


# Agroindustrial dynamics in the Gran Chaco: an approach to the Argentina-Paraguay cross-border space

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# Agroindustrial dynamics in the Gran Chaco: an approach to the Argentina-Paraguay cross-border space

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## Abstract

The article focuses on the study of the links that maintains the territorial expansion of the agribusiness productive model in South America with the continuities and discontinuities organized by the edges of the national territories. With this objective, it addresses the advance of the modern agrarian frontier in the Gran Chaco, focusing attention on the cross-border space that is organized around the international boundary between Argentina and Paraguay. The study area is defined by the province of Formosa (Argentina) and the departments of Boquerón and Presidente Hayes (Paraguay), which condense the majority portion of the meeting area between both states. In methodological terms, the proposal is based on the review of specialized literature, the systematization of statistical information and field surveys. The referenced cross-border space, after having constituted an axis of conflict between both countries, nowadays represents a resource that seeks to be capitalized by the agroindustrial corporations and governments. In this scenario, the advance of the modern agrarian frontier, although it is supported by regional and cross-border integration mechanisms, deepens its fragmentation through the structuring of a centrifugal network directed to the regional and port centers of Argentina and Paraguay.

**Keywords:** Modern agrarian frontier. Gran Chaco. Edges. Borders.

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## Dinámicas agroindustriales en el Gran Chaco: una aproximación al espacio transfronterizo Argentina-Paraguay

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### Resumen

El artículo se enfoca en el estudio de los vínculos que mantiene la expansión territorial del modelo productivo de los agronegocios en Sudamérica con las continuidades y discontinuidades que organizan los bordes de los territorios nacionales. Con este fin, aborda el avance de la frontera agraria moderna en el Gran Chaco, centrando la atención sobre el espacio transfronterizo que se organiza en torno al límite internacional

entre Argentina y Paraguay. El área de estudio está definida por la provincia de Formosa (Argentina) y los departamentos Boquerón y Presidente Hayes (Paraguay), que condensan la porción mayoritaria del área de encuentro entre ambos estados. En términos metodológicos, la propuesta se sustenta en la revisión de bibliografía especializada, la sistematización de información estadística y los relevamientos en campo. El espacio transfronterizo de referencia, luego de haber constituido un eje de conflicto entre ambos países, representa hoy un recurso que busca ser capitalizado por las corporaciones agroindustriales y los gobiernos. En este escenario, el avance de la frontera agraria moderna, si bien está sostenido sobre mecanismos de integración regional y transfronteriza, profundiza su fragmentación a través del andamiaje de una red de carácter centrífugo cuyo destino son los centros regionales y portuarios de Argentina y Paraguay.

**Palabras clave:** Frontera agraria moderna. Gran Chaco. Bordes. Fronteras.

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## Dinâmica agroindustrial no Gran Chaco: uma abordagem ao espaço transfronteiriço Argentina-Paraguai

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### Resumo

O artigo centra-se no estudo dos vínculos mantidos pela expansão territorial do modelo produtivo do agronegócio na América do Sul com as continuidades e descontinuidades que organizam as bordas dos territórios nacionais. Para tanto, aborda o avanço da fronteira agrária moderna no Gran Chaco, concentrando a atenção no espaço transfronteiriço que se organiza em torno do limite internacional entre Argentina e Paraguai. A área de estudo é definida pela província de Formosa (Argentina) e pelos departamentos de Boquerón e Presidente Hayes (Paraguai), que condensam a maior parte da área de encontro entre os dois estados. Em termos metodológicos, a proposta se baseia na revisão de literatura especializada, na sistematização de informação estatística e em levantamentos de campo. O espaço transfronteiriço de referência, depois de ter constituído um eixo de conflito entre os dois países, representa hoje um recurso que pretende ser capitalizado pelas corporações agroindustriais e pelos governos. Nesse cenário, o avanço da fronteira agrária moderna, embora apoiado em mecanismos de integração regional e transfronteiriça, aprofunda a sua fragmentação através da estruturação de uma rede centrífuga cujo destino são os centros regionais e portuários da Argentina e do Paraguai.

**Palavras-chave:** Fronteira agrária moderna. Gran Chaco. Bordas. Fronteiras.

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## Introduction

The objective of this work is to contribute to the study of the links maintained by the territorial expansion of the agribusiness productive model in South America with the continuities and discontinuities organized by the edges of the national territories. This interest is framed in the recognition of the tensions generated by the geopolitical dynamics of extractivism, which transcend states and forge new material and symbolic territorialities (Gómez Lende, 2022). In this context, it seeks to overcome the nation-state as a unit of study for addressing productive frontiers (which includes modern agrarian fronts), to focus attention on the conditions and processes that characterize the global spaces destined to the accumulation and circulation of capital (Schweitzer, 2020). This does not mean underestimating the role of state borders or suggesting their disappearance; on the contrary, its impact on the current process of diffusion and territorialization of capital is problematized.

The countries of South America participate in a subordinate manner in the international division of labor, where they have a prominent role in the production of commodities and agricultural products with a low processing level. Within this scenario, the obtaining of grains and meat stands out as one of the most widespread forms that the deepening of extractivism on the continent has acquired in recent decades. It is of interest, then, to analyze the grain-meat chain as a territorial network (Frederico, 2021) that drives the expansion of the agribusiness production model in the Southern Cone. Broadly speaking, three moments associated with the advance of the modern agrarian frontier are revealed: the displacement of cattle to areas considered marginal in agricultural terms, generally forestry, where their devastation as a result of the use of natural pastures and the introduction of forage crops (pastures and grains) is witnessed; the expansion of forage crops; and the generalization of grain production, for its use in diversified meat production and for export purposes (Salizzi, 2017).

In a context marked by the colonial origin of the South American states, spatial contradictions arise derived from the modernization, accumulation and verticalization of agricultural production. In this framework, the use of modern technical systems stands out along with ancient forms of exploitation of work and nature, as well as the clash between values and practices of local communities with projects and actions of external agents (Frederico, 2021). Additionally, the colonial legacy is manifested in the presence of vast areas that are seen as territorial funds excluded from the productive space integrated into the world-economy (Moraes, 2009), on which agroindustrial capital places its attention. The Amazonia and the Gran Chaco are paradigmatic examples of regions that agribusiness values as land reserves to be exploited. Both cases not only manifest the material and symbolic construction of internal frontiers of national territories, but also global spaces marked by the tension between transnational business territorialities, state sovereignties and local projects.

Since the end of the 20th century, the Gran Chaco has faced a profound transformation process based on the spread of cattle ranching and large-scale grain production, which positions it as one of the main global focuses of deforestation (Mosciaro *et al.*, 2022). Its agroecological potential and the global demand for agricultural commodities configure a scenario of increasing pressure on its natural resources, focused on agricultural and livestock exploitation. According

to the data provided by MapBiomás Chaco (2023), the agricultural area practically doubled between 2000 and 2021, going from 10.6 to 19.9 million hectares (+89%). This growth was due to the area allocated to pastures, which went from 4.7 to 11.3 million hectares (+140%) and to annual crops, whose increase was from 5.7 to 8.6 million hectares (+ 47%).

Based on this background, the article focuses on the singularities presented by the advance of the modern agrarian frontier on the cross-border area that is structured within the Gran Chaco. To this end, it takes as reference the case of the international boundary between Argentina and Paraguay, between the 2000s and the present. Thus, attention is focused on areas traditionally considered marginal within the productive schemes of these states, which are reached by the advance of modern agriculture.

The proposed study seeks to overcome the restrictions imposed by the reduction of the effects of the territorial expansion of the agribusiness productive model to the matrix built around state borders. Without ignoring the particularities established by the historical, political and economic conditions of each of the states, a certain methodological nationalism that marks the study of agrarian frontiers is problematized, which leads to their consideration as an internal phenomenon to national territories.

The article is structured in five sections. Firstly, the theoretical-methodological approach adopted in the research is introduced. Secondly, the main characteristics of the Gran Chaco are described, detailing the conditions that highlight its geopolitical importance. Thirdly, attention is focused on the segment of the international border between Argentina and Paraguay located within their area of influence. Fourthly, the transformations introduced by the advance of the modern agrarian frontier in the study area are addressed. Finally, a series of reflections are developed on the continuities and discontinuities that organize the edges of the territories of Argentina and Paraguay in relation to the agroindustrial territorial expansion and new triggers are formulated to continue investigating the topic.

## **Theoretical-methodological approach and characterization of the study area**

The agrarian frontier is understood as the process of transition between different forms of occupation and productive organization of space with agricultural purposes. The adopted definition not only accounts for the change in land use, but also focuses centrally on the system of practices and relationships that support its transformation dynamics, highlighting its conflictive and contingent nature (Salizzi, 2020). After the 1970s, agrarian frontiers acquired a new expression in South America, associated with the characteristics imposed by the territorial diffusion of the agribusiness productive model. This new process extends beyond the frontier scheme as a population settlement system and is aimed at expanding the area destined for the production of agricultural commodities, with a view to quickly obtaining economic benefits. In this framework, the notion of modern agrarian frontier is disseminated in the field of geography:

[...] empleada para denominar los sectores ocupados hacia el último cuarto del siglo XX por monocultivos intensivos en capital y tecnología, a través del reemplazo de la vegetación nativa, los cultivos tradicionales (practicados por campesinos y/o productores familiares) y las áreas extensivas de pastoreo (Frederico, 2011, p. 6 apud Salizzi, 2020, p. 589).

This interpretative scheme also covers the processes associated with livestock intensification and its agro-productive chains (cf. Bernardes *et al.*, 2021). Its purpose is to investigate the characteristics adopted by the territorialization of capital, associated with the process of agricultural modernization, addressing the spatial contradictions of the process.

As Frederico (2011) states, the modern agrarian frontier is thought as an emblematic event in the dispersion of the technical-scientific-informational milieu (Santos, 2000) that, although it has marked the entire space for decades, it is characterized by a selective (not homogeneous) diffusion of its technical objects. Among the topics that have historically accompanied the study of productive fronts and frontiers, the environment, population, transportation and technology stand out.

Based on this framework, progress is made in the study of the characteristics that the modern agrarian frontier assumes in the cross-border space shared by Argentina and Paraguay within the Gran Chaco. The area that extends on both sides of the international boundary is taken as a reference, initially considering the province of Formosa in Argentina and the Boquerón and Presidente Hayes departments in Paraguay<sup>1</sup> (see Figure 1). These units condense the largest portion of the cross-border space between both nations located within the margins granted to the Gran Chaco.

The period of analysis extends from the year 2000 to the present, when the territorial expansion of the agribusiness production model in the region deepened, through the dissemination of genetically modified crops.

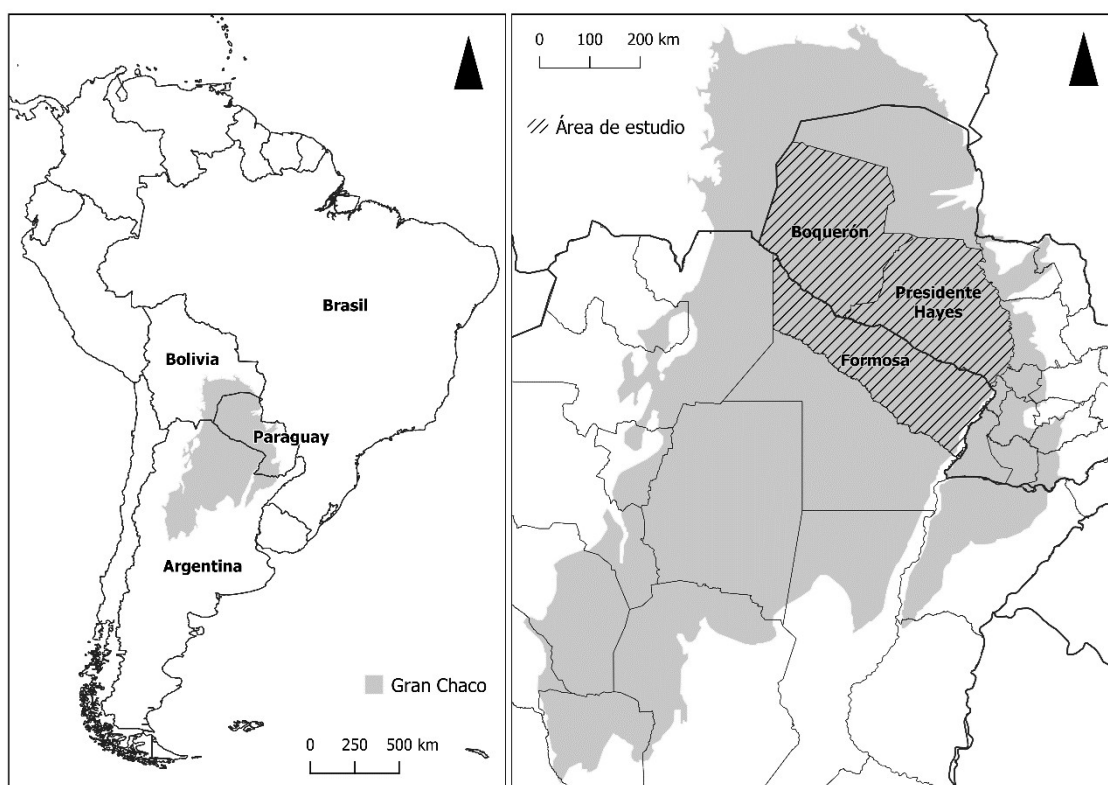
The proposed approach is based on the review of specialized literature on the subject, the systematization of statistical information and the records obtained in the field. In this order, the availability of data linked to land use changes provides key elements for the contextualization and evaluation of the productive transformation processes addressed. These are essential inputs to advance in its historicization, interpretation and analysis.

Finally, a central node of the methodological strategy is found in the multiscale analysis. This perspective is based on the thesis that a multiplicity of scales is involved in every spatial construction process, which can be associated with the practices of the different social actors involved in it (Correa, 2018). This is manifested in the study area through the convergence of territories and borders of different origins (states, corporations, communities, social organizations, etc.) and scopes (subnational, national, transnational, etc.). In short, although we start from the analysis of the border space shared by Argentina and Paraguay, focusing centrally on the subnational level (provinces and departments), the scales analyzed are redefined in the research process itself.

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<sup>1</sup> The first-order subnational administrative units into which the territories of Argentina and Paraguay are organized are called, respectively, provinces and departments.

**Figure 1 – Location of the study area**



Source: Self made.

## The Gran Chaco

The Gran Chaco comprises the wide plain, close to one million square kilometers, located in south-central South America, which extends through the national territories of Argentina, Bolivia, Paraguay and a small portion of Brazil. It is estimated that Argentina has approximately 60% of its total area (650,663 km<sup>2</sup>), Paraguay 28% (303,818 km<sup>2</sup>) and the remaining 12% is divided between Bolivia (122,586 km<sup>2</sup>) and Brazil (13,122 km<sup>2</sup>) (MapBiomias Chaco, 2023). The variety of its environments, among which forests, shrubs, savannahs, grasslands and wetlands stand out, supports a great biodiversity that includes numerous endemic species. It represents the second forested area on the continent after the Amazonia and includes the largest of them if only the presence of dry forests is considered (Morello & Rodríguez, 2009). Its environmental conditions position it as an important reserve of natural resources, where national governments and extractivist capitals are increasingly directing their attention.

At the same time, it includes an interior region that has historically been the scene of different bordering processes, understood as social practices of diverse nature that engender spatial discontinuities that are commonly called borders (Benedetti, 2017). During the colonial period, it constituted a conflict zone where the native peoples resisted the European advance. This condition spread in the 19th century, when young states sought to expand their influence over inherited territories, subjugating indigenous communities, exploiting natural resources and disputing the delimitation of their territories with neighboring nations. Currently, its geopolitical relevance, both at the South American and global levels, is defined by the presence of natural

resources that are widely valued and demanded in the international market (agricultural, forestry, minerals and hydrocarbons).

Together with the Amazonia basin, it is one of the South American regions that has most strongly and persistently evoked the idea of backwardness and savagery, thus emerging in various imaginaries as a space that has barbarism as its main attribute (Gordillo, 2001). The parallelism reaches paroxysm when the diversity of discourses that affect the expropriation regime to which it is subjected is recognized, with a view to its incorporation into the circulation of capital. Thus, not only does its characterization as a wild space, demographic void or territorial fund stand out, which requires to be occupied or integrated into the global economy, but also its valuation as a reserve of natural areas, territories and indigenous or traditional knowledge. These figures affect the construction of land reserves, partially or totally immobilized, for use by capital (cf. Rougemont, 2021).

Taking into account their impact on the spread of modern agriculture, two factors stand out that are directly associated with the geopolitical importance of the Gran Chaco. The first one is linked to the agroecological potential of the region, whose main limiting factor lies in the availability of water (Naumann, 2006). The second corresponds to its interior location within the continent. This condition, although it has been historically associated with the occurrence of border conflicts, has acquired in recent decades a new meaning linked to the strategic nature of the Gran Chaco for South American regional integration. This is a scenario defined by the strengthening of transportation infrastructure, aimed at improving international connectivity and increasing the circulation of goods and services (Hourcade; Oddone, 2012; da Costa Feres, 2021). This is the framework of action, for example, of the projects promoted in the last twenty years through the Initiative for the Integration of the Regional Infrastructure of South America (IIRSA), highlighting the situation of three hubs of integration with special influence on the Gran Chaco territory: Central Interoceanic, Paraná Paraguay Waterway and Capricorn. These projects and investments not only aim to facilitate the circulation of goods through the region (linking interoceanic destinations), but they are also aimed at promoting the transportation of commodities obtained there. In this way, they reinforce their role as an extraction area through the structuring of infrastructure and logistics networks made up of a multiplicity of roads, machinery, telecommunications, transportation and storage (Castilla; Schmidt, 2021).

Argentina and Paraguay lead the deforestation process taking place in the Gran Chaco. The two countries share within the region an extensive cross-border space that integrates large forest areas of their respective territories. In recent decades, these edges have become the area for the dissemination of productive practices related to the advancement of the modern agrarian frontier. In this cross-border space, corporate agendas intersect and become strained, which manifest the companies' aim to impose their regional hegemony; the public policies of both countries (environmental, social, economic and security); and the interests of the local population, represented mainly by indigenous peoples, peasant families and small producers.



## The Argentina-Paraguay border in the Gran Chaco

The international border between Argentina and Paraguay has a total length of 1,699 km. It extends between the tripoints Argentina-Bolivia-Paraguay, in the west, and Argentina-Paraguay-Brazil, in the east, resting almost entirely on river courses: Pilcomayo, Paraguay and Paraná (IGN, 2023). The area of influence of the Gran Chaco covers a predominant portion of its trace. The Argentine province of Formosa is the subnational administrative unit that concentrates most of the limit, with an extension close to 900 km. In the Paraguayan case, the most representative departments are Boquerón (260 km) and Presidente Hayes (340 km) (MRE, 2023).

Regarding the bordering process between both countries, central elements of national policies that have directly influenced its institutionalization can be highlighted: the establishment of security zones (Argentina) or border strips (Paraguay); the organization of border crossings and checkpoints; and the signing of bi/multilateral agreements, aimed at understanding between nations and the organization of integrated border devices. Additionally, the numerous cultural ties maintained by the inhabitants of the border area between Argentina and Paraguay should be highlighted, as well as the intense commercial and productive activity.

If attention is focused on the presence of international crossings, of the 39 indicated by the Ministry of Security (2023) of Argentina for its border with Paraguay, 9 of them are located in Formosa territory and are enabled for cross-border transit. Those with the greatest circulation are structured around the towns of Clorinda (Argentina) and Asunción (Paraguay), linked through the San Ignacio de Loyola International Bridge and the ports Pilcomayo (Formosa) and Itá Enramada (Asunción). A significant flow of people, vehicles and goods moves through them. Despite being the only authorized passages for cargo traffic, their incidence is lower due to the comparative benefits that river transport presents in the region. through the Paraná Paraguay Waterway (FONPLATA, 2015). In the western sector, in the province of Salta, the international crossing Misión La Paz (Argentina) - Pozo Hondo (Paraguay) is located, which consists of a bridge over the Pilcomayo River and is not enabled for cargo.

In this way, the incidence of infrastructure works aimed at facilitating the connection between and through both territories stands out in the study area, thus responding to continental initiatives. Considering those that are organized around the province of Formosa, the following can be mentioned:

- a) The San Ignacio de Loyola international bridge. Inaugurated in the 1970s, it is the main link through the Pilcomayo River between both countries, with all types of vehicular traffic. It is connected to the Argentine road network through RN 11, which extends far south to the port terminals of Gran Rosario (province of Santa Fe); and with the Paraguayan road network through the national route PY09, known as Trans Chaco, which enters the Chaco Boreal in a northwesterly direction, until reaching the international border with Bolivia in Fortín Sargento Rodríguez (Boquerón department). About 1,500 vehicles circulate on this last route per day, of which about 50% correspond to the transportation of livestock and dairy products (MOPC, 2023).

- b) The Paraná Paraguay Waterway, which represents for both countries the most relevant infrastructural support on which the agro-export model is based (Rausch, 2022). It includes, in this case, the section called “Asunción-Confluencia”, which has an extension of 390 km. This portion has a draft of 10 feet, which allows the transit of barges and tugboats for the mass transportation of cargo, ranging between 12,000 and 18,000 tons per convoy (MAGyP, 2023)<sup>2</sup>. Along this route are the ports of Formosa (Argentina) and Asunción, Villeta and Pilar (Paraguay). The metropolitan area of Asunción concentrates a preponderant number of port terminals in Paraguay, constituting a logistics node of great relevance for the region. For its part, Formosa has a public port, without a concession, which is located at km 1,444 and represents the first Argentine port north of the Waterway (Calvo; Calzada, 2018). The latter, however, does not currently represent a node of importance.

On a more limited scale, and with another purpose, the so-called “Pantalón Project” can be mentioned, which includes one of the main infrastructure works located in the Pilcomayo River basin. It was inaugurated in 1991 and consists of the construction of a system of diversion canals that equally distribute the waters of the Pilcomayo River between Argentina and Paraguay. Its importance lies in the role it plays in the administration of a scarce resource in the region such as water, essential for the survival of the population, local biodiversity and the development of productive activities. Since its creation, there have been incidents related to the lack of maintenance and dredging of the channels, which become clogged by the accumulation of sediments (Brown; Arnold; Speranza, 2018).

Finally, there are two environmental aspects of great impact in the study area, whose influence extends to the delimitation and bordering processes between both countries. The first includes the structuring of the international boundary on river courses. In this framework, the Pilcomayo River basin stands out, which according to its extended hydrographic conditions constitutes a cross-border ecosystem (Brown; Arnold; Speranza, 2018); and the Paraguay River, which is distinguished for being a navigable waterway of great regional importance for the transportation of cargo. The second refers to the institutionalization of natural conservation areas, with various restrictions on use. In relation to this aspect, both Argentina and Paraguay have defined a series of protected areas that are located on the margins of their respective territories. These are different characteristic environments of the Gran Chaco, mostly wetlands, which are subject to different conservation schemes.

Despite the continuity evidenced by the ecosystems that are organized on both sides of the border, there is no case recorded in which conservation units show cross-border continuity. Two notable cases, both for their extension and for their representativeness of the included environments, are the Río Pilcomayo National Park (public) and the Tinfunqué Managed Resources Reserve (private), both located close to the international boundary. This discontinuity is replicated around

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<sup>2</sup> The goods transported are mostly raw materials (90%), mainly grains for export, and to a lesser extent manufactured product (10%) (MAGyP, 2023).

environmental legislation aimed at controlling deforestation, where the criteria and strategies adopted are not comparable nor do they dialogue with each other. However, in both cases the regulations are prone to the conversion of land to livestock uses.

## **The modern agricultural frontier in the central area of the Gran Chaco**

For decades, the Gran Chaco has faced a degradation process based on the extractive use of its natural resources. Given its agroecological potential and considering the growing global demand for meat and grains, it faces an accelerated expansion of livestock farming and intensive crops such as soybean. This situation makes the region one of the most threatened forest areas in the world, with the particularity that only 9% of its forest area is covered by protection measures (Kuemmerle *et al.*, 2017). Within this scenario, Argentina, which concentrates 60% of its area, is home to most of the land converted to agricultural uses (annual crops), close to 8 million hectares; while Paraguay, which represents 28%, has most of the land planted with pastures (forage herbaceous plants), which comprise about 6.9 million hectares (MapBiomass Chaco, 2023). The diffusion of these productive practices occurs in areas characterized by great ecological fragility, where deforestation leads to fragmentation and loss of habitats and species. In turn, the process directly affects the local population through the exclusion and displacement of indigenous and peasant communities.

Below, some particularities adopted by the organization of the agricultural production circuit in Argentina and Paraguay are presented, followed by the analysis of the characteristics established by its territorial expansion over the province of Formosa (Argentina) and the departments of Boquerón and Presidente Hayes (Paraguay).

## **Meat and grains in Argentina and Paraguay**

Towards the end of the 20th century, Argentina and Paraguay experienced a profound process of transformation of their agro-productive structures, associated with the introduction and generalization of new crops, the adoption of techniques and technologies in production processes, the growing intervention of financial capital and the consequent expansion of the agricultural frontier. Although each country went through this process with particular times, actors and conditions, and even today its situation is far from being comparable -fundamentally considering the degree of consolidation of its agro-industrial chains-, the predominant place that the cultivation of transgenic soybean acquired in both experiences is remarkable. In the Paraguayan case, soybean represents the main export product, with beef production also standing out (OEC, 2023a). Likewise, Argentina presents an economy conditioned to this crop, whose exports represent the main channel for the entry of dollars into the country. The commercialization of beans, flour and soybean oil reaches a figure close to 25% of the value of its exports, with the participation of industrialized products being largely the majority (OEC, 2023b). Another crop with great importance in Argentine exports is corn, which also has an impact on the growth of the agricultural area. In any case, the territorial expansion of annual crops was radical in both

countries during the last decades, explaining a good part of the processes of advance of the modern agrarian frontier, either by direct effect or derived from the landslide and the expansion of the area destined for livestock activity.

In Paraguay, soybean cultivation is concentrated in the southeast of the national territory, in the sector known as the eastern region, located east of the Paraguay River. There, the departments that have historically condensed their production can be found: Alto Paraná, Canindeyú, Itapúa, Caaguazú and, to a lesser extent, Caazapá. Other centers are found to the north of said region, in the departments of San Pedro and Amambay, and to the south, in the department of Misiones (Rozadilla, 2019a). The grains obtained there are transported mainly to the port terminals located on the Paraguay River, from where the production is marketed through the Paraná Paraguay Waterway, with the port and agro-industrial complex organized around Gran Rosario being one of its main destinations (Rozadilla, 2019b). This situation contrasts with what happens in the Chaco Boreal region, where the diffusion of cultivation is still incipient and livestock farming is the dominant activity.

Interstate borders represent a relevant element in the recent history of Paraguayan agriculture, since they have played a significant role in the expansion of soybean. The entry of the crop into the country occurred in the 1970s and was associated with the arrival of Brazilian settlers from the southern states, who promoted the spread of technical agriculture (Souchaud, 2007; Rojas Villagra, 2009). The process gained new impulse towards the end of the 1990s, with the illegal entry of transgenic soy seeds from Argentina, where they had been released to the market in 1996. This influence continues even today, given that many Argentine and Brazilian companies and capitals perform agricultural operations in Paraguayan territory. It is estimated that about 35% of its extension is under direct or indirect control of foreign capital, this trend becoming stronger in the Chaco area (Ávila; García, 2019).

In the Argentine case, the provinces of Buenos Aires, Córdoba and Santa Fe not only lead the production of soybean but also represent three quarters of the total planted area (MH, 2019). From there, production is directed to the country's main agro-export hub, which is organized around Gran Rosario, where the largest installed capacity in the country for the storage and industrialization of grains is concentrated. There are also other areas where the cultivation of the oilseed extends, such as the east of the provinces of Salta and Tucumán and the provinces of Santiago del Estero and Chaco. These sectors make up the nodes where in recent decades the process of agricultural expansion within the Gran Chaco has taken hold.

The release of transgenic soybean in the national market in 1996 began a process of incorporating land into the large-scale agro-industrial matrix that was accompanied by the relocation of livestock enterprises (pampeans and extra-pampeans) to areas of less agricultural suitability, from of the adoption of adapted pastures (Ginzburg; Torrella, 2022). The 2000s marked the intensification of this trend, reaching new corners of the Argentine portion of the Gran Chaco. In this context, the province of Formosa showed significant growth in its agricultural areas, which between 2001 and 2015 increased from 246,000 to 781,000 ha (Arriaga Velasco-Aceves; Xu; Ginzburg, 2021).

In general terms, and with a transversal look at the situation of both countries, it is observed that the introduction of soybean cultivation and the expansion of livestock areas are integrated and have a direct impact on the loss of forest land in the Gran Chaco. Soybean and livestock are part of a linked system in South America, which acquires transnational characteristics, in which producers alternate between said activities as a strategy to reduce dependence on international prices, reinvest profits, resist periods of drought and evade government regulations that limit deforestation (Fehlenberg *et al.*, 2017). This scheme covers the area on which this work focuses its attention, where the meeting of sectors from Argentina and Paraguay takes place that can be characterized as marginal within their respective productive schemes, but which together form an area of growing interest for capitals and companies eager for land where they can expand their businesses. There, we witness the advance of the modern agrarian frontier fundamentally through livestock expansion, which introduces the process of deforestation, later giving rise to the adoption of pastures and the cultivation of grains.

These practices are consistent with the trends observed on a South American scale, where the growing influence acquired by strategies based on the financialization of production, the trans-latinization of companies (Borras *et al.*, 2013) and the land grabbing, aimed at reducing risks and ensuring greater competitiveness through the geographical (and political) diversification of ventures (Frederico; Gras, 2017). An example of this is the agribusiness “Argentine mega-companies” that since the 1990s have extended their influence throughout the Southern Cone, even reaching agricultural frontier areas located in Brazilian territory (Nascimento; Frederico, 2022).

## **The province of Formosa**

Formosa is one of the Argentine provinces of the Gran Chaco where cattle farming was relocated following the agriculturalization process that began in the country in the mid-1990s. According to the National Agricultural Census (CNA) of 1988, before the 1990s, the province had 1,046,510 heads of cattle (INDEC, 1988), a figure that increased to 1,741,660 in 2019 (MAGyP, 2019).

Bovine production currently leads livestock activity in the province. In accordance with the agroecological characteristics that dominate the area, it has historically been developed as an extensive breeding activity with little use of pastures. One of the dominant characteristics of the sector lies in its significant concentration, where 4% of the establishments have more than 1,000 heads of cattle and account the 44% of the provincial herd (MH, 2019). Within the group of these companies, with large staff, are those that incorporate technology and promote complementarity with agricultural activity. Small producers, on the other hand, develop small livestock (mainly goats) in combination with other subsistence activities and off-farm income.

The province shows, in short, a great heterogeneity of actors. The departments that account for a greater relative concentration of small producers are: Patiño, Pilcomayo, Bermejo, Pirané and Pilagás. These, along with Ramón Lista, are the ones that simultaneously show higher

relative levels of unsatisfied basic needs. They are home to an important part of the communities of indigenous peoples that inhabit the province, such as the Wichí, Qom and Pilagá (MPyA, 2019).

Agriculture is concentrated in the central western sector of the province and presents relatively less development, although it has grown in area in recent years. The activity is mainly based on grain production, cotton cultivation and horticulture (MPyA, 2019). In 2021, the province had 170,516 agricultural hectares (MapBiomass Chaco, 2023), its main crops being corn, sorghum, soybean and sunflower, rice and cotton, in that order according to its surface area (GIRSAR, 2021). Regarding the production of corn and soybean, the former is the most important and growing one -in 2019 it had close to 70,000 ha (MH, 2019)-, while the latter is less significant -in the 2021/22 campaign the surface was 13,232 ha (SISA, 2022)-. The relevance of corn is mainly due to the role it assumes as forage for cattle farming. Agriculture is then developed in differentiated sectors, as a complement to livestock business production; and in small producers, where it is carried out on a small scale and for horticultural and forage purposes. Regarding large-scale grain production, cereals, such as corn, represent the main export product (INDEC, 2022). In the case of soybean, as happens in the Paraguayan Chaco, it is developed in double cultivation together with corn. In this case, the production is marketed to local livestock companies and concentrator producers located in the south of the region, generally in the province of Chaco, avoiding freight costs to the port complex of Gran Rosario.

In relation to the variation in land use and the growth of the agricultural area, according to the data provided by MapBiomass Chaco, an expansion of the area planted with pastures is observed between the years 2000 and 2021, which went from 147,327 to 503,295 ha, also showing a considerable acceleration since 2019. Likewise, during this period there is an increase in agricultural areas, although more moderate, from 130,108 to 170,517 hectares. Regarding this aspect, it is also necessary to consider the increase in the area of closed grasslands (with little presence of woody ones), which went from 524,607 to 746,104 ha. and which, considering the simultaneous growth of the agricultural and pasture area, could account for deforestation processes for livestock purposes.

Recently, a private initiative has advanced in the province aimed at establishing a soybean processing plant near the town of Ibarreta (Patiño department), on RN 81. According to what is indicated by its owners, it seeks to process 15,000 ha of soybean that are planted in the area and promote the expansion of the crop, considering the presence of potential hectares. In this way, it is aimed at increasing agro-industrial chains, placing soybean at the local level and marketing the expeller for animal feed (Bontempo, 2022).

Finally, it can be stated that Formosa has freshwater reservoirs and fertile soils, which is why it is seen by various public and private actors as a province with agricultural potential (Girsar, 2021). In accordance with National Law 26,331/2007, on Minimum Budgets for Environmental Protection of Native Forests, the province sanctioned its territorial planning under Provincial Law 1,552/2010 and introduced a zoning that divides its territory into two parts of similar extension, establishing for each zone maximum admissible percentages of land use change (Ginzburg; Torrella, 2022). After the sanction of the ordinance, between 2012 and 2021, the deforestation of 324,223 hectares of forest was officially recorded (MAyDS, 2022).

## Boquerón and Presidente Hayes departments

The Boquerón and Presidente Hayes departments are located in the southern sector of the Boreal Chaco, an area that has had particular significance for having been the scene of the War of the Triple Alliance (1864–1870) and the Chaco War (1932–1935). It is a space that in the past has been poorly integrated with the rest of the Paraguayan territory, which is today immersed in a globalization process led by the agro-industrial sector (Vázquez, 2007).

The main activity in the departments is cattle farming. This production, which was initially extensive, intensified in the last decade and a half under the impulse given by descendants of Mennonite settlers (in the region since 1930), who advanced in the organization of the agro-industrial chain through the installation of refrigerated plants to meat exports (Vázquez, 2021). The Mennonite colonies are located in the western sector, where Philadelphia (capital of the Boquerón department) is located, which comprises the most extensive and continuous urban center in the region (Gill *et al.*, 2020). The importance of the Mennonite community is not only due to their role as technical agricultural producers, but also to their contributions to the strengthening and integration of Paraguayan ranchers present in the region (Vázquez, 2007). Through the process described, in which international capital also participated, the bovine herd increased between 2010 and 2020 from 1,144,570 to 2,395,734 heads in Boquerón, where the leap was most pronounced; and from 2,396,644 to 2,468,734 heads in Presidente Hayes (SENACSA, 2023).

The departments in question are characterized by great ethnic and socioeconomic heterogeneity, where numerous communities of indigenous peoples and peasant populations are present. Agro-industrial corporations associated with national and foreign capital are also found there, mainly from the Southern Cone and Asia (Nosetto *et al.*, 2012). These companies, which began to exploit the region around the 1990s, base their activity on the production of meat on implanted pastures and are responsible, together with the Mennonite colonies, for the advance that agriculture is experiencing through the cultivation of grains. Among South American capital, Brazilian, Argentine and, in the last decade, Uruguayan companies stand out. In the case of Argentine companies, their presence is generally framed within corporate translatinization strategies, acting through planting pools and rarely acquiring ownership of the land (Pereira, 2018).

In relation to the information provided by MapBiomás Chaco (2023), it can be indicated that in both departments the area dedicated to pastures increased notably between 2000 and 2021, where it went from 1,682,774 to 4,753,532 ha, of which 3,448,467 ha correspond to Boquerón. Regarding agriculture, the growth of its surface area was concentrated in the same department, which showed an increase from 36,730 to 83,387 hectares, while for the same period it decreased in Presidente Hayes from 30,927 to 22,443 hectares. This is because grain production expanded fundamentally in the former, where experimental crops of drought-resistant transgenic soybean have been developed since 2019 (Ávila; García, 2019). For its part, the Presidente Hayes department has been the central object of livestock expansion.

In general terms, this sector of the Northern Chaco is witnessing the growth of the area destined for the cultivation of corn, rice and soybean. Within the region, a central agro-industrial and service area is distinguished; and a livestock and agricultural area that extends to the north and south (Vázquez, 2021). The possibility of continuing to expand the agricultural

frontier is associated with conditioning factors that have been actively intervened in recent years: transportation infrastructure, access to electrical energy, and the restrictions established by environmental legislation. According to the authorities of the Boquerón Regional of the Rural Association of Paraguay (ARP), if the aforementioned limitations are addressed, some 500,000 agricultural hectares can be reached by 2030 and transform the region into an agro-industrial hub completely integrated into livestock activity (PuroCampo, 2022).

Finally, it is worth highlighting that the environments of the Western Chaco are covered by Law 422/1973 (Forest Code) that establishes provisions for the conservation, management and sustainable use of forest resources. This regulation indicates that in clearings for agricultural purposes carried out on properties of more than 20 hectares, 25% of the forest surface must be maintained, corresponding to the legal reserve, and 15% for separation strips between plots (totaling 40%). In this framework, the main mechanism of loss of coverage due to conversion to agricultural uses lies in deforestation for livestock purposes, which enables the implementation of pastures (Gill *et al.*, 2020).

## Conclusions

The cross-border space that is organized around the international boundary between Argentina and Paraguay in the Gran Chaco comprises an area historically relegated to a marginal position within the territorial schemes of the respective states, based on the centralized exercise of their national sovereignty, the scarce assessment of its agroecological conditions and its recurrent association with negative images and discourses. These edges currently share the common feature of constituting one of the central scenarios of the advance of the modern agrarian frontier in the region, thus making their study particularly relevant. It was addressed through the analysis of the situation in the province of Formosa (Argentina) and the departments of Boquerón and Presidente Hayes (Paraguay).

The entry point to the problem was established in the growing pressure that the environments of the Gran Chaco (mainly forests and grasslands) receive under the constant agricultural expansion. It was observed, then, that the main factor of land use change in the study area corresponds to the implementation of pastures and, to a more limited extent, the introduction of annual crops, the latter concentrated in Formosa and Boquerón. Likewise, a certain temporality could be recognized, where the opening of land for livestock is responsible for deforestation and precedes the introduction of grain cultivation.

In the framework defined by the subordination of the countries in question to the world market of agricultural commodities, the evidence deepened the question about the way in which agro-industrial corporations organize their business strategies and production circuits, generating new territorial dynamics in South America. In this way, attention was focused on the Gran Chaco in terms of a cross-border space considered marginal, which became global and was increasingly used to guarantee the accumulation and circulation of capital. This perspective enabled a set of reflections that are presented below, centered around the continuities and discontinuities that organize the edges of the territories of Argentina and Paraguay in relation to agro-industrial territorial expansion.



Firstly, although there is consensus in pointing out that the expansion of the livestock and grain cultivation area (soybean and corn) explains the deforestation that affects the Gran Chaco, as could be shown for the study area, it is necessary to emphasize its integration and focus attention on the way in which these activities complement and disseminate each other. To this end, it is essential not to lose sight of the national and continental scales, which, although they exceed the scope analyzed, deeply condition their processes. It is inevitable, then, to highlight the particularities that the territorial network erected for the production of meat and grains adopts in each country, to then problematize its links in the cross-border space that makes up the Gran Chaco.

Secondly, it can be stated that, after having constituted a historical space of conflict between neighboring states, the segment of the border between Argentina and Paraguay located within the Gran Chaco today represents a resource that both agro-industrial corporations and governments of both countries seek to capitalize. This is due, on the one hand, to the identification of remaining territorial funds, which are valued by the growing global demand for their natural resources and, on the other hand to the influence exerted by the interior (and border) condition of the region, which favors the construction of territorial agro-industrial business networks and the transnational circulation of goods, services and information. This defines a framework in which strategies associated with the financialization of production take place; the translatinization of companies; and land grabbing.

However, the approach developed allowed to observe that although the province of Formosa and the departments of Boquerón and Presidente Hayes are subject to closely associated courses of productive transformation, the advance of the modern agrarian frontier, instead of promoting its physical connection, reinforces its fragmentation. This is because the circulation of goods is condensed in a few border points, located in the eastern end of the region, around the Paraguay River. In summary, the globalization process described, despite being supported by regional and cross-border integration mechanisms, deepens the scaffolding of a centrifugal transport network, whose destination is the regional and port centers of Argentina and Paraguay, crystallizing the role of Gran Chaco within the territorial division of labor organized by each of the countries. It can then be thought that it constitutes a doubly sacrificed zone, a marginalized space within state territorialities that is exploited to guarantee the dependent insertion of the South American metropolises into the world market.

Thirdly, in the study area, spatial homogenization based on deforestation and conversion of land to agricultural uses is combined with a growing heterogeneity of uses and users of the territory that dispute its resources: indigenous communities, peasants, Mennonite colonies (in Paraguay), agro-industrial producers and planting pools. In the Paraguayan portion, this diversity expands due to the growing presence of foreign capital (Asian and South American). A scenario dominated by verticalities is thus configured, in which it is necessary to reflect upon the social conflicts that emerge in contexts marked by inequality and exclusion.

Finally, it should be noted that the extractive advance on the Gran Chaco is not only driven by agribusiness - mining and hydrocarbon companies operate simultaneously. These activities also define productive fronts that put the sovereignty and survival of the population at

stake. These are forces and projects that require further investigation in order to describe their integration into the territorial dynamics that characterize the region. These productive fronts must be thought of as new bordering practices based on the interest and actions of corporations, which accelerate and direct the circulation of cross-border flows essential for their functioning (capital, information, inputs, transportation, marketing, etc.).

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