

December 2023

# Bolivia and Paraguay

Soy production, Deforestation, and International trade



Photo credit: © 2010CIAT/NeilPalmer



aid  
environment

# Executive summary

*Soy farming is one of the most significant drivers of deforestation in Bolivia and Paraguay. In recent years, these two countries have been undergoing significant land use change linked to the expansion of soy production areas, which has had an impact on forest cover loss and degradation of important ecosystems. Most importantly, even though Bolivia and Paraguay are not major direct exporters of soy and soy derivatives to large consumer markets, such as the European Union (EU), their soy production, and associated deforestation, might reach these markets via indirect trade. Through Argentina, a major supplier of processed soy products to the EU market and currently a relevant importer of soybeans from Bolivia and Paraguay, deforestation-linked soy products might still find their way to the EU market and create hurdles for operators and traders who need to comply with the requirements of the EU Deforestation Regulation. Traceability and transparency must therefore be enhanced in these supply chains to guarantee the protection of forests in Bolivia and Paraguay, as well as deforestation-free supply of soy to Argentina and to large consumer markets.*

## Table of Contents

	PAGE
<b>Trade flows</b>	
Recent trends in international trade	2
Direct trade links to the EU	3
Indirect trade links to the EU via Argentina	4
Trade routes	5
<b>Soy-driven deforestation</b>	
Soy expansion and forest loss in Bolivia	6
Soy expansion and forest loss in Paraguay	7
Soy expansion and indigenous communities	8
<b>Soy production and supply chain</b>	
Relevance of the soy sector for national economies	9
Key actors and production dynamics	10
Main characteristics of Bolivian soy production and its supply chains	11
Main characteristics of Paraguayan soy production and its supply chains	12
<b>Deforestation exposure risks</b>	
Traceability and transparency	14
Policies and legislation in Bolivia	15
Policies and legislation in Paraguay	16

# Trade flows

## Recent trends in international trade

Soy is one of the most internationally traded commodities in the world. Soybeans have become an indispensable source of protein for humans and animals, with [85 percent of soy cultivation](#) dedicated to animal feed. The soy market, projected to reach [\\$215.7 billion](#) by 2025, is thus vital to many economies worldwide. By far, South America is the [largest producing region](#), accounting for about 55 percent of the global soybean supply. Four out of the ten largest soy-producing countries are found on the South American continent, with Brazil (1st), Argentina (3rd), Paraguay (5th) and Bolivia (10th) (see Figure 1).



Figure 1. Top 10 soybean-producing countries in 2021. Source: [FAOSTAT](#)

Soy cultivation has seen a [massive expansion](#) in South America in recent years while also being a major direct driver of forest and key global ecosystem loss. Despite the pledges made by 145 nations, including Brazil, Argentina and Paraguay, during [COP26](#) to end and reverse deforestation by 2030, global tree loss in 2022 exceeded by 21 percent the level needed to achieve the zero-deforestation goal in 2030. In terms of regional progress, Latin America and the Caribbean are the furthest of track to meet their deforestation reduction target. In a more recent attempt in August, leaders from eight South American countries, including Brazil and Bolivia, gathered for the [Amazon summit](#) to formulate a plan for halting regional deforestation by 2030. Still, the initiative failed due to strong opposition from Bolivia and Venezuela.

Given that a significant percentage of soy imports in the European Union (EU) originate from South America, it is crucial to comprehend the trade dynamics of soy entering the EU, particularly considering the European Union Regulation on Deforestation-free Products (EUDR), which entered into force in June 2023. Changes in regulations will become applicable as of 30 December 2024, emphasizing the importance for operators to identify the source of imported soy, making this knowledge essential for ensuring compliance.



# Trade flows

## Direct trade links to the EU

Examining direct soy trade links with Europe from Argentina, Bolivia, and Paraguay reveals significant disparities among these South American countries. Among the three, Argentina is the largest exporter of soy and soy derivatives to the EU. In contrast, Bolivia and Paraguay export significantly smaller volumes directly to the European countries. Table 1 provides a detailed overview of the import volumes of four soy products to the EU market from Argentina, Bolivia, and Paraguay between 2021 and 2023, emphasizing the dominance of Argentinian exports to Europe. Yet, Argentina's soy cultivation has faced [major challenges](#) due to adverse weather conditions, especially La Niña-induced droughts. Decreased rainfall and persistent drought have caused a significant reduction in soybean production in Argentina, leading to a [forecasted 38 percent decline](#) in soy production in 2022-23 compared to the previous year. This soybean shortage affects the country's soybean-processing plants, which must face a [large idle capacity](#) that may overcome the current 65 percent. Due to this setback, Argentina is estimated to import 8.3 million tonnes of soybeans in 2023 - a new record - to keep its large soy processing capacity of [62 million tonnes](#) of soybeans running. Considering Argentina is a relevant soy exporter, it is crucial to understand where it imports its soy from, and the potential deforestation risks the EU and other consumer markets expose themselves to upon importing soy products from Argentina.

		Imported volumes 2021 (kg)	Imported volumes 2021 (%)	Imported volumes 2022 (kg)	Imported volumes 2022 (%)	Imported volumes 2023 (kg)	Imported volumes 2023 (%)
Paraguay	1201 (soybeans)	6,918,799	0.05%	3,120	0.00%	2,842	0.00%
	1208 10 (soy flour)	405	0.00%	173	0.00%	0	0.00%
	1507 (soy oil)	8,067,246	1.65%	120	0.00%	0	0.00%
	2304 (soy oilcake)	598,903,334	3.63%	404,872,035	2.40%	137,021,870	1.82%
Bolivia	1201 (soybeans)	4	0.00%	42	0.00%	104	0.00%
	1208 10 (soy flour)	-	-	-	-	0	0.00%
	1507 (soy oil)	-	-	-	-	0	0.00%
	2304 (soy oilcake)	163	0.00%	29,941,895	0.18%	25,002	0.00%
Argentina	1201 (soybeans)	9,533,042	0.07%	32,299,405	0.23%	6,005	0.00%
	1208 10 (soy flour)	2,843	0.01%	9,474	0.03%	147,343	0.59%
	1507 (soy oil)	90,053,399	18.38%	89,165,582	17.73%	9,021,608	3.56%
	2304 (soy oilcake)	6,594,690,048	39.98%	6,589,126,833	39.02%	1,931,814,291	25.72%

Table 1. Direct trade to the EU from Argentina, Bolivia and Paraguay from the years 2021, 2022 and the first six months of 2023.

Source: AidEnvironment based on [Access2Markets](#).

# Trade flows

## Indirect trade links to the EU via Argentina

In addition to ranking as the world’s third-largest soy producer, Argentina claimed the position of the [third-largest](#) soy importer in 2021. Over the period from 2016 to 2021, [Argentina's soybean imports increased by 440 percent](#), from 0.9 Million tonnes in 2016 to 4.9 Million tonnes in 2021. Major contributors to these imports included Bolivia, Brazil, Uruguay and, most significantly, Paraguay, as illustrated in Figure 2. The soybeans exclusively sourced from Paraguay held a value of \$2.15 billion in 2021. In the same year, soybean was the [most exported product](#) from Paraguay.

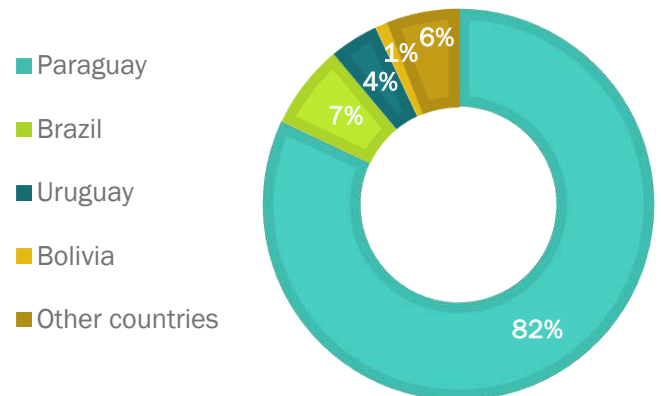


Figure 2. Origin of soy imports into Argentina 2016-2021.

Source: AidEnvironment based on data from [Trase](#)

Argentina’s soybean harvesting season starts in [April](#) every year and utilizes its domestic supply to crush soybeans into soy derivatives, including soybean oil, soy oilcake, and soy flour. Under normal non-drought conditions, Argentina’s domestic supply lasts till the end of the year, only relying on imports during the first quarter of the year to meet its large crushing capacity. Paraguay stands out as a primary source, reflecting a significant dependency. However, due to drought conditions, Argentina and [Paraguay](#) have substantially declined soy production.

Analyzing soy imports into Argentina from 2020 to 2023, reveals a stable level of soybeans sourced from Paraguay annually, except for 2022 (see Table 2). The prior multi-annual drought conditions provide a plausible explanation for the sharp decline in Argentina's soybean imports from Paraguay. Though also having experienced drought conditions, Bolivia did so to a smaller and [less persistent extent](#), possibly explaining why Argentina significantly increased soybean imports from Bolivia in 2022. With El Niño weather events taking over from La Niña, Paraguayan imports into Argentina were significantly rebound in 2023.

Argentina’s reduced capacity simultaneously presents more opportunities for Brazil. Soy production in Brazil is concentrated in central and southern Brazil, which received ample [rainfall in 2022](#), effectively diminishing the drought conditions. In the first five months of 2023, Argentina imported [1.92 million metric tons](#) of soybeans from Brazil. Brazil, already ranked as the largest global soy producer, has [overtaken](#) Argentina for soymeal exports for the first time since 1998.

	2020	2021	2022	2023*
Bolivia	0	28,068,755	495,127,148	345,808,015
Paraguay	4,913,057,979	4,601,765,052	1,739,713,681	4,613,887,961

Table 2. Argentina’s imports of Soybeans from Bolivia and Paraguay. \*The last update was done on October 18 of 2023, by which the amounts referred for that year represent imports until September of 2023. Source: [Instituto Nacional de Estadística y Censos](#) (Comex INDEC), viewed in November 2023.

# Trade flows

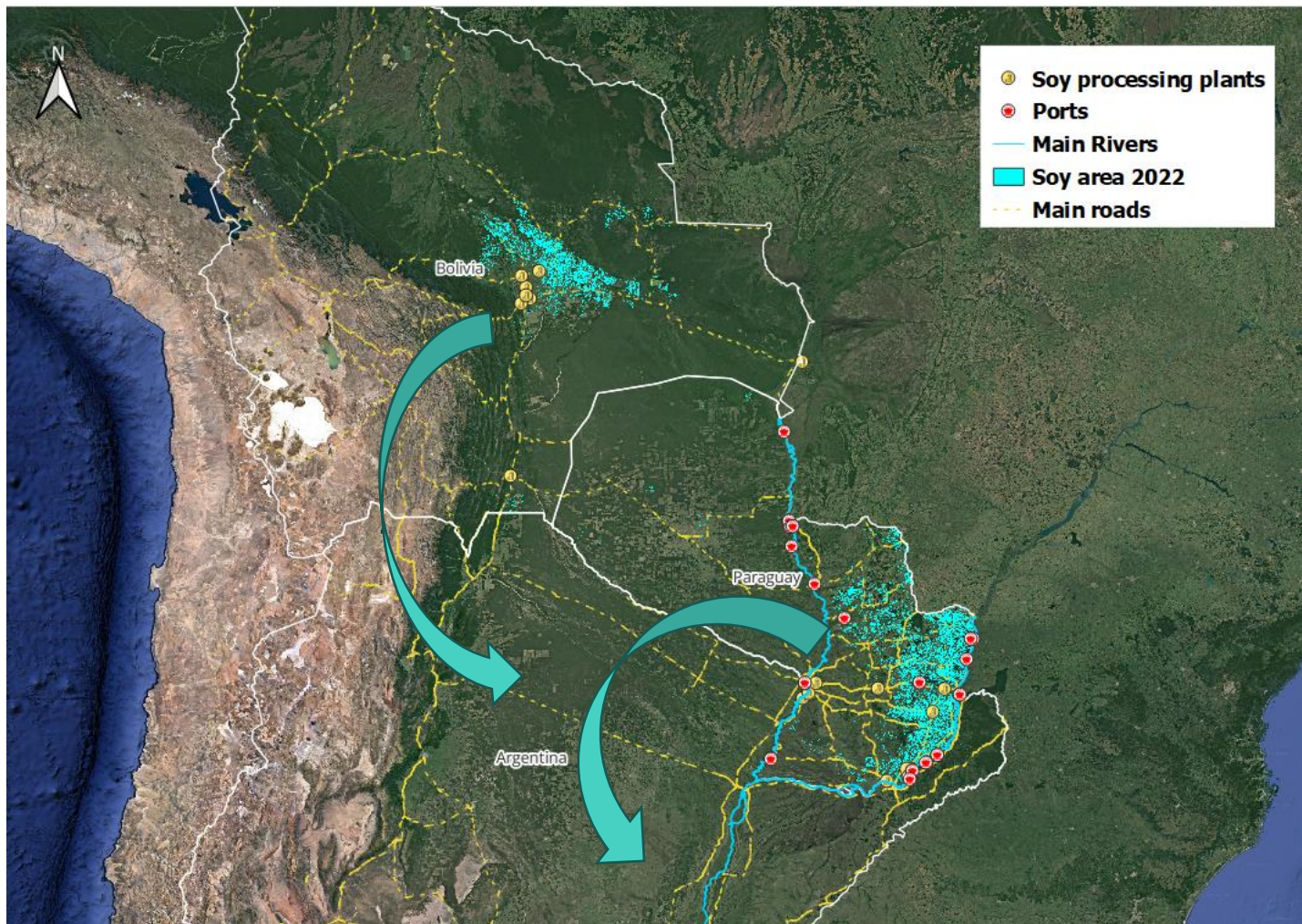


Figure 3. Trade flows between Bolivia, Paraguay and Argentina. Source: AidEnvironment

## Trade routes

The primary route for exporting soybeans from Paraguay is the Paraguay-Paraná Waterway System. This 3,302-kilometer-long waterway connects Argentina, Brazil, Bolivia, Paraguay, and Uruguay, with 44 private ports and terminals facilitating international cargo transport. Nearly 80 percent of Paraguay's trade occurs through this waterway. Soybean exports from Paraguay reach the ports of Rosario and Buenos Aires in Argentina via the Paraguay-Paraná Waterway. In 2019, almost two-thirds of Paraguay's soybean exports were managed by just five traders: ADM, Cargill, COFCO, Louis Dreyfus, and Sodrugestvo, most of whom also own various ports along the rivers.

For Bolivia, the primary route for soybean export is through river waterways, with most exports passing through the exit point of Puerto Suárez in Corumbá, connecting to the Paraguay River. The secondary mode of transport is via highways, specifically the Fortín Villazón highway through Boyuibe. In Bolivia, 90 percent of its soy is designated for crushing into soybean meal and oil. Notably, 85 percent and 80 percent of these soy by-products are exported. Despite being the 10th largest soy producer globally, Bolivia exports only a relatively small quantity of soybeans, with the majority destined for Argentina and Peru (Figure 4).

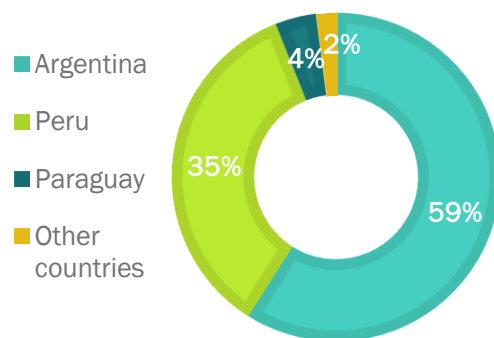


Figure 4. Receiving countries from Bolivian soybean export, in 2021 and the first four months of 2022. Source: AidEnvironment based on data from [Aduana Nacional](#) (BO)

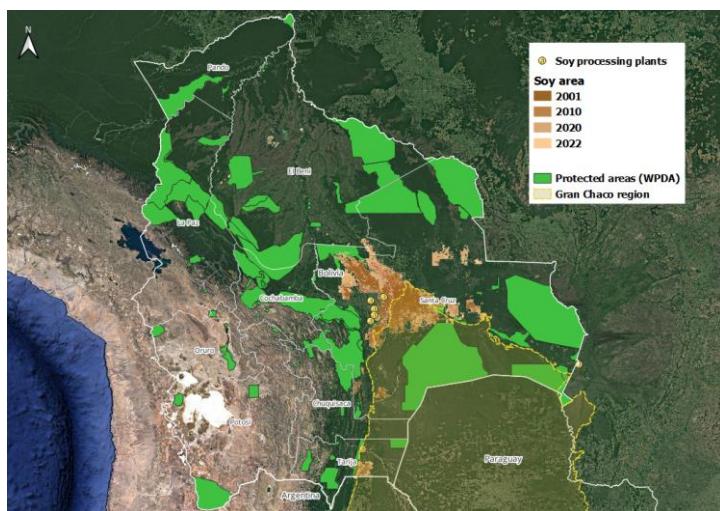
# Soy-driven deforestation

## Soy expansion and forest loss in Bolivia

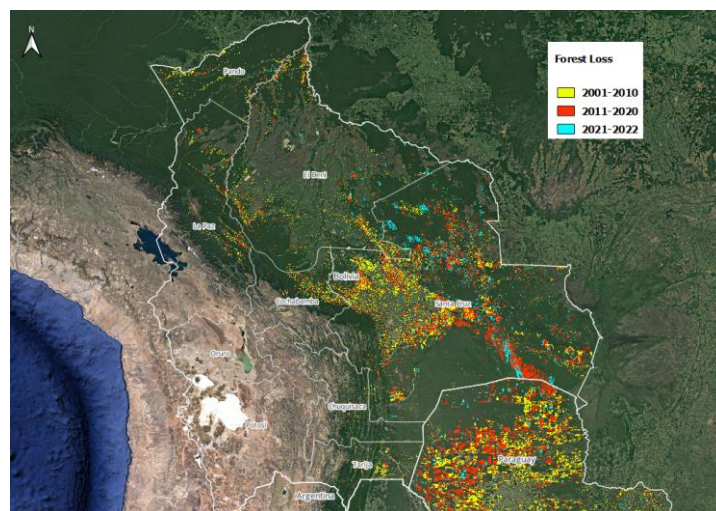
Bolivia's soy expansion over the last 20 years has concentrated mainly in the eastern lowlands of the country, more specifically in the Santa Cruz department that comprises part of the Amazon basin. The Bolivian eastern lowlands' tropical and subtropical climates, characterized by dry and wet seasons, provide favorable conditions for seasonal soy cultivation. Besides these, the expansion of soy cultivation has reached other departments in Bolivia, such as the southern part of El Beni and the Chaco region. 'El Gran Chaco' is a hot and semiarid lowland natural region with savannas and grasslands covering eastern Bolivia, western Paraguay, northern Argentina, and some parts of southern Brazil (Figure 5). Soy expansion in 'Gran Chaco' has been linked to loss of native vegetation, soil erosion, and loss of biodiversity, threatening the region's protected areas.



**Figure 5. El Gran Chaco region.** Source: AidEnvironment. Photo credits: Coordenação-Geral de Observação da Terra/INPE; Christian Ostrosky (@flickr)

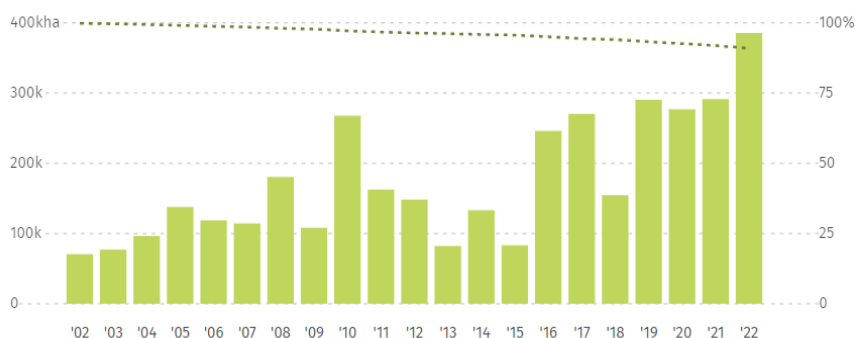


**Figure 6. Soy cultivation and protected areas in Bolivia**  
Source: Song et. al. 2021. "Soy Planted Area", and WPDA [database](#)



**Figure 7. Forest loss between 2001 and 2022 in Bolivia**  
Source: University of Maryland and World Resources Institute. "Global Primary Forest Loss". Accessed through Global Forest Watch on 23/11/2023 from [www.globalforestwatch.org](http://www.globalforestwatch.org).

The primary forest loss in Bolivia has increased over the last 20 years (Figures 7 and 8). In this period, the country lost [3.7 Mha](#) of humid primary forest, which represents 52 percent of its total tree cover loss in the same period. As in other South American countries, the main driver of deforestation in Bolivia is [agricultural expansion](#), in this case mostly from soy cultivation and cattle ranching. An [increase](#) in the total soy planted area in the country from 778,660 ha in 2020 to 1.08 Mha in 2021 suggests that soy is increasingly a direct driver of deforestation and conversion of forests. Figures 6 and 7 show a clear overlap between the soy agricultural areas in the center and southeast of the Santa Cruz department and the forest loss over the last 20 years.

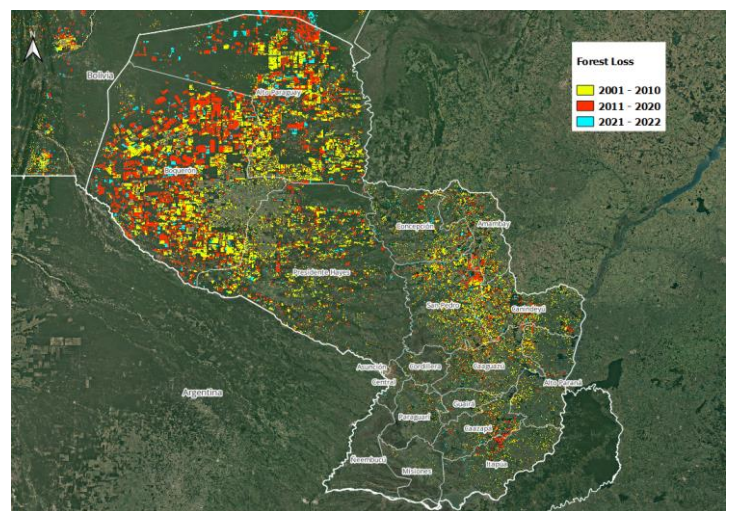
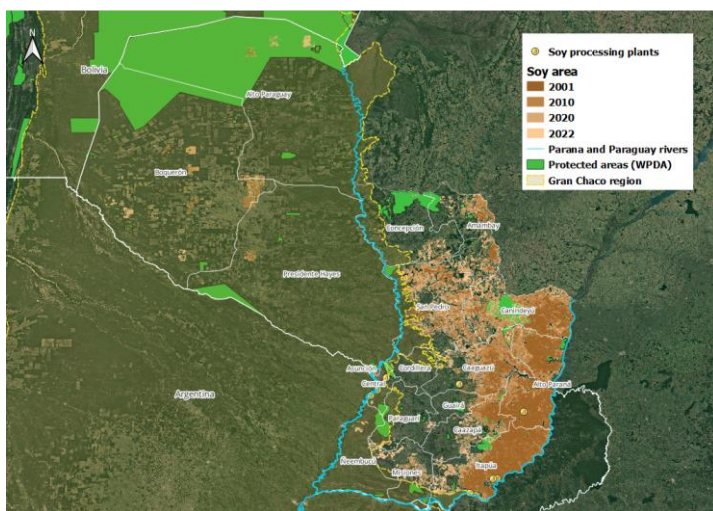


**Figure 8. Primary forest loss in Bolivia**  
Source: University of Maryland and World Resources Institute. "Global Primary Forest Loss". Accessed through Global Forest Watch on 23/11/2023 from [www.globalforestwatch.org](http://www.globalforestwatch.org).

# Soy-driven deforestation

## Soy expansion and forest loss in Paraguay

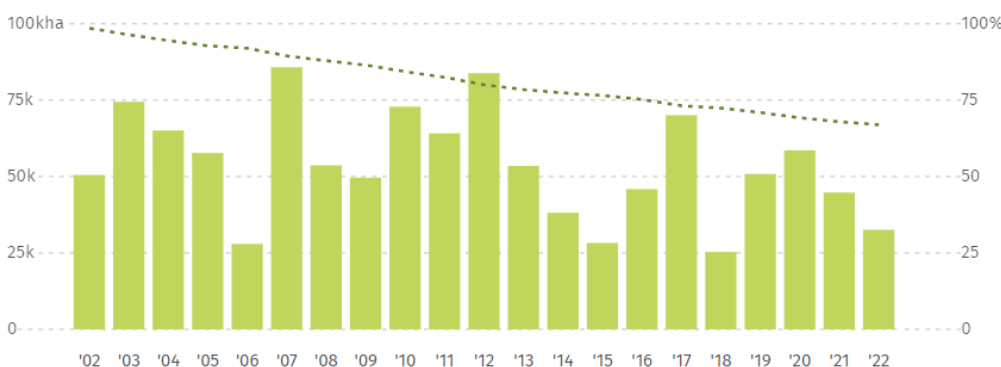
Paraguay's soy expansion over the last 20 years has concentrated mainly in the eastern part of the country, mostly between the Paraná and Paraguay rivers, where most of the remaining forested areas remain (Figure 9). The subtropical climate of the eastern region (including Alto Paraná, Itapúa, Canindeyú, and other departments) provides suitable conditions for agricultural activities, with distinct wet and dry seasons. Additionally, the Chaco region in the western part also contributes to soy cultivation, more specifically in the departments of Boquerón, Alto Paraguay, and Presidente Hayes. The Chaco region in Paraguay is characterized by savannas, dry forests, and grasslands. Although there is a soy production area in the Paraguayan part of El Chaco, it is much smaller than that of the eastern region. This indicates that a new deforestation frontier is developing, with cattle being the main commodity produced over the last few years. Deforestation is likely to [accelerate](#) – directly (for cropland) or indirectly by displacing and expanding cattle pasture into new areas. Land conversion for soy cultivation in these regions raises concerns regarding habitat loss, soil degradation, and changes in local ecosystems, particularly in the forested regions.



**Figure 9. Soy cultivation and protected areas in Paraguay**  
Source: Song et. al. 2021. "Soy Planted Area", and WPDA [database](#)

**Figure 10. Forest loss between 2001 and 2022 in Paraguay**  
Source: University of Maryland and World Resources Institute. "Global Primary Forest Loss". Accessed through Global Forest Watch on 23/11/2023 from [www.globalforestwatch.org](#)

Primary forest loss in Paraguay has declined over the last few years (Figures 10 and 11), mainly since the approval of the national [zero-deforestation law](#) in 2004. The drop in deforestation is mainly located in the Atlantic forest between the two main rivers; however, land conversion still exists, posing challenges to water scarcity, soil conditions, and climate variability, impacting agricultural practices and productivity.

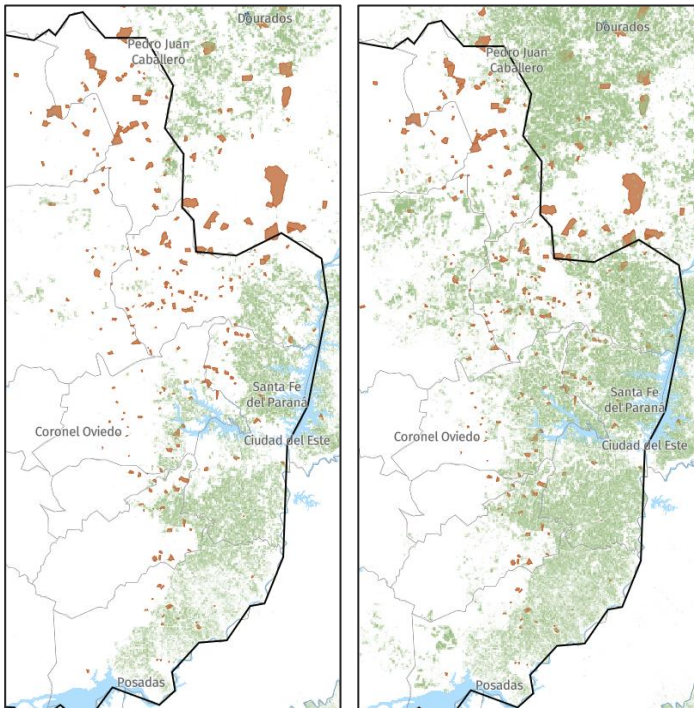


**Figure 11. Primary forest loss in Paraguay**  
Source: University of Maryland and World Resources Institute. "Global Primary Forest Loss". Accessed through Global Forest Watch on 23/11/2023 from [www.globalforestwatch.org](#).



# Soy-driven deforestation

## Soy expansion and indigenous communities

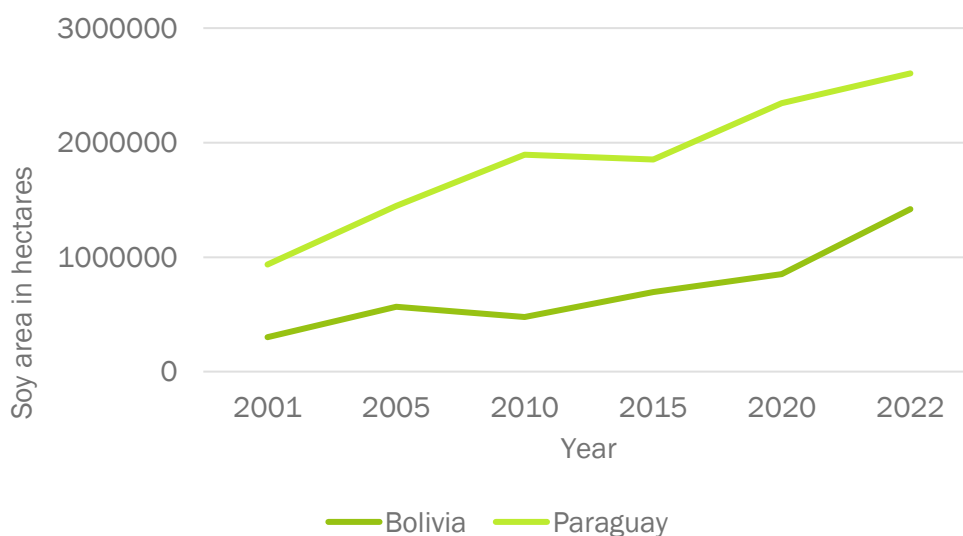


The expansion of soy cultivation in Paraguay has severely and widely impacted indigenous communities. Figure 12 shows a significant and increasing overlap between indigenous territories and soy areas in Eastern Paraguay. Soy production has been linked to serious [human rights abuses](#), including intimidation, eviction, and chemical poisoning. The use of toxic agrochemicals by agribusiness has resulted in health issues for people, the destruction of crops and livestock, and substantial environmental damage. Consequently, the traditions of indigenous communities are disrupted as their resources vanish. In 2021, the [United Nations Human Rights Committee](#) accused Paraguay of failing to regulate the use of illegal pesticides near an indigenous community, leading to health problems and causing damage to the land and culture of the Ava Guarani Indigenous community.

**Figure 12.** Soy area (green) and Indigenous lands (brown) in 2001 (left) and 2022 (right). Source: Tierras Indígenas. Accessed through Global Forest Watch on 28/11/2023 from [www.globalforestwatch.org](http://www.globalforestwatch.org).

## Soy expansion trend

Both Bolivia and Paraguay have experienced a substantial increase in their respective soy production areas. Between 2001 and 2022, the soy production area in Bolivia experienced a growth of 472 percent, as illustrated in Figure 13. The most substantial expansion occurred in 2021, with an increase of 449,884 hectares. In contrast, Paraguay shows a more gradual growth, with its soy production area expanding by 278 percent over the 22-year period.



**Figure 13.** Soy expansion in Bolivia and Paraguay between 2001-2022. AidEnvironment based on data from [Song et al. \(2021\)](#).

# Soy production and supply chain

## Relevance of the soy sector for national economies

According to the latest [OECD-FAO agricultural outlook](#), South America has risen as a food-producing giant and, as a region, it is likely to continue increasing its contribution to global food production in the future. The wide region of Latin America and the Caribbean is responsible for slightly more than half of the global soybean production, most of which is produced in South American countries. This share is expected to continue rising and, by association, so is the extent of cropland in the region, which is expected to increase in the region between 2023 and 2032 by 7.1 Mha.

In 2021, soybean production [reached](#) 372 million metric tons worldwide (Figure 14). Over half of the total area harvested in Latin America and the Caribbean is expected to be dedicated to maize and soybeans by 2032, accounting for 22 percent of the cropland expansion. Although adverse events linked to climate change, such as droughts and wildfires, might challenge this projection, soy production is expected to reach 415 million metric tons by 2032, doubling the combined output of other oilseeds.

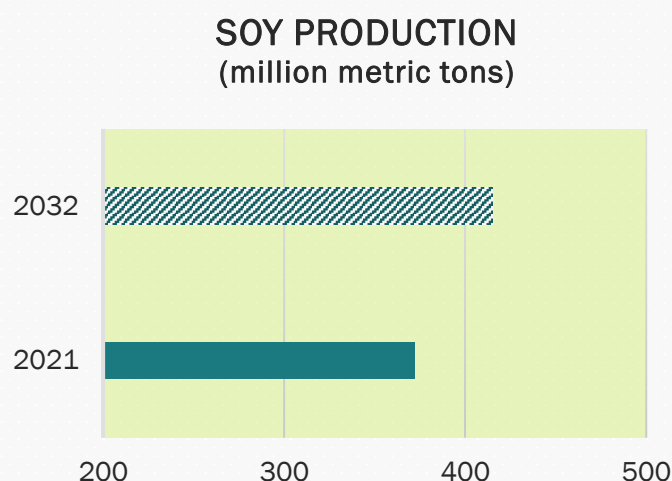


Figure 14. Global soybean production in 2021 and estimated production volumes in 2032. Source: AidEnvironment based on data from OECD-FAO Agricultural Outlook 2023-2032..

Brazil and Argentina are the two largest soy producers in South America, with Paraguay and Bolivia also among the top 10 soybeans and soybean oil producers in recent years. Bolivia was the 9<sup>th</sup> and 10<sup>th</sup> largest soybean producer in the world in 2020 and 2021, respectively, while Paraguay occupied the 6<sup>th</sup> place in both years (Table 3).

	Bolivia		Paraguay	
	2020	2021	2020	2021
Soybeans	2,829,356	3,318,169	11,024,460	10,537,080
Soybean oil	548,668	No data available	695,600	No data available

Table 3. Soybean and Soybean oil production quantities in Bolivia and Paraguay in 2020 and 2021 (most recent years available). Source: AidEnvironment based on [FAOSTAT](#) data, viewed in October 2023

In Bolivia and Paraguay, agricultural production has an important contribution to the national gross domestic product (GDP). According to [World Bank data](#), the GDP of these two countries in 2022 was approximately the same, as was the contribution of agricultural production to each country's GDP (Figure 15). In the case of Bolivia, agricultural production (including forestry and fishing) represented, in 2022, about 12 percent of the national GDP, while in Paraguay, the contribution of this sector was around 11 percent. Soy is one of the most important crops produced in Bolivia and Paraguay, so its contribution to the overall agricultural production of these countries is significant. According to Bolivian national data, the soy produced in 2022 corresponded to 17.1 percent of the country's crop production. Similarly, in Paraguay, soy accounted for almost 28 percent of crop production in the country.

# Soy production and supply chain

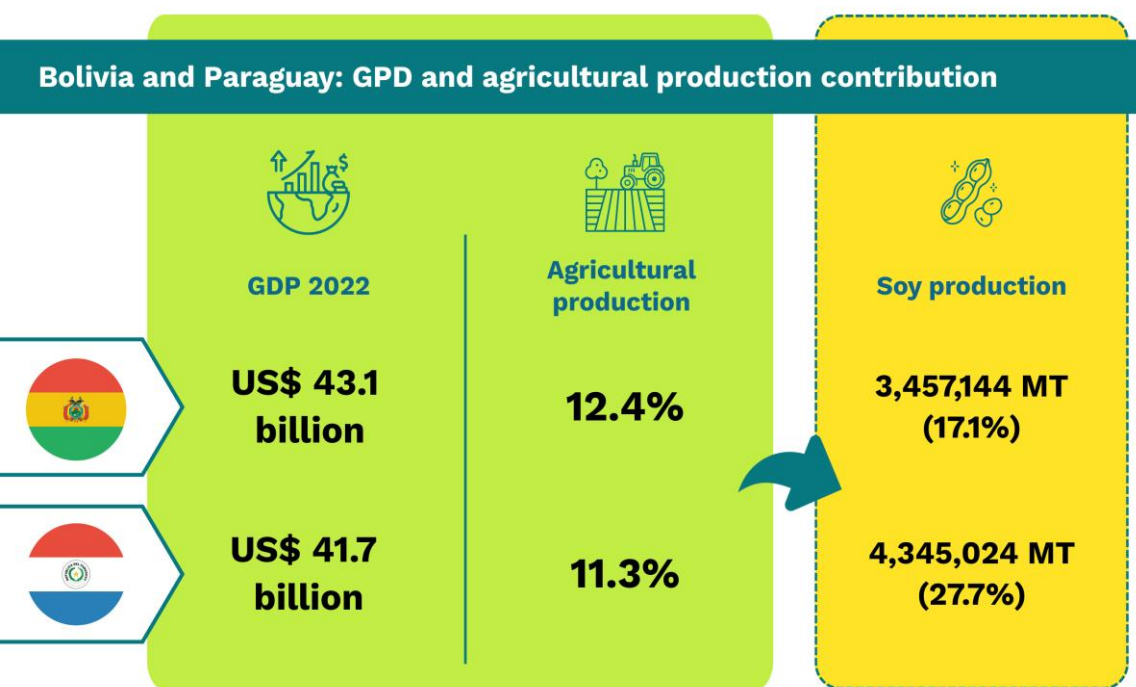


Figure 15. Agricultural production contribution to the Bolivian and Paraguayan GDPs in 2022 and soy production relative contribution to the sector. Source: AidEnvironment, based on GDP and agricultural data obtained from World Bank data on Gross Domestic Product (current US\$) and the value added of agriculture, forestry, and fishing (% of national GDP) in 2022. Data on soy production, including its relative share about the production of other major crops in the country, was derived for Bolivia, from publicly available data of the Instituto Nacional de Estadística de Bolivia: Ministerio de Desarrollo Rural y Tierras (Producción por año agrícola, según cultivos, 1984-2022), and for Paraguay, from Censo Agropecuario Nacional (CAN) – 2022 (Principales cultivos).

## Key actors and production dynamics

Large-scale farmers [are estimated](#) to account for over 80 percent of total soybean production globally, which means that only 20 percent is in the hands of small-scale farmers, an indication of the inequality that tends to permeate the production and commercialization of this crop. Both Bolivia and Paraguay follow this trend. Although both countries have considerably high numbers of smallholders, who are also largely involved in soy cultivation, the biggest share of commercial production of soybeans is the responsibility of large landowners.

In Bolivia, a small property is [defined](#) as a farmland having less than 50 hectares, while medium-size farms vary between 50 and 500 hectares, and large farms have over 500 hectares. [Eighty percent](#) of Bolivian soy producers are considered smallholders according to this standard. On the other hand, medium-size and large producers, which aggregate most of the cultivation land, comprise 20 percent of this group. Bolivian large-scale producers and export-oriented industrial agriculture are [concentrated](#) in the department of Santa Cruz. Even though there is no recent data publicly available on the distribution of producers and farm sizes in Bolivia, nor on its correlation with soy production currently, there have been earlier estimations suggesting that large-scale producers are responsible for more than [70 percent](#) of the total soy area cultivated in the country (Figure 17).

Similarly, in Paraguay, large-scale farmers control most soybean production. According to early reports from Oxfam, [71.3 percent](#) of soybean plantations in the country are controlled by only 1 percent of large-scale farmers while soybeans represent over three quarters of the total land cultivated area.

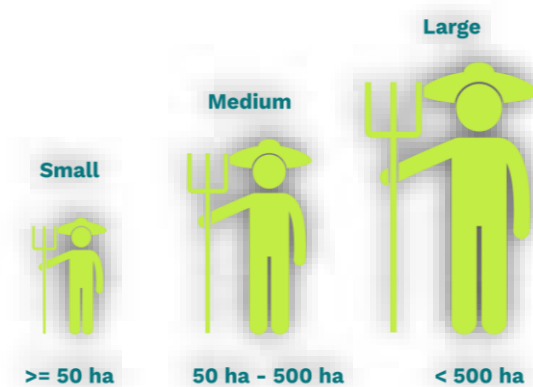


Figure 16. Farm categories according to farm size. Source: Murgia, J. M., Hossiso, K. W., and Lence, S. H. (2018). [Rural Land Titling and Property Rights: Does Legislating Smallholdings as Non-seizable Family Assets Improve Smallholder Farmers' Welfare?](#) (Working paper n. 00920). Inter-American Development Bank.

# Soy production and supply chain

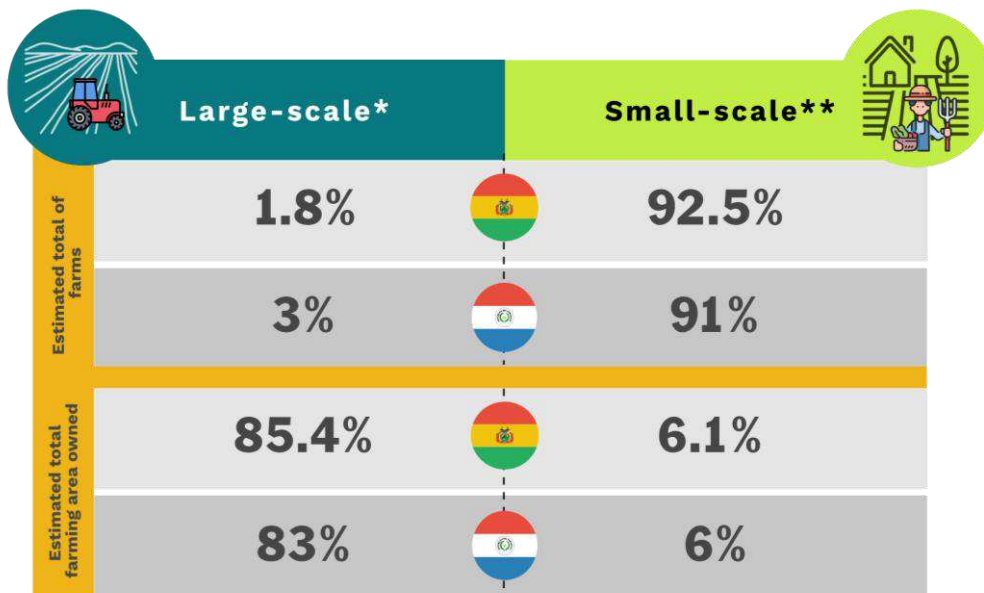


Figure 17. Estimated number of farms and farming area distribution among large- and small-scale producers in Bolivia and Paraguay. \*/\*\* In Bolivia, there are [three categories](#) of farms, defined according to their size: Small properties (up to 50 hectares), medium-size properties (between 50 and 500 hectares) and large properties (over 500 hectares). The small and large categories were used here, and they were adopted as well for the classification of Paraguayan farms.

Source: AidEnvironment based on Weisbrot, M. and Sandoval, L. (2008). [La distribución de los recursos naturales más importantes de Bolivia y los conflictos autonómicos](#) [Informe temático]. Washington DC, United States: Center for Economic and Policy Research, p. 3; [Censo Agropecuario Nacional \(CAN\) 2022](#) - Características de las fincas agropecuarias y del productor/a (volume I), viewed in November 2023.

Besides the producers, soy supply chains or 'soy complex' count on other actors and contributions that come together in interlinked stages, from production to export and, ultimately, consumption (Figure 18). Large-scale agriculture, which has been at the forefront of the soy boom in these two countries, relies on imported agricultural inputs (e.g., seeds, chemicals, machinery) and is often linked to transnational companies concentrating on storage, processing, transportation, and export services. In Bolivia and Paraguay, these companies are key figures in the respective soy supply chains, mainly determining the ongoing dynamics.

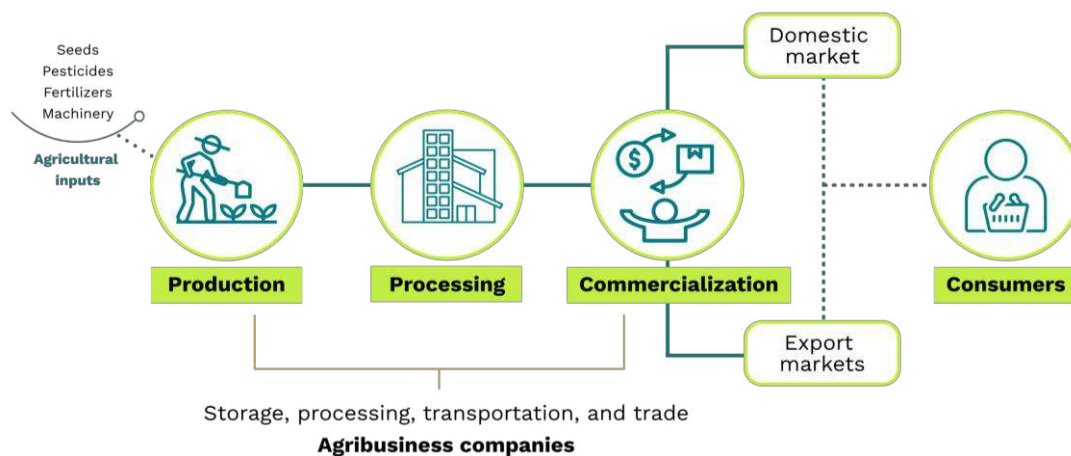


Figure 18. Generic scheme of soy supply chain stages, involved actors, and inputs in Bolivia and Paraguay. Source: AidEnvironment based on Mckay, B. & Colque, G. (2015). [Bolivia's soy complex: the development of 'productive exclusion'](#). The Journal of Peasant Studies, and Arrúa et al. [Radiografía del Agronegocio Sojero: Análisis de la cadena productiva de la soja y su impacto socioeconómico en Paraguay](#) (Asunción, BASE-IS, Diciembre 2020)

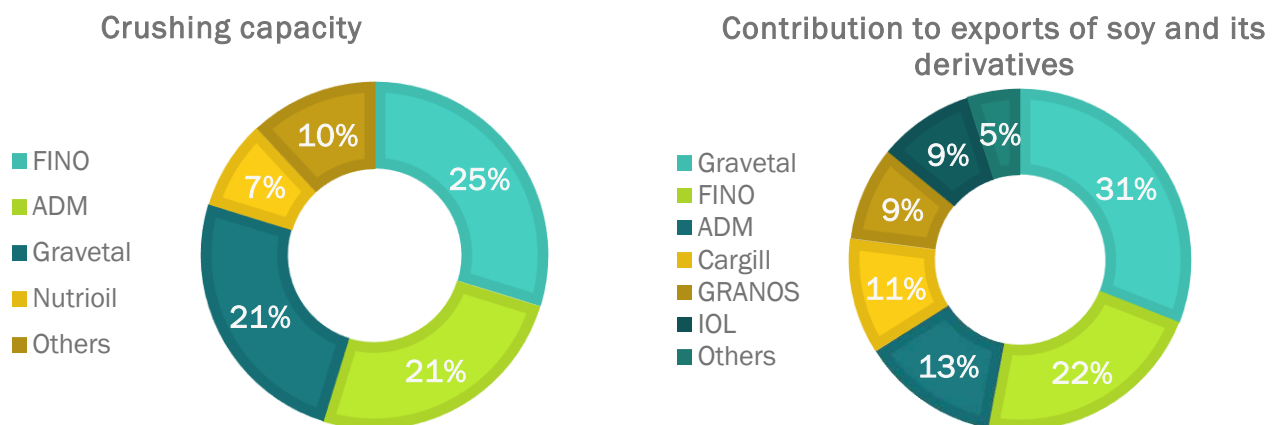
## Main characteristics of Bolivian soy production and its supply chains

In Bolivia, soybean plantations [started to expand](#) in the 80s and 90s thanks to an influx of foreign producers, capital (particularly from Brazil, Argentina, and Colombia), and new technologies. Since then, major improvements in infrastructure, not only for soy processing and storage but also for transportation, have been taking place, particularly in the department of Santa Cruz, the [main center](#) for agricultural expansion. This led to an agricultural shift in the region from traditional and peasant-based crop production for domestic consumption to an export-oriented agro-industrial model, whose support network includes public and private services, input suppliers, traders, technical assistance companies and research centers besides producers and consumer segments.

# Soy production and supply chain

Despite these developments, small farmers and peasant settlements were mostly maintained while new producers were established in other areas defined as suitable for intensive agricultural development by the government. This allowed soy agribusiness in Bolivia to [count on](#) the participation of settler producers who are still often integrated into the model under the modality of contract farming – an agreement where these entities provide inputs (e.g., seeds and credit) to producers who, in turn, sell them their harvest. According to the [Asociación de Productores de Oleaginosas y Trigo](#) (Oilseed and Wheat Producers Association - ANAPO in its Spanish acronym), contract farming is not regulated in the Bolivian soy sector, which can lead to violations of contractual fairness and competition law.

[In 2016, the Bolivian soybean](#) agribusiness comprised around 20 companies dedicated to the collection, storage, processing, and trade of soybeans and their derivatives. Six of these companies, four of which are transnational, gathered most control over the value chain, namely ADM (USA), Cargill (USA), Gravelal (Venezuela), GRANOS (Bolivia), Industrias de Aceite FINO (Peru), and Industrias Oleaginosas – IOL (Bolivia). The six companies mentioned [often operate](#) by contract farming, obtaining their grain supply while focusing on storage, processing, commercialization, and export. They [controlled](#) approximately 95 percent of Bolivia’s soybean market at the time, appropriating, as well, most of the value generated by the soy complex in Bolivia (Figures 19 and 20).



Figures 19 and 20. Crushing capacity of main transnational companies operating in Bolivia and those with the largest contribution to soy exports of soy and its derivatives. Source: AidEnvironment, adapted from Fundación Tierra. [Empresas Transnacionales Controlan el Agronegocio Sojero en Bolivia](#) (August 2016). Propuestas para Políticas Públicas N. 6. La Paz – Bolivia.

Due to the interest in targeting foreign markets, these companies have also been deemed key players in the export boom that the Bolivian soy sector has had in recent years. Recent government data [shows](#) that about 30 registered agribusiness companies in Bolivia are linked to the production of soy and its derivatives. The six mentioned previously (except for GRANOS) are still active. At the same time, other major global players operate in the Bolivian soy sector, namely Bunge and Louis Dreyfus Company (LDC).

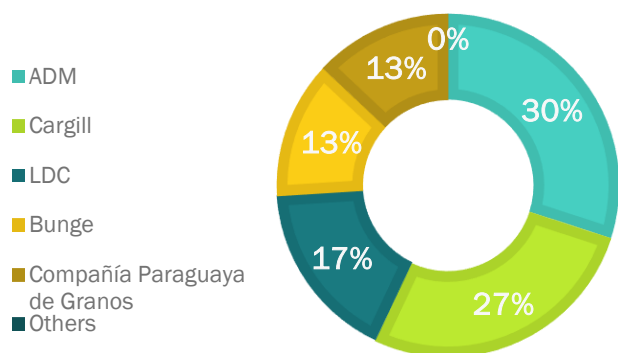
## Main characteristics of Paraguayan soy production and its supply chains

In Paraguay, soybean cultivation [was introduced](#) by Brazilian businessmen. The crop area under cultivation was extended thanks to the introduction of inputs such as machinery, chemicals, and improved seeds. With the growth of international demand for soybeans from the second half of the 1990s, there was a steady increase in the production of this crop in the country. At the same time, corporate control was gradually established throughout the entire soybean-growing, processing, and exporting process. The logic of soybean production expansion production has historically occurred on the lands of peasant and indigenous communities and forests.

# Soy production and supply chain

Soybean production in Paraguay is dominated by large landowners mostly because they have the administrative and financial capacity to produce according to the conditions imposed by trade and market dynamics, such as international demand and speculation. Peasant participation in soybean production is negligible as the lands cultivated with soybeans are mostly concentrated in large estates (*latifundios*), and, [in 2020](#), this crop was not gaining ground in the production activity of small producers. Conversely, a significant share of the medium-size and large producers have increased their focus on soy production and even organized themselves in cooperatives to gain more economic and political control over this supply chain. These cooperatives provide farmers with silos and storage facilities, as well as with financing for soybean production. Private companies, however, also play a similar role that allows them to structure the agribusiness sector at the local level. Besides offering silos, they finance soybean production by providing input packages to farmers, which are paid for at the end of the harvest with the delivery of an agreed part of the harvested grains.

Soy processing companies in Paraguay



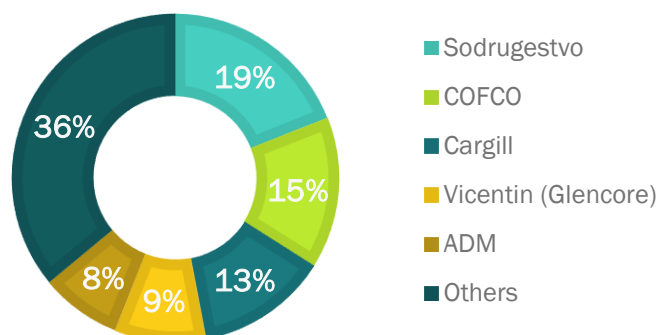
**Figure 21. Main soy processing companies in Paraguay.** Source: Arrúa et al. *Radiografía del Agronegocio Sojero: Análisis de la cadena productiva de la soja y su impacto socioeconómico en Paraguay* (Asunción, BASE-IS, Diciembre 2020)

In Paraguay, soybeans' acquisition, collection, processing, transport, and trade (especially exports) are highly concentrated and transnationalized. ADM, Bunge, Cargill, and Louis Dreyfus Company (LDC) are the leading exporters of industrialized products (soybean oil and soybean meal/pellets) in Paraguay. In 2019, these traders accounted for 87 percent of the country's industrialized soybean derivatives (Figure 21). However, soybeans processed products have become less relevant in exports since the 2010s. On average, the percentage of industrialized products of the soybean complex was only 35 percent, falling clearly behind the 65 percent for the trade of soybeans.

One of the reasons for this shift might be the fact that Argentina, one of the leading destinations of Paraguayan soy in recent years, is the world's leading exporter of grain oils and has the largest grain processing capacity in the world, which drives its demand for soybeans, particularly from neighbouring countries such as Paraguay.

Considering exports (Figure 22), around 60 percent on average is in the hands of five commodity trading giants – ADM, Cargill, COFCO, and Sodrugestvo in 2019. As of 2020, GLENPAR (part of the Glencore group). In 2019, as illustrated in Figure 22, 64 percent of exports were reunited by Sodrugestvo, COFCO, Cargill, Vicentin (a company associated with the Glencore group), and ADM, while the remaining share included 27 agro-exporting companies, more than half of which were under the control of Brazilian capital.

Paraguayan soybean exports in 2019



**Figures 22. Main trading companies' relative share of soybean exports.** Source: Arrúa et al. *Radiografía del Agronegocio Sojero: Análisis de la cadena productiva de la soja y su impacto socioeconómico en Paraguay* (Asunción, BASE-IS, Diciembre 2020)

These large transnational companies have at their disposal all the necessary infrastructure for international trade, from logistics services - own fleet of trucks and barges; control of the main private ports located on the Paraguay and Paraná rivers – while also owning more than 11 percent of the silos installed in the country. This allows them to stockpile, store and do basic processing of the soybeans so they meet the necessary standards for export.

# Deforestation exposure risks

## Traceability and transparency

As described in the trade flow section of this report, within [Argentina](#), soy oil and soy cake supply chains are likely exposed to indirect soybean supply from areas where deforestation is ongoing, such as Bolivia and Paraguay. Bolivian soy exports to Argentina have, according to [data from Trase](#), an exposure to deforestation and conversion at 5,095 hectares, making it the country with the largest soy deforestation exposure per kiloton at 168 ha/kt. As for Paraguay, where most soy destined for export is produced in the Eastern part of the country, the exposure to illegal deforestation risks linked to soy imports from the Atlantic Forest region among the leading importers, including Argentina, [reached](#) 5,700 hectares in 2019, even though this risk has declined since 2014.

One of the leading importers of soy derivatives from Argentina is the EU, which is at risk of being exposed to deforestation through the supply chains and trade linkages between the three South American countries. This becomes a challenging issue under the EU Deforestation Regulation, which prohibits a series of soy products from being placed in the EU market if they are linked to deforestation. More broadly, it also shows that a narrow focus on direct soy supplies to large consumer markets could prevent a system-wide change towards deforestation-free supply chains in the region. Such a focus could increase deforestation through indirect supply, particularly considering increasing deforestation in countries like Bolivia in recent years (both in the Bolivian Chaco and in the northern part of Santa Cruz) and new agricultural frontiers for soybean production in the Paraguayan Chaco.

Traceability and transparency are two crucial factors to guarantee the protection of forests in Bolivia and Paraguay, as well as deforestation-free supply of soy to Argentina and thereby to large consumer markets. However, as summarized in Figure 23, it is challenging to trace the origin of soy, map its supply chain, and assess the eventual associated risks, namely of deforestation and ecosystem degradation. Significant data gaps remain and publicly available information that can help tracing soy between these countries and shed light in these specific supply chains is, in many cases, limited.



### Soy producing areas

In Bolivia and Paraguay, it is possible to visualize these areas remotely using datasets on crop commodity mapping developed by the [Global Land Analysis and Discovery](#) (GLAD) laboratory in the Department of Geographical Sciences at the University of Maryland. The datasets include all soy-producing areas in South America since 2001. This makes it possible to identify with high precision the regions, provinces, municipalities and farms where soy is cultivated.



### Grain silos and soy processing plants

In Bolivia, there is limited information available on the location of active silos, making it difficult to trace the soy produced. On the other hand, there is information available on the soy processing plants in the country. However, this information is not provided by governmental organizations, but rather by international institutions. This lack of official data, one of the missing links in the Bolivian soy supply chain, affects the accurate traceability of soy products.

In Paraguay, public information from the [Paraguayan Grains and Oilseed Traders Association](#) on the silos and soy processing plants is publicly available. However, it is in the form of statistics without underlying datasets available. Complementary information about the soy agricultural sector can be found online through research done by international organizations and local institutions. Nonetheless, full traceability of soy from farm to processing plant is lacking, missing specific transaction documentation between the supply chain links.



### National Forest Monitoring Systems

Both Bolivia and Paraguay do not cover recent deforestation through national monitoring systems. Identification and monitoring of recent deforestation is crucial to locate land conversion in soy-producing areas and to identify producers who are active in illegal deforestation. Global detection systems are necessary to detect recent land conversion in Bolivia and Paraguay. Such systems are publicly available and do cover both countries.

Figures 23. Available sources and tools to monitor deforestation and trace soy in Bolivia and Paraguay. Source: AidEnvironment

# Deforestation exposure risks

## Policies and legislation in Bolivia

Bolivia was a pioneer in the introduction of legal protection to nature. Its Mother Earth Law, which is grounded in indigenous principles, [provides nature](#) with a similar legal standing as that attributed to humans regarding the right to be protected from exploitation. Although a promising piece of legislation for the protection of forests, it has not been considered successful. Its shortcomings have been mostly linked to the Bolivian government's enactment of new regulations in recent years that allow for agricultural expansion and the clearance of significant extensions of land for cattle ranching and soy farming, all despite the Law of Mother Earth.

Although there are calls to reinforce the Law of Mother Earth, there has been resistance to doing so, mostly for political and economic reasons. The Bolivian government has been more inclined to respond to the increasing soy demand than to implement stronger environmental laws and policies that could revert the ongoing deforestation and land conversion trend. In recent years, it has been implementing a regulatory framework that [encourages soy expansion](#), namely through:

### *Increased soy export quotas*

The Bolivian government [regulates](#) soy exports. Approximately 40 percent of the soy produced in the country must be traded in the domestic market, and only after internal demand is met can soy be traded internationally. However, ANAPO [has advocated](#) for further liberalization of soybean exports, leaving only 32% of the production for domestic consumption.

### *Changed land assignments to allow for agricultural activities*

In the department of Beni, for example, the new Land Use Plan (PLUS) [has been approved](#) to allow for further development of grain agriculture and the production of meat for export, which is part of a government proposal aimed at expanding the agricultural frontier in the Bolivian Amazon to increase agricultural and livestock production in the departments in that area. The PLUS in Beni has become the legal basis for promoting this process, even though significant expansion of grain production, such as mechanized rice and soybean production, was already ongoing, much due to this already being an expansion area for these crops from the department of Santa Cruz.

### *Granting of more permits to deforest land for soy production and approving deforestation of land that was cleared without a prior permit*

Between 2016 and 2021, about [212 thousand hectares](#) of land per year received deforestation authorizations from the Bolivian Forest and Land Authority (ABT in the Spanish acronym). Moreover, the government [has pardoned](#) illegal deforestation retrospectively, approving the clearance after the acts took place without the necessary permits.

Deforestation occurring in new areas since 2016, beyond the “old” agro-industrial zone, has coincided with the implementation of the Economic and Social Development Plan aimed at meeting the goals of the 2025 Patriotic Agenda. This productive pact [was reached](#) in July 2013 between the agricultural business community and the government of Bolivia, where they agreed to extend the agricultural frontier from three to 13 million hectares in the following 12 years and produce 45 million tons of food, half of which for domestic consumption and the other half for export. At the time, the agricultural business sector made a series of demands (e.g., maintaining the non-collection of taxes on land ownership, maintaining the non-collection of a tax on soy exports, liberalization of exports, authorization for the use of transgenic seeds) and, later, ANAPO [reinforced that](#) the right conditions needed to be fostered to maintain this commitment, for which liberalization of exports and reduction of export restrictions were considered crucial. These changes in the context of the 2025 Patriotic Agenda have contributed to the ongoing deforestation and land conversion in the country.



# Deforestation exposure risks

## Policies and legislation in Paraguay

Paraguay had already seen [one-third](#) of its native vegetation disappear and be converted into grassland by 2018, most of which illegally. This has happened despite the introduction of a zero-deforestation law (Ley de Deforestación Cero) in 2004, which, although [contributing to](#) the decline of deforestation rates in the Atlantic Forest, has not completely stopped deforestation.

Law 2524/2004 (later Law n. 6256), known as the Zero-Deforestation Law, is a [regulation](#) that seeks to protect, recover and improve the native forest in Paraguay's Eastern Region, where the highest percentage of biodiversity and water resources are found. This law prohibits transforming or converting areas with forest cover into areas for agricultural use or human settlements unless they have a land-use plan that considers sustainable development standards. Some of its [key points](#) and goals are:

### 🌳 **Forest Protection**

Protection of native forests by establishing guidelines and regulations for sustainable management, conservation, and restoration.

### 🌳 **Sustainable Use**

Promoting the sustainable use of native forests, encouraging practices that support both conservation and economic activities related to these forests.

### 🌳 **Conservation Areas**

The law emphasizes creating and managing protected areas and reserves to safeguard biodiversity and ecosystems within native forests.

After several extensions, this law was due to expire in December 2020, but [the National Congress approved President](#) Benítez's regulation to extend once again for ten more years (until 2030). The request for extension was [based on](#) the need to provide more time for 1) The recovery of highly degraded forests, 2) The adequate implementation of the financial mechanism included in the law, and 3) The strengthening of the institutions that safeguard the forests' natural heritage.

In the Western region, where the Chaco is located, only the Forestry Law (Law 'N. 422/73 - [Ley Florestal Paraguaya](#)), Paraguay's main environmental regulation, is applicable. According to Decree 175/18, which regulates Article 42 of this law, native vegetation can be cleared under established conditions, namely that, in properties larger than 20 hectares, 40-45% of the native vegetation inside the property must be preserved, of which:

- 25 percent of natural forests
- 15 percent of conservation borders (protection strips and separation plots)
- 5 percent of riparian forests to protect riverbeds (if there is a watercourse on the property)

This means, however, that a large part of the native vegetation can still be legally cleared – around seven million hectares, according to some [estimates](#). Also, there is a relatively lax enforcement of the law in Paraguay due to which, according to a [study](#) by the Paraguayan Forest Authority from 2019, 20% of the deforestation occurring in the Chaco region of the country was illegal. This, as mentioned before, happens on the backdrop of increasing agricultural expansion in this region as favourable conditions for soy production, for instance, continue attracting producers, such as new infrastructure (e.g., Bioceanic Corridor connecting Brazil, Paraguay, Argentina, and Chile) to facilitate exports from the region; government approval of drought-resistant soy varieties that can endure the climate of the Dry Chaco; and relatively low land prices.

**AidEnvironment Europe**

Barentszplein 7  
1013 NJ Amsterdam  
The Netherlands  
T: +31 (0)20 686 81 11  
M: info@aidenvironment.org

**AidEnvironment East-Africa**

Plot 99 Luthuli Avenue  
Kampala  
Uganda  
T: +256 (0)393 20 88 17  
M: eastafrica@aidenvironment.org

**Sangga Bumi Lestari**

Noble House, Mega Kuningan,  
29th fl. No. 2,  
Jl. Dr. Ide Anak Agung Gde Agung Kav.  
E 4.2 Jakarta, JK 12950, Indonesia  
M: info@sanggabumilestari.org



With the support of

