

Sourcing physical deforestation and conversion-free soy

Protocol V. 1, 2022





Although the Dutch feed industry is covering its soy footprint with responsibly produced soy for many years now, the transition to physical responsible soy has not taken-off. That is why Royal Agrifirm Group is pioneering to develop a physical, deforestation and conversion-free soy supply chain. Which means that all actual, physical soybean meal in this dedicated supply chain is guaranteed free from land-conversion and deforestation.

This document explains the approach of Royal Agrifirm Group to physical, deforestation and conversion-free soy supply chain in more detail. This approach is used as practical guidance for the pilot on deforestation-free soy with Royal Friesland Campina.

Definitions

Royal Agrifirm Group follows the definitions for deforestation- and conversion-free sourcing¹ as presented by the Accountability Framework Initiative (AFI).

The AFI introduces the following definitions:

- Conversion: change of a natural ecosystem to another land use or profound change in the natural ecosystem's species composition, structure, or function.

- Deforestation: the loss of natural forest as a result of conversion to agriculture or other non-forest land use; conversion to a plantation; or severe or sustained degradation.
- Conversion-free: commodity production, sourcing or financial investment that do not cause or contribute to land conversion.
- Deforestation-free: commodity production, sourcing or financial investment that do not cause or contribute to deforestation.

Royal Agrifirm Group considers soybean meal as conversion and deforestation-free when soy is sourced from agricultural land that has not been converted or deforested after the cut-off date of 31-12-2020.

¹ Please find more information about the definition of 'deforestation-free soy' of this pilot on the AFI website and topical summary of deforestation and conversion.

Sourcing guaranteed deforestation- and conversion-free soy

To guarantee physical deforestation- and conversion-free soy, Royal Agrifirm Group works closely together with a selection of its suppliers. These suppliers are active in both regions with a high and a low risk of deforestation and land-conversion. For both risk levels, verification measures differ. That is why a thorough and broadly accepted risk-assessment of sourcing regions for our pilot is so important (see Annex: risk-assessment study).

To assess the conversion and deforestation risk in the sourcing areas of the pilot, Royal Agrifirm Group makes use of publicly available documentation, such as the satellite monitoring by MapaBiomass, TerrasBrasilis, Global ForestWatch and Trase; and reports about land conversion in the Amazon and Cerrado by ABIOVE and Agrosatelite. Based on the input

collected, a list is generated of low and high-risk areas (states in this case), which will be discussed with suppliers and other stakeholders and finetuned based on their inputs.

The verification measures depend on the risk of deforestation and land conversion. The verification regimes for low- and high-risk regions are introduced on the next page. The final details of the low and high-risk assessment will be developed further during our pilot and adapted (if needed) after the first practical experience, conversations with suppliers and NGOs. A new version of the protocol and risk study will be published in March 2023.

Logistics

Logistics play a critical role in our journey towards deforestation- and conversion-free soy supply chains. Throughout the entire supply chain, deforestation- and conversion-free

soy must not be mixed or mingled with soy that is not considered or guaranteed to be deforestation- and conversion-free. As these logistics can be challenging, Agrifirm specifically selected its suppliers on their ability to handle the logistic challenge of keeping the shipments 'clean'.

Annual third-party audits of Royal Agrifirm Group supply chain will take place to guarantee 'clean' supply chains, and the delivery of physical deforestation- and conversion-free soy to clients. Agrifirm calls this supply chain model for delivering deforestation- and conversion-free soy soft identity preserved (Soft IP).

In this supply chain model, only farmers that deliver guaranteed deforestation- and conversion-free soy are allowed to deliver to Agrifirm. The physical soy of these 'green' farmers must not be mixed, mingled or pooled at any time with soy that is not considered or guaranteed to be deforestation- and conversion-free of 'orange farmers'. The soy of 'green' farmers is allowed to be mixed, mingled and pooled.

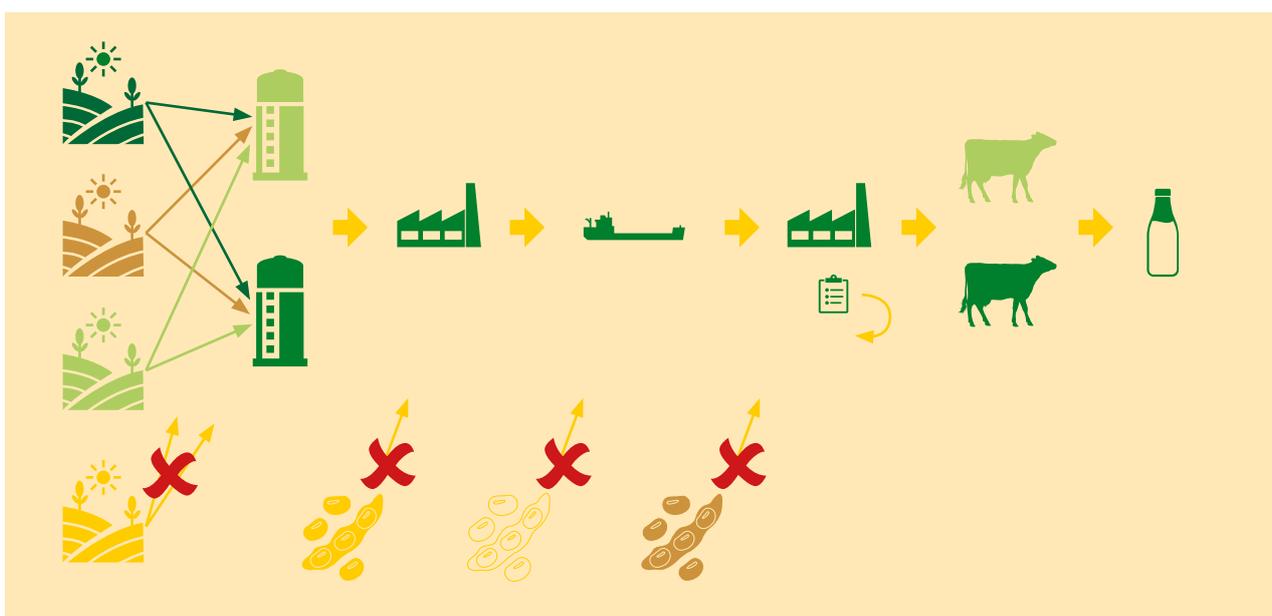


Figure 1: The Soft IP supply chain of deforestation-free and conversion-free soy.

1. Sourcing from low-risk area's

In case soy is sourced from low-risk areas (see Annex: risk-assessment study²), we will ask the supplier for a declaration of origin. Two routes are foreseen:

> Annual declarations

Large suppliers often have their own systems in place to verify the origin of their soy. On an annual basis we will ask these suppliers to show that their soy is indeed originating from low-risk regions and that no mixing with soy from high-risk regions occurred. Of course, the own systems of these suppliers will be compared with the requirements of Agrifirm on the logistics of the supply chain and the definitions of deforestation-free soy, as described in this protocol.

> Third party verification of supply base

Smaller suppliers often do not have a system to track and trace their commodity flows. Nonetheless, we will also ask them to also provide us with assurance about the origination areas of the soy by offering them the option to work on annual third-party verification to determine if their soy indeed originated from a low-risk area (see for 'more details about third party verification' the section below).

2. Sourcing from high-risk area's

In case soy is sourced from high-risk areas (see Annex: risk-assessment study²), we will ask for further verification or certification to ensure that the soy is from deforestation- and conversion-free farms. Three routes are foreseen:

> FEFAC SSG compliant soy

Physical soy that is certified under schemes that are positively benchmarked against the FEFAC Soy Sourcing Guidelines 2021 (including the conversion-free criterion nr. 34) and kept separated from non-certified volumes, is accepted as deforestation- and conversion-free soy.

> Supplier schemes (batch level)

Physical soy certified or verified under a supplier-owned verification/certification scheme for deforestation- and conversion-free soy is accepted when:

- the definitions align with the AFi definitions
- assurance is provided about origin (field/land level)
- third party auditing is included.

> Third party verification of supply base

Smaller suppliers are often not able to deliver under their own or

third-party certification system.

We will offer them the possibility to work with us on yearly third-party verification to prove that the soy they deliver(ed) is from deforestation- and conversion-free fields/lands.

More details about third-party verification

All additional third-party verification of the supply base is executed following the FSA SAI Methodology, which includes third-party audits with random samples of farmers (sample size is based on the total number of suppliers), self-assessments with farm audits and possible satellite imaging. The self-assessments and farm audit protocols will be based on existing material, e.g. developed by NGOs.

Timeline

The first version of this protocol will be applicable for the procurement of all Royal Agrifirm Groups deforestation-free soy from 1 March 2022 – 1 March 2023. After 1 year of practical experiences, the protocol will be evaluated with stakeholders leading to a updated version. The second version of the protocol will also be published by Royal Agrifirm Group.

Sector commitments (RTRS/FEFAC SSG)

During the pilot, Royal Agrifirm Group will continue to deliver on its own and sector commitments and purchase RTRS-certificates for the Dutch market and FEFAC-SSG certificates for all soybean meal imported to Europe.

Contact

Gesineke Borghuis

CSR Coördinator RAG

g.borghuis@agrifirm.com



A risk-classification for soy sourcing countries

Disclaimer

This quick-scan was executed by Schuttelaar & Partners using publicly available data sources about land conversion and deforestation in soy producing countries. It is the starting point for further stakeholder engagement and will be frequently revised- also anticipating internationally recognized risk-assessments or benchmarks, such as the one in the forthcoming Regulation on Deforestation-Free products by the European Union.

Introduction

Royal Agrifirm Group and Friesland Campina have joined forces to develop a fully segregated, deforestation- and conversion-free supply chain to Europe. Their joint commitment is to guarantee a deforestation- and conversion-free supply chain (cut-off date 2020) on the one hand, whilst making an impact in the risk-regions on the other hand. This document presents a proposal for the qualification of states in Brazil, Paraguay, Canada and the United States into high and low risk for conversion.

Method

The section below presents the main insights into the risks of land conversion and deforestation in relation to soy production in the main soy producing countries. All information is derived from publicly available data sources, allowing for everyone to verify the results. Since we are using different data sources for different countries and the data sources all have their own approach (also the cut-off date of 2020 requires rather recent data that is not always available), the quick-scan should

be seen as a starting point rather than an end point. If one of the data sources suggests that land conversion is a problem, this area is indicated as high-risk. In that sense, the risk assessment takes a 'better safe than sorry' approach.

¹ Definitions in line with Accountability Framework, meaning that also natural ecosystems such as wetlands and savannas are included.

² Argentina is not included in the quick-scan, since Agrifirm is not sourcing soy from Argentina.



United States

The United States has for a long time been the number one soy producer and is competing with Brazil for that number one position. Soy production is mainly concentrated in the Midwest of the country, as can be seen in figure 1 below.

Legislative framework

The United States has a comprehensive legal framework for the protection of natural ecosystems, incentivizing farmers via financial compensation measures to implement certain conservation practices. The national soy program 'Sustainable Soybean Assurance Protocol' (SSAP), is recognized to be

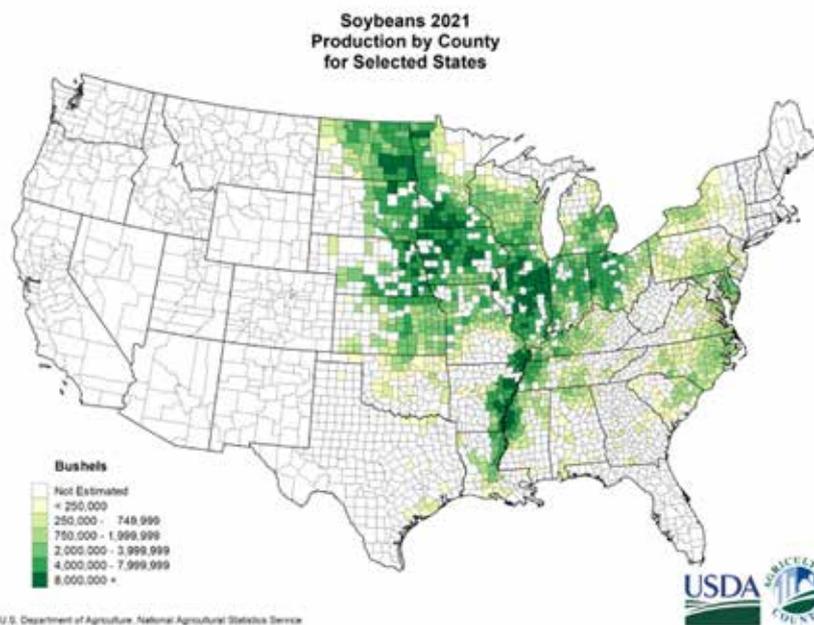
in compliance with the FEAC Soy Sourcing Guidelines (2021 version, including non-conversion).

Deforestation and land conversion in the United States

The United States is generally perceived as a country with a low risk of deforestation. In the European Soy Monitor, FEAC proposes a low-risk qualification for the United States. However, civil society organizations have raised concerns in relation to land conversion in the United States, specifically for the natural grasslands of the Great Plains.

The Great Plains

Figure 2 provides an overview of the states that are part of the Great Plains (in the United States). WWF US publishes an annual report (Plowprint report⁴) on conversion of this native grassland into agricul-



U.S. Department of Agriculture, National Agricultural Statistics Service

Figure 1: Soy production in the United States in 2021³

³ https://www.nass.usda.gov/Charts_and_Maps/Crops_County/sb-pr.php

⁴ <https://www.worldwildlife.org/projects/plowprint-report>



Figure 2: Great Plains in the United States

tural lands. The 2021 report finds that from 2018-2019 an estimated 2.6 million acres of grassland were plowed up (in the entire Great Plains also covering parts of Mexico & Canada), primarily to make way for row crop agriculture. The researchers suggest that nearly 70% of new conversion across the Great Plains was for three crops: corn (25%), soy

(22%), and wheat (21%). A recent study about land use change in the United States between 2009 and 2015 suggests that in some states more land was converted for agriculture than abandoned.

Other researchers have raised the issue that monitoring conversion of grass lands is a challenge, because

moderate resolution satellite data is not accurate enough to successfully differentiate between native grasslands and farmlands. In contrast to the Plowprint report, these researchers estimate that from 1985 to 2020 approximately as much land was allowed to go fallow as native land turned into farm-land.

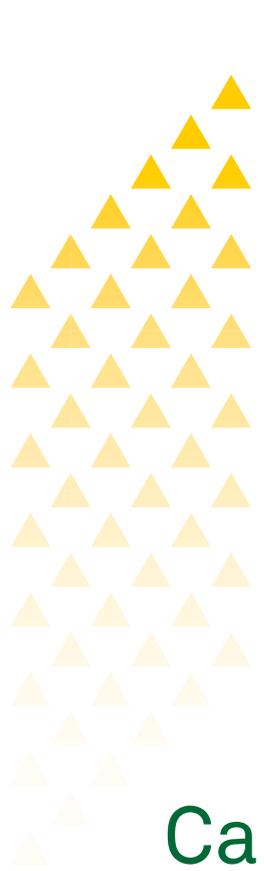
Risk-level	States
Low	Maine, New York, Vermont, New Hampshire, Pennsylvania, Rhode Island, Connecticut, Massachusetts, Ohio, Virginia, Delaware, New Jersey, West Virginia, North Carolina, Maryland, Georgia, South Carolina, Florida, Washington, Idaho, Oregon, Nevada, California, Utah, Arizona, Wyoming, New Mexico, Arkansas, Louisiana, Wisconsin, Michigan, Indiana, Oklahoma, Illinois, Mississippi, Alabama
High	Montana, Colorado, North Dakota, South Dakota, Nebraska, Kansas, Texas, Tennessee, Minnesota, Iowa, Missouri, Kentucky

Conclusion

Taking the careful approach, the following states are considered low risk (note that most don't have soy production) and high-risk.

⁵ <https://www.nature.com/articles/s41467-020-18045-z>

⁶ <https://www.mdpi.com/2073-445X/9/5/166>



Canada

The soy production sector in Canada produced 6.27 MMT of soy in 2021. Between 1971 and 2016, the soy production volumes grew by 57%, while the total farm area decreased by 6%. In total 70% of the total volume is exported to 60 countries and 19% to the European Union⁷. Together the four provinces Ontario, Quebec, Maritimes and Saskatche-

wan account for 99% of the total production area (see figure 3 and 4).

Legislative framework

Canada has a big forestry/timber sector. Responsible management of these forests is a priority. The country protects its forest via a strong legal framework⁸. In 2021, the Canadian government announced a

serious investment in protecting the Prairies (the Canadian part of the Great Plains in the states of Alberta, Manitoba and Saskatchewan) and wetlands⁹.

Deforestation and land conversion in Canada

A publication¹⁰ released by the Canadian government about land use change between 2010 and 2015, indicates that a total of 347.300 hectares of land cover change was observed in Canada in that period, corresponding to less than 1% of overall area. Of this number, 65% is related to conversion of natural land to farmland.

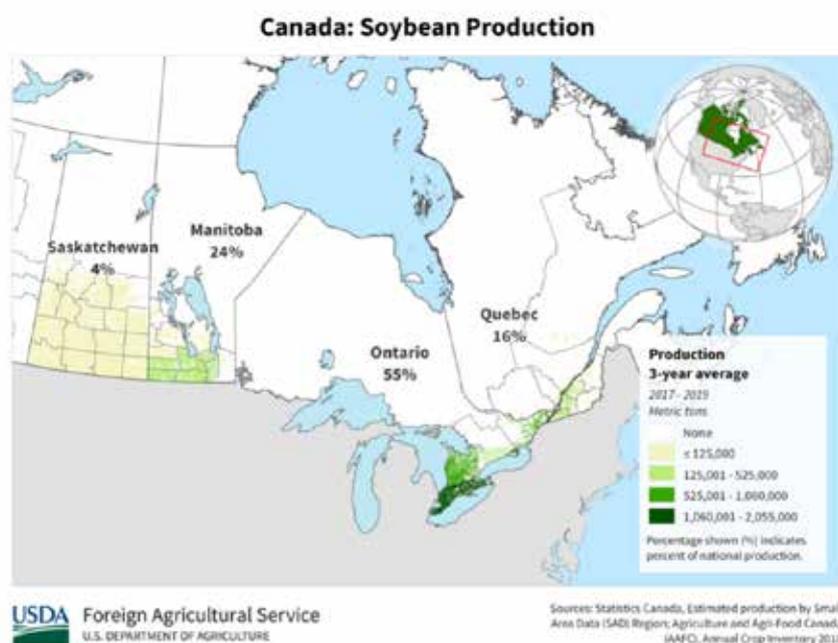


Figure 3: Soy production in Canada

⁷ <https://soycanada.ca/industry/statistics/>

⁸ <https://www.nrcan.gc.ca/our-natural-resources/forests/sustainable-forest-management/canadas-forest-laws/17497>

⁹ <https://www.canada.ca/en/environment-climate-change/news/2021/07/canada-invests-25-million-to-protect-wetlands-and-grasslands-in-the-prairies.html>

¹⁰ 2021, https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/land-use-change/2021/Land-use-change_EN.pdf



Year	Canada Total	Ontario	Quebec	Maritimes	Manitoba	Saskatchewan
2021	6,271,835	4,082,331	1,101,708	72,643	963,764	50,935
2020	6,358,500	3,908,700	1,159,700	55,900	1,162,800	68,800
2019	6,145,000	3,708,200	1,146,000	56,600	1,122,300	107,200
2018	7,416,600	4,200,500	1,164,000	76,600	1,731,600	231,800
2017	7,716,600	3,796,600	1,115,000	80,700	2,245,300	479,000
2016	6,462,700	3,374,700	1,040,000	76,500	1,669,000	202,500

Figure 4: Soy production (in metric tonnes) in Canada

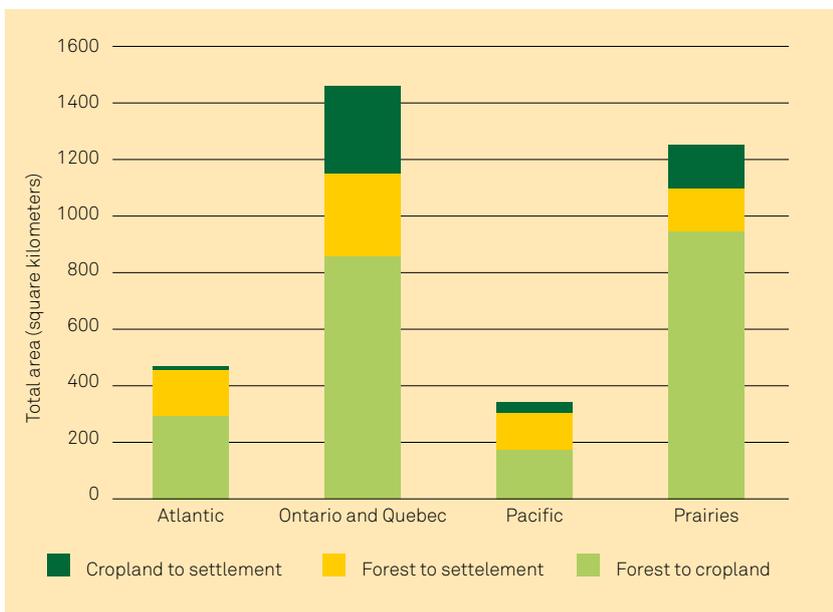


Figure 5: Land use change in Canada between 2010 and 2015

The Plowprint Report¹¹ by WWF suggests that also in Canada grasslands are still converted for the production of crops. The three Canadian states that are part of the Great Plains are Alberta, Manitoba and Saskatchewan. A recent study¹² about protection of native grass lands in the prairies of Canada, mainly in Saskatchewan, shows the importance of this biome and the need to protect it from land conversion.

Conclusion

Although the Canadian government is investing in the protection of the prairies and wetlands and most studies indicate accurate nature protection in Canada, the three states of the Great Plains are considered high-risk, following the 'better safe than sorry' approach.

¹¹<https://www.worldwildlife.org/publications/2021-plowprint-report>

¹²<https://onlinelibrary.wiley.com/doi/full/10.1111/cag.12768>

Risk-level	States/Countries
Low	British Columbia, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Nunavut, Ontario, Prince Edward Island, Quebec, Yukon
High	Alberta, Manitoba and Saskatchewan





Paraguay

In 2020, Paraguay produced 11 million tonnes of soybeans. Paraguay is the sixth largest producer of soybeans and the fourth largest exporter. Soybeans are an important source of income and contribute 18% to the country's GDP (UNDP). Most of the soybeans are produced in the south-east of Paraguay in the Atlantic Forest (see figure 6).

Legislative framework

In 2004, Paraguay introduced their Zero Deforestation Law, aimed at halting deforestation in the Eastern region¹³. Since the introduction of the law, deforestation in the Atlantic Forest has declined significantly but not fully stopped. In addition, deforestation continued in other regions such as the Chaco¹⁴.

Deforestation and land conversion in Paraguay

Land conversion in Paraguay is widespread and threatens important ecosystems. The Mapa Biomass system shows the presence of land conversion in almost all parts of the country, as can be seen in figure 7. Not all land conversion is happening for soy production. Mappings executed by Trase, suggest that land conversion for soy (for export) is especially taking place in the Eastern part of the country, as can be seen in figure 8.

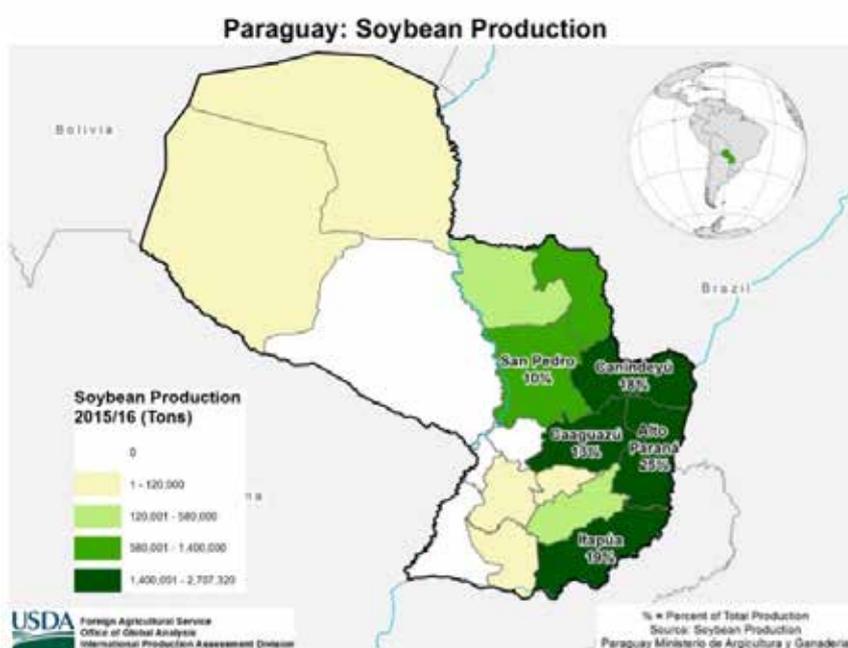


Figure 6 - Soybean production in Paraguay (USDA)

⁷ Paraguay_CRP.pdf (climatelinks.org); https://www.climatelinks.org/sites/default/files/asset/document/Paraguay_CRP.pdf

⁸ Trase; <https://insights.trase.earth/insights/soy-deforestation-risk-in-paraguay-continues-despite-decline/>

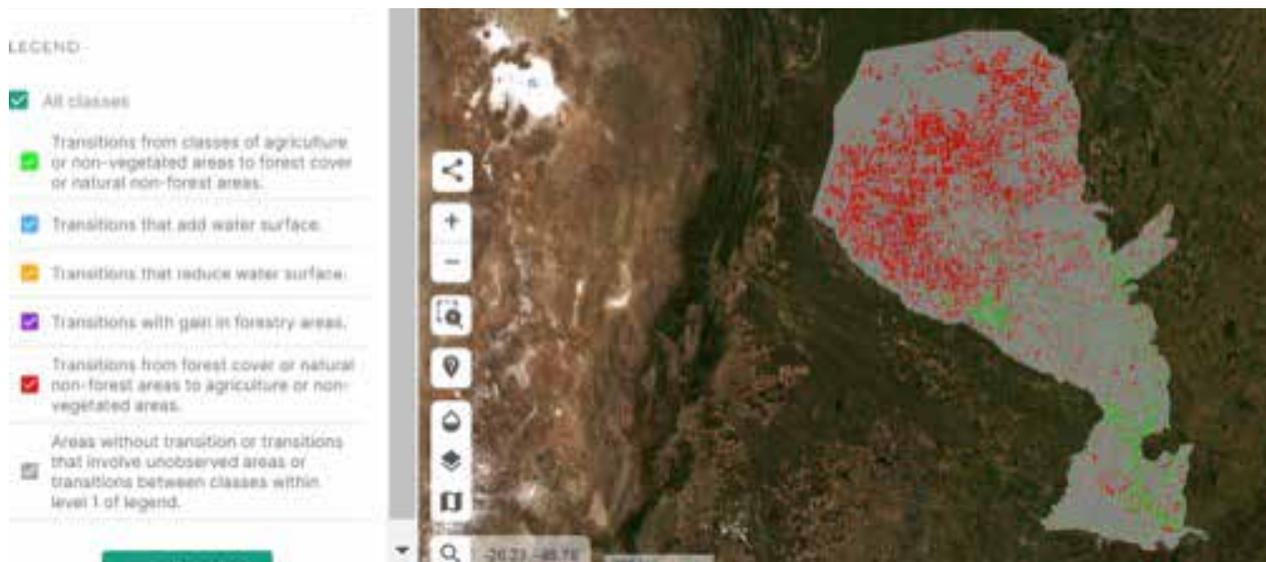


Figure 7: Deforestation in Paraguay from 2000-2021 (Mapa Biomás¹³)



Table 1 below indicates per 'department' the exported volume and the deforestation risk. When the relative volume linked to deforestation is below 1%, the department is indicated to be low risk. In all other cases, the department is considered to be high risk.

Figure 8: Soy deforestation risk in Paraguay (Trase¹⁶)

Paraguay regions	Soy deforestation risk (HA)	Soy deforestation risk (%)	Volume (T)	Volume of total (%)
San Pedro	3360,38	40,55%	811685,46	11%
Caaguazu	1182,02	14,26%	1055374,05	14%
Canindeyu	1092,38	13,18%	1200413,38	16%
Concepcion	783,18	9,45%	60244,94	1%
Amambay	556,65	6,72%	309251,88	4%
Alto Parana	439,57	5,30%	1998053,41	27%
Caazapa	407,67	4,92%	420277,15	6%
Itapua	392,27	4,73%	1400982,12	19%
Guaira	65,09	0,79%	33378,96	0%
Misiones	7,68	0,09%	64038,05	1%
Paraguari	0,82	0,01%	36,79	0%

Table 1: (source:Trase 2019)

Paraguayan Atlantic Forest

In 2019, 75,000 ha of forest was cleared in the Paraguayan Atlantic Forest. Currently, only 13% of the native vegetation in the Paraguayan Atlantic forest is still standing¹⁷. As most Paraguayan soy is produced in this region, Trase addresses that (part of) soy exports from Paraguay are exposed to a risk of illegal deforestation.

Chaco region

The Zero Deforestation Law is focused on the Eastern region of Paraguay, and therefore does not cover the Paraguayan Chaco, which lies in the West¹⁸. Unintendedly the law may have caused a new deforestation front in the Chaco. Deforestation in

the Chaco region is rapidly increasing, with a loss of 2.4 million ha of native vegetation between 2010 and 2019. Over the past decade, the Dry Chaco has even seen some of the highest rates of deforestation in the world, as indicated by Trase¹⁷. It must be noted that the Dry Chaco is located unfavorable for exports as it is far from the sea. Therefore, most of the soy from the Chaco may be sold on the domestic market.

Conclusion

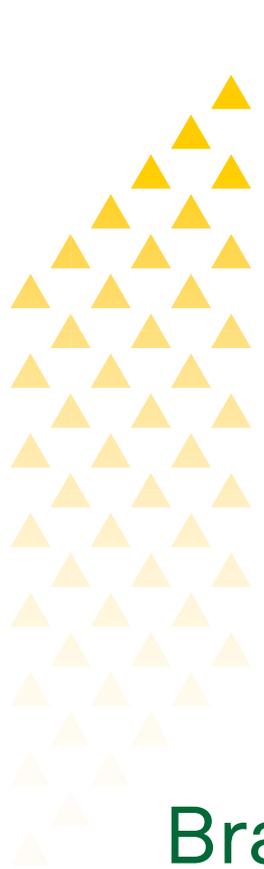
Given the deforestation and land conversion rates in Paraguay and the lack of monitoring, almost the entire country should be considered high-risk.

¹⁷ <https://insights.trase.earth/insights/soy-deforestation-risk-in-paraguay-continues-despite-decline/>

¹⁸ https://www.climatelinks.org/sites/default/files/asset/document/Paraguay_CRP.pdf

Risk-level	Departments
Low	Guaira, Misiones, Paraguari
High	Alto Paraguay, Alto Parana, Amambay, Asuncion, Boqueron, Caaguazu, Caazapa, Canindeyu, Central, Concepcion, Cordillera, Itapua, Neembucu, Presidente Hayes, San Pedro.





Brazil

General information

Brazil is the fifth biggest country in the world. The country is divided into 5 bigger regions, 26 states (see table 2), 136 mesoregions, 557 microregions and 5.569 municipalities. For the past years, Brazil has been the biggest soy producer in the world. It is the number one sourcing area for the European Union.

Legislative framework

Brazil has some of the strongest laws for the protection of the environment and the guarantee of best practices at farm level. Implementation is a problem, though. The Forest Code obliges land owners to leave part of their lands in tact (80% in Amazon, 35% Cerrado and 20% rest), in addition a buffer zone around riparian areas and steep hills needs to be installed. The Amazon Moratorium, an agreement between the soy traders, blocks the trade of soy from converted Amazon lands. The current agricultural expansion area is the Cerrado, specifically the states

of Maranhão, Tocantins, Piauí and Bahia.

Deforestation and land conversion in Brazil

Although satellite systems in Brazil allow for tracking of deforestation at a very small scale, the focus of this proposal is at a higher level of aggregation. Agrifirm wants to

create a physical deforestation and conversion-free supply chain and hence needs to take into account the practical reality of the supply chain as well. Therefore, the initial focus is on identifying the low risk-states²⁰.

²⁰ It is important to realise that the Soft Commodities Forum is focusing on risk-municipalities in the Cerrado. Trase also allows for tracing back flows to the municipality level.



Region	States in the region	Biomes in the region
Central-West Brazil	Goiás Mato Grosso Mato Grosso do Sul	Amazon Cerrado
North-East Brazil	Alagoas Bahia Ceará Maranhão Paraíba Pernambuco Piauí Sergipe Rio Grande do Norte	Cerrado Mata Atlântica Caatinga
North Brazil	Acre Amapá Amazonas Pará Rondônia Roraima Tocantins	Amazon Cerrado
Southeast Brazil	Espírito Santo Minas Gerais Rio de Janeiro São Paulo,	Mata Atlântica
South Brazil	Paraná Rio Grande do Sul Santa Catarina	Mata Atlântica Pampas

Table 2: The regions, states and biomes of Brazil



Risk qualification in Brazil

INPE, the Brazilian institute for space research, maps all land conversion and deforestation in Brazil (illegal and legal). The data is available via 'Terra Brasilis'²¹. An initial 'high-over' look at the map shows that recent deforestation

and land conversion is most prominent in the midst of the country (the Cerrado) and that since 2002 hardly any deforestation happened in the southern states: Rio Grande do Sul, Santa Catarina and Paraná. Also, along the coastline, land conversion since 2002 is absent. Rio Grande

Do Norte, Paraíba, Pernambuco, Alagoas and Sergipe are not indicated on the map to have conversion of lands. Note that not all these states produce soy.

²¹<http://terrabrasilis.dpi.inpe.br/app/map/deforestation?hl=pt-br>



Figure 9: Deforestation and land conversion in Brazil since 2002

Figure 11 shows the total soy production per state. In the North and along the coastline, soy production is hardly present. In Southern Brazil, specifically the state of Parana, soy production is with 19m tons (in 2018) quite substantial, close to the largest soy producing state Mato Grosso (24m tons). The grey-striped states have neglectable soy production. The assessment focuses on the biggest soy producing states.

Clarification:

Agrifirm takes a conservative approach to assessing whether a state has a high or low risk for land conversion and deforestation. The states with high deforestation-risk can easily be identified using INPE data and the hotspots are clear to the soy community as well. The states that do not have deforestation (anymore) can also be identified rather straightforward. There are however a lot of states in the 'middle category': such as old Cerrado expansion area, states under the Amazon Moratorium and the coastline of the country. Identifying credible data sources for the qualification of these areas is a lot more challenging.

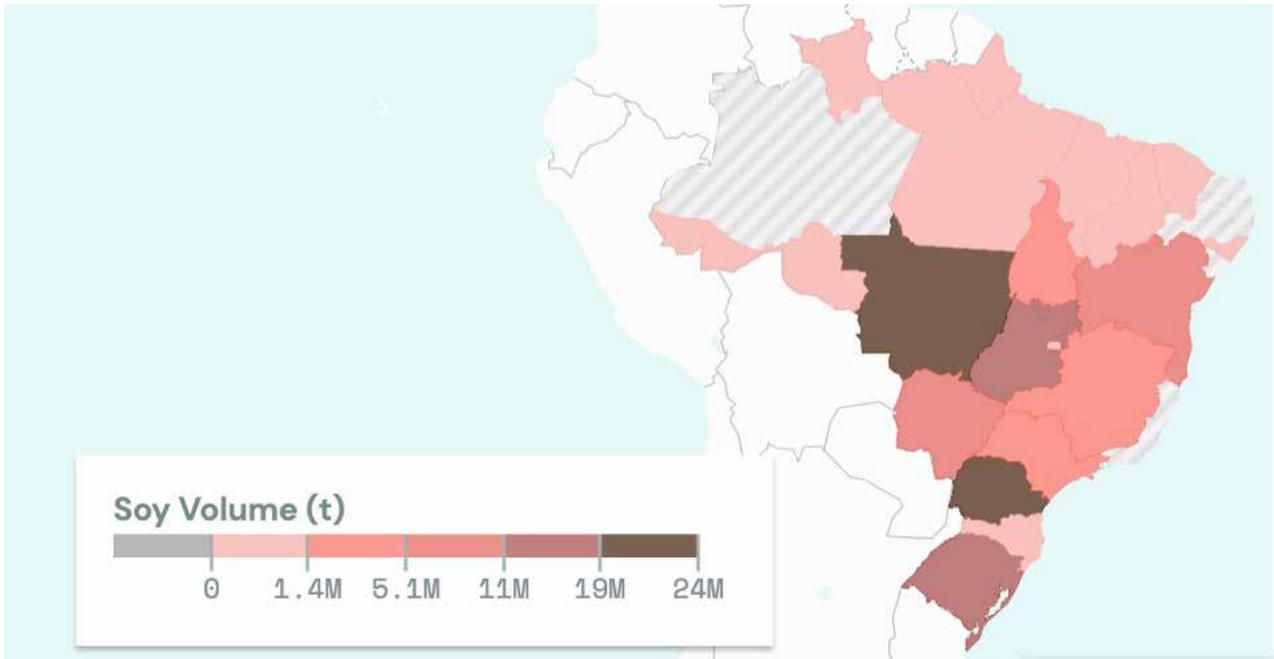


Figure 10: Soy production volumes (t) in Brazil per state (source: Trase 2018)

State per state assessment

A dataset from Trase about the year 20183 gives insights into the soy volumes and the deforestation risk (in ha and %) associated with Brazilian soy export. Table 3 shows

the 13 states with the highest soy production and the biggest deforestation risk. The first four states, in red, have the highest risk of deforestation. The four states in orange, have a lower but still

significant risk. The green states present the lowest risk. The state Parana relatively has one of the lowest soy deforestation risks per hectare.

Brazil states	Soy deforestation risk (HA)	Deforestation risk (%)	Volume (T)	Volume of total (%)
Tocantins	19761,78	32,15%	2332768,75	2,87%
Bahia	11139,84	18,12%	5056921,03	6,22%
Mato Grosso	9990,26	16,25%	23669759,88	29,12%
Maranhao	8233,15	13,40%	1378595,81	1,70%
Piaui	4924,07	8,01%	803034,93	0,99%
Goiias	3921,35	6,38%	10786783,85	13,27%
Minas Gerais	1966,82	3,20%	4914084,86	6,05%
Para	660,88	1,08%	1428846,57	1,76%
Mato Grosso Do Sul	608,75	0,99%	8020065,16	9,87%
Rondonia	87,52	0,14%	569948,92	0,70%
Parana	62,02	0,10%	18658205,08	22,95%
Sao Paulo	55,78	0,09%	3410297,13	4,20%
Distrito Federal	50,05	0,08%	253110,05	0,31%

Table 3: Deforestation risk per state (source: Trase 2018)

High-risk states following Soft Commodities Forum

The Cerrado is considered the new agricultural frontier in Brazil, specifically the states of Maranhão, Piauí, Bahia and Tocantins. The Soft Commodities Forum has identified the 61 municipalities in the Cerrado (new and old expansion states) that have the largest risk for land conversion. The list can be found here and includes municipalities in Bahia, Tocantins, Piauí, Maranhão, Mato Grosso, Goiás and Minas Gerais.

States under the Amazon Moratorium

Soy traders have agreed not to source soy from regions in the Amazon biome that have been deforested after 2008. These agreements are referred to as the Amazon Soy Moratorium²². Although deforestation has indeed declined since the start of the Moratorium. Deforestation for soy is not gone. The figure below shows where in the Amazon, soy production takes place and Table 4 indicates the deforested area per year.

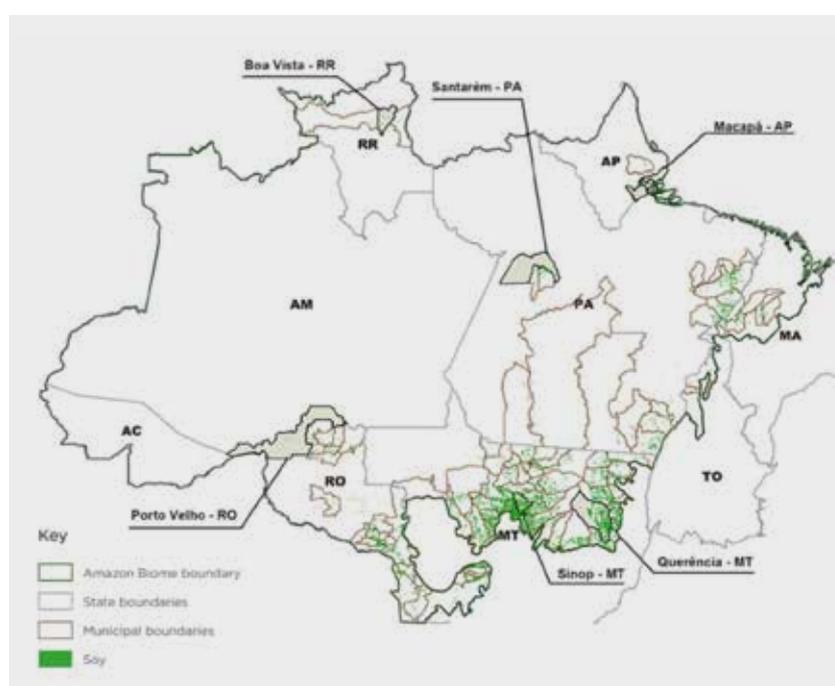


Figure 12 and table 4 indicate the need to also be careful in the states

Figure 11: Locations of soy production in the Amazon biome crop year 2019/2020

State	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
MT	71,841	71,664	94,321	70,983	102,352	101,914	150,497	136,050	127,965	137,818	177,087	1,242,492
PA	355,732	341,788	255,202	172,610	213,457	182,990	288,568	284,444	260,218	263,098	445,012	3,063,119
RO	42,479	44,803	77,299	69,617	96,915	76,822	108,522	122,045	128,743	120,438	138,002	1,026,705
RR	11,124	24,268	13,174	10,801	15,364	19,056	23,617	24,913	12,575	8,475	54,286	217,653
AP	4,739	7,201	1,676	1,954	2,417	2,911	4,582	1,827	1,893	1,397	3,877	34,474
MA	45,563	25,317	18,087	13,483	16,054	13,944	17,146	13,896	15,494	8,150	16,541	203,676
TO	2,340	2,998	1,243	1,054	1,875	1,213	2,143	1,952	1,274	652	995	17,739
Total	533,818	518,039	461,002	340,502	448,434	398,850	595,105	858,127	548,162	540,028	836,790	5,805,857

Table 4: Total annual deforestation area (ha) in the Amazon biome during the Soy Moratorium (2009-2019) in Mato Grosso (MT), Pará (PA), Rondônia (Ro), Roraima (RR), Amapá (AP), Maranhão (MA) and Tocantins (To).

²² <https://abiove.org.br/en/relatorios/moratoria-da-soja-relatorio-13o-ano/>

of the Amazon biome, despite the Moratorium and include the states referred to above as 'high-risk'.

States in the Cerrado

The Cerrado is referred to as the expansion frontier of Brazil, especially the states Maranhão, Tocantins, Piauí and Bahia (MATOPIBA) (see figure 13 for a map). A recent report by ABIOVE shows the expansion for soy production and for other uses.

Figure 13 indicates that deforestation in general and for soy is very small in Paraná (PR), Rondônia (RO), Sao Paulo (SP) and Para (PA) and in the Federal District (DF). In other states such as Goiás (GO), Mato Grosso (MT), Minas Gerais (MG) and Mato Grosso do Sul (MS) and Maranhão (MA), Tocantins (TO), Piauí (PI) and Bahia (BA) deforestation for other purposes than soy and for soy is quite significant.

Conclusion

Different information sources show a slightly different picture for deforestation and land conversion in Brazilian states. Mato Grosso do Sul for instance is sometimes mentioned as low (Trase) and sometimes as higher risk (Abiove/Agrosatelite). Agrifirm takes the conservative approach and assigns a state the high-risk label when a credible data source suggests that deforestation or land conversion is taking place. Based on the information as shared above, our proposal would be to make the following risk-qualification.

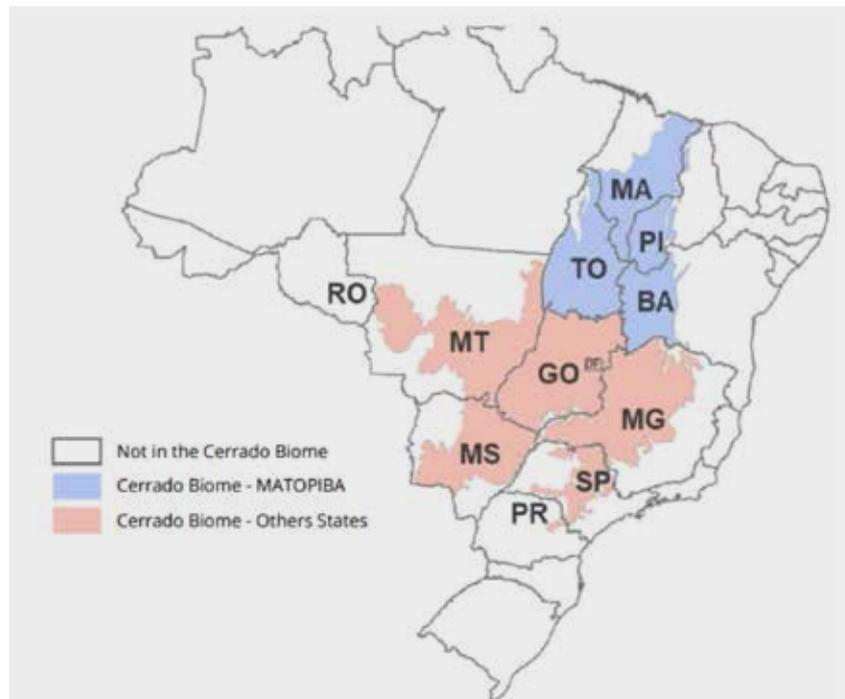


Figure 12: The states in the Cerrado Biome

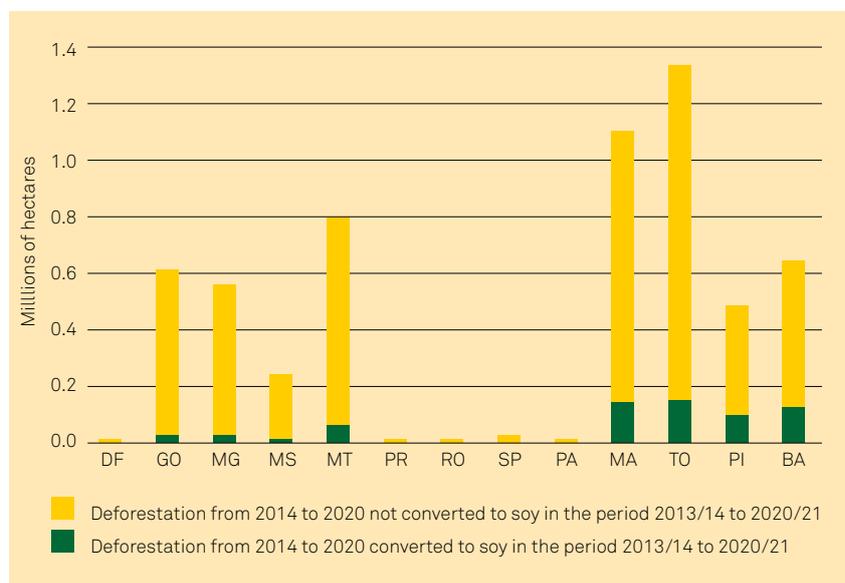
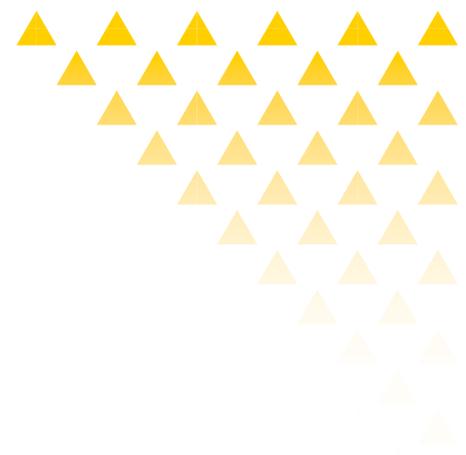


Figure 13: Deforestation in the Cerrado converted into soy and not converted into soy

Risk-level	States/Countries
Low	Rio Grande do Sul, Santa Catarina, Paraná, Rio Grande Do Norte, Paraíba, Rondônia, Sao Paulo, Pernambuco, Sergipe and Distrito Federal
High	Bahia, Tocantins, Piauí, Maranhão, Mato Grosso, Goiás, Minas Gerais, Mato Grosso do Sul, Alagoas, Ceará, Acre, Amapá, Amazonas, Pará, Roraima, Espírito Santo, Rio de Janeiro



References

ABIOVE (2021), Amazon Moratorium.

<https://abiove.org.br/en/relatorios/moratoria-da-soja-relatorio-13o-ano/>

ABIOVE (2022), Cerrado Biome.

https://abiove.org.br/wp-content/uploads/2020/06/Report_Geospatial-Analysis-of-Soy-Crop-in-the-Cerrado_en.pdf

Ermgassenn et al (2020), Using supply chain data to monitor zero deforestation commitments: an assessment of progress in the Brazilian soy sector.

<https://iopscience.iop.org/article/10.1088/1748-9326/ab6497/pdf>

Garrett et al (2022), Should payments for environmental services be used to implement zero-deforestation supply chain policies? The case of soy in the Brazilian Cerrado, World Development, Volume 152, 2022, 105814, ISSN 0305-750X.

<https://doi.org/10.1016/j.worlddev.2022.105814>.

Global forest watch (2022).

<https://www.globalforestwatch.org/>

Mapabiomas (2022).

<https://brasil.mapabiomas.org/>

TerrasBrasilis (2022).

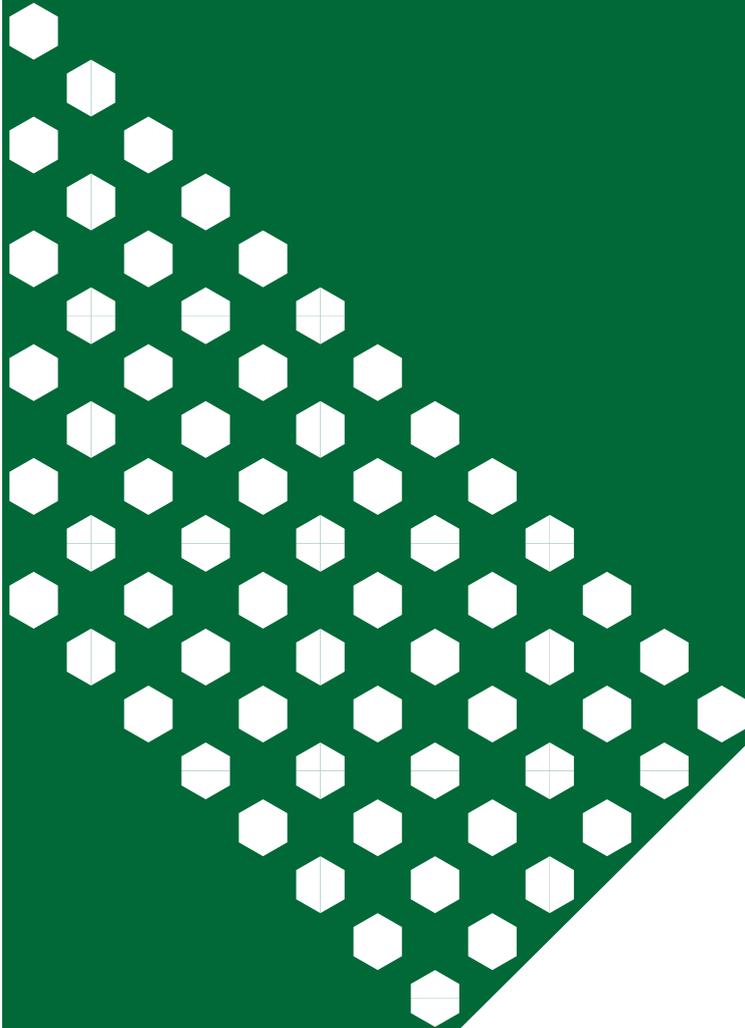
<http://terrabrasilis.dpi.inpe.br/en/home-page/>

Trase, data for the soy sector about 2018, retrieved on September 2022.

https://explore.trase.earth/explore/brazil/soy/commodity_deforestation_risk?includes_domestic=true&year_start=2018&year_end=2018®ion_type=STATE®ion_level=3

Trase (2022), Proposed EU Regulation on deforestation and forest degradation, Understanding the impact of excluding other ecosystems.

<http://extranet.greens-efa.eu/public/media/file/1/7722>



Koninklijke Coöperatie Agrifirm U.A.

Landgoedlaan 20
7325 AW Apeldoorn

Postbus 20000
7302 HA Apeldoorn

T 088 488 10 00
F 088 488 18 00

info@agrifirm.com
www.agrifirm.com

