreliable deforestation results at country specific level. The choice (ii) might have overstated specific commodities expansion into forest. According to the phase 1 webinar Q&A, after known that the driver of deforestation for a certain area was cropland, an underlying crop map was used so participants of a campaign was asked to check by visual interpretation what was the commodity that drove the tree loss in that area. Since the maps' accuracy could not be the best available, and considering the calculations we made (table 1), it seems clear that the allocation of soybean on expansion into forest is overestimated and should be reviewed.

In addition, the report from the European Commission presented in 2019 shows that combining data from Brazil, other South American countries and the rest of the world, the average fraction of soy expansion onto forest was 8%. This was possible because, besides Latin American countries, the greatest soy expansions since 2008 have been observed in countries such as India, Ukraine, Russia, and Canada, in which little evidence for soy cultivation causing direct deforestation could be found (table 2).

Table 2. Estimate of World Average of Soy Expansion into Forest Areas

Fraction of world soy expansion in Latin America	53%
Observed expansion into forest in rest of the world	2%
World average fraction of soy expansion onto forest	8%

Source: Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee. Brussels, 13.3.2019 COM(2019) 142 final.

So, considering the calculations ABIOVE presented here combined with the analysis using data from MapBiomass and the EC study, there’s no reasonable explanation for soybean to be attributed with the average expansion rate into forest presented in the Guidehouse study.

3. Soybean productivity factor calculation

Another topic ABIOVE examined was the calculation for the soybean productivity factor (PF), which is the reference for calculating all other commodities.

As mentioned in slide 12 of the webinar presentation, since in Brazil a multi-cropping soybean-maize system has become a common practice, in an attempt to avoid double counting, Guidehouse excluded data related to maize 2nd crop and only considered it in some analytical exercises. However, in doing that, a significant amount of energy that should have been allocated to soybean was also excluded.

Agroicone, a Brazilian think tank, presented a report in 2018, which was quoted by the European Commission, stating that the net soybean area increased 3.3 million of ha more than the total annual crop expansion between 2012 and 2017, which could be explained by the replacement of maize 1st crop area by the soybean-maize multi-crop production system. Taking this into consideration, the share of natural vegetation in soybean expansion would fall to about 6% in the timeframe of the study (calculated as 8%).

To be able to make comparisons with the number presented in the Guidehouse study, ABIOVE took national data to calculate the adjusted soybean PF weighted maize area share:

Table 3. Brazilian soybean and maize data

Crop	Soybean		Maize	
	2008	2019	2008	2019
Area (ha)	21,313,100	35,874,000	9,635,600	4,103,900
Production (t)	60,017,700	119,718,100	39,964,100	25,646,701
Yield (t/ha)	2.816	3.337	4.148	6.249

Source: Conab, 2022.

To calculate the maize share, it was necessary to know the amount of area and production of this commodity displaced by soybean in the same hectares, that is evidenced by the difference between

2008 and 2019 periods. After that, we attribute those numbers to soybean to calculate the adjusted yield for this commodity, which is use for calculation the PF:

Table 4. Calculating soybean adjusted yield

<i>Crop</i>	<i>Unit</i>	<i>Result</i>
Maize area loss	ha	-5,531,700
Maize production loss	t	34,569,520
Soybean Yield (ajust.)	t/ha	3.726

Applying the new yield to the formula found in slide 16, we would have a productivity factor for soybean of 1.3 instead of 1.0, as shown in table 5:

Table 5. Productivity Factor (PF) Calculation

<i>Crop</i>	<i>Yield (kg/ha)</i>	<i>LHV (MJ/kg)</i>	<i>Moisture (%)</i>	<i>Energy (MJ crop/ha)</i>	<i>PF</i>
Maize	7,584	18.50	15	119,258	2.1
Soybean	2,803	23.53	15	56,061	1.0
Soybean (ajust.)	3,726	22.86	15	72,398	1.3

It’s worth mentioning that because soybean is the reference, the calculation still considers the soybean-only energy for the denominator. With that, the other commodities would not be affected and their analysis is preserved.

These new results reflect in a more accurate way the global soybean reality in ABIOVE’s understanding and we hope they are considered and mentioned in the next review and refinement phases of the study under Guidehouse’s responsibility in order to provide the EU Commission with the best and more precise outcome possible.

About ABIOVE

ABIOVE – Associação Brasileira das Indústrias de Óleos Vegetais (Brazilian Association of Vegetable Oil Industries) has, for 41 years, represented the companies that process oilseeds and produce meal, vegetable oils and biodiesel. Our member companies are among the country’s largest exporters, adding value to Brazil’s oilseed and grain chains and stimulating sustainable production practices.

References

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ⁱ FAO defines forest area as native and planted forests, both with canopy equal or higher than 10%, 0.5 ha of polygon area and trees taller than 5 meters. With regards to the concept of deforestation, FAO defines as the conversion of forest to a different land use or a reduction over time on the canopy to levels below 10%. The definition encompasses, for example, forest area converted to uses as agriculture, pastures, water reservoirs and urban areas. FAO definition does not cover commercial forest conversion.

ⁱⁱ EC report from 2019 states that: given the lack of studies providing recent data on a global scale, data were combined from studies and databases from Brazil, other South American countries and the rest of the world. For Brazil, data on soy expansion since 2008 was taken from the Brazilian IBGE-SIDRA database and combined with data on expansion into forest areas in the Cerrado [Gibbs et al. 2015], averaging for the period 2009-13 in the Amazon [Richards et al. 2017] and the rest of Brazil [Agroicone 2018]. [Graesser et al. 2015] provides data for crop expansion onto forest in other Latin American countries. For the rest of the world, in the countries showing the greatest soy expansions since 2008, i.e., India, Ukraine, Russia and Canada, few concerns for soy cultivation causing direct deforestation could be found in the literature. Therefore, a share of 2% expansion onto forests was assumed for the rest of the world. As a result, the world average fraction of soy expansion onto high-carbon land was estimated at 8%.