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LAND RIGHTS, BEEF COMMODITY CHAINS, AND DEFORESTATION DYNAMICS IN THE PARAGUAYAN CHACO

TENURE AND GLOBAL CLIMATE CHANGE (TGCC) PROGRAM

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ACRONYMS AND ABBREVIATIONS

ARP	*Asociación Rural del Paraguay*
CAR	*Cadastro Ambiental Rural*
EU	European Union
FAPI	*Federación por la Autodeterminación de los Pueblos Indígenas*
FMB	*Fundación Moisés Bertoni*
GAT	*Gente, Ambiente y Territorio*
GFW	Global Forest Watch
GRSB	Global Roundtable on Sustainable Beef
IA	Iniciativa Amotocodie
IDEA	*Instituto de Derecho y Economía Ambiental*
IFL	Intact Forest Landscapes
ILO	International Labor Organization
INDI	*Instituto Paraguayo del Indígena*
INFONA	National Forest Institute or *Instituto Forestal Nacional*
IWGIA	International Work Group for Indigenous Affairs
NGO	Non-Governmental Organization
PCI	*Pro Comunidades Indígenas*
Prodechaco	Proyecto de Desarrollo Sustentable del Chaco Paraguayo (Sustainable Development of the Paraguayan Chaco) project
SEAM	Secretariat of the Environment or *Secretaría del Ambiente*
SENACSA	*Servicio Nacional de Calidad y Salud Animal*
SFN	National Forest Service
SICAR	Cadastre and Registry Information System
SINASIP	*Sistema Nacional de Áreas Protegidas del Paraguay*
TFA 2020	Tropical Forest Alliance 2020
TL	Tierra Libre

TV	Tierra Viva
USAID	US Agency for International Development
WCS	Wildlife Conservation Society
WDPA	World Database on Protected Areas
WRI	World Resources Institute
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

Cattle ranching is expanding in the Paraguayan Chaco and has contributed to the degradation and loss of forests and associated ecosystem services there. Until the late 1880s, much of the Paraguayan Chaco was used by indigenous peoples; they now legally hold just a small fraction of their traditional land. Today, most land in the Paraguayan Chaco is private land, with a significant amount also in large public protected areas. Deforestation rates on private lands are considerably higher than on indigenous lands and lands in the public protected estate. As cattle production expands, the risk of more deforestation on private lands is high. Protecting the land rights of indigenous peoples could help secure their livelihoods and protect forests.

This report provides an assessment of the deforestation and land rights risks to meatpackers sourcing cattle from the Paraguayan Chaco, and identifies some possible approaches to addressing these risks. Given the significant losses over time, particular attention is paid to indigenous lands, including both lands that are now legally held by indigenous peoples and those that are claimed by indigenous peoples but are legally held by private landholders or the state. The Chaco has the greatest diversity of indigenous peoples in Paraguay, including the last uncontacted indigenous persons outside the Amazon. The Chaco covers 24,155 ha (250,000 km^2), or about 60 percent of Paraguay's land area; however, it is home to less than two percent of the country's population.

Extensive cattle ranching began in Paraguay in the 1960s. Over time, as the population in the Chaco has grown and international beef markets have expanded, previously (locally) powerful, but small-scale cooperative farm groups have transformed into much larger cattle agribusinesses. Furthermore, in the early 2000s, Brazilian and other foreign ranchers began to buy large tracts of land in the Chaco exclusively for livestock production, particularly because of the low price of land. The result has meant the transition of the Chaco in the minds of Paraguayans living in the capital or the eastern region from a distant wilderness to a region with significant economic influence, nearly all of which is concentrated in cattle-oriented agribusiness. The expansion of market-oriented agriculture (annual crops and cattle) incentivized enormous forest clearing.

Decades of unrestrained agricultural expansion, often at the expense of tropical and sub-tropical forests has made Paraguay one of the world's top exporters of soy (ranked fourth) and cattle (fifth). The remaining Atlantic forest has been lost to annual crop production (especially soybeans in a number of departments in the far east of the country), while the also biodiverse Gran Chaco, the second largest forest in Latin America after the Amazon, has been particularly hard-hit, losing nearly three million hectares (7.4 million acres) of forest – mostly to pasture – in the past ten years alone. Having moved through the south of Argentina and east of Paraguay with large-scale soy production and cattle ranching, agribusiness (in particular cattle ranching) has extensively expanded into the Chaco of western Paraguay.

The current pattern of land rights and tenure security in the Paraguayan Chaco has roots in land grants issued by the government in the 19th century. At the time, the Chaco was inhabited principally by indigenous peoples. In 1825, the government issued a decree mandating that all citizens present titles to the lands they occupy. Lands without titles, such as those held and used by indigenous peoples, were declared state property. The decree allowed the government to take "legal" possession of the Chaco, although it did not lead to an immediate occupation or use of this land. This all changed in the late 1800s. To pay for Paraguay's debt following its defeat in the 1865-70 War of the Triple Alliance with Uruguay, Brazil, and Argentina, the government sold large tracts of land to foreigners, mostly Argentines. These actions concentrated land holdings that are still present today.

Today, more than 95 percent of land in Paraguay is held as private property. In the Chaco, most land is privately owned, principally by individuals, corporations, and cooperatives. Some land is public land, such as land in the protected areas and the lands alongside roads and power lines. While estimates vary, a relatively small amount of land in the Paraguayan Chaco – likely less than five percent - is legally held by indigenous peoples (although they claim considerably more land). There are also a number of smallholder farmers living in the Chaco.

Based on World Resources Institute (WRI) calculations, the Paraguayan Chaco lost an average of 245,746 ha of forest/year between 2001 and 2014, for a total loss of 3,440,441 ha in this 14-year period from 2001-2014. This translates into an annual average deforestation rate of 1.4 percent, resulting in a 14 percent total decline of forest area in the Chaco. These figures are in general agreement with those provided by other researchers. More specifically, public protected areas experienced the lowest annual average rate of average deforestation rate of 0.3 percent/year from 2001-2014 and indigenous lands had an average deforestation rate of 0.6 percent/year. Private lands had the highest average deforestation rate at 1.5 percent/year.

The last decade has seen an enormous shift in the generally accepted standard of agricultural commodity sourcing standards. The global beef and leather industries are, however, arguably the least progressive among the major drivers of tropical deforestation, with neither a globally recognized certification or standard-setting body, and little uptake of basic sourcing criteria or global, time-bound commitments by major multinational players. The Global Roundtable on Sustainable Beef (GRSB) is relatively young and with little influence compared to the other major commodity roundtables (for example around timber, soy and palm oil), and is resistant to any verified certification or standard setting regime. While major grain and vegetable seed oil traders (Wilmar, Cargill, ADM, etc.) have made global commitments, the major meatpacking companies sourcing in the tropics have so far not done so.

As Paraguay's cattle exports are not primarily to higher value markets (e.g. the United States, European Union [EU], or Japan), there has been little history of promoting progressive criteria for social and environmentally monitored beef production. In general, the respective markets for Paraguay export beef determine the relatively small differences in sourcing criteria, and these correspond to price differences. The European market is both the smallest and most demanding of markets, requiring higher levels of traceability and animal welfare requirements, while Chile also requires documentation of the corral location as part of its requirements. Russia, the leading export destination of Paraguayan beef in most years, imposes very few criteria on imports beyond sanitary controls (such as foot and mouth disease regulations).

Apart from the portion of the market that requires corral coordinates, the present perception of risk and the relatively permissive regulatory environment discourages additional measures to connect supply chains to ranch locations or inquiries into the land tenure of sourcing areas. Investment in geospatial data for day-to-day operations is likewise limited (against the general trend in the agricultural world), and the land use and land ownership history is of little concern for cattle buyers. Disputed titles and indigenous claims and their related controversies tend not to weigh in sales contracts that are more concerned with volume and price.

Recognizing this context, three potential avenues for improvement are provided, including:

- Leveraging of existing cattle sector initiatives and best practices. Provided that sufficient incentives come into play, especially from major buyers in export markets, collaborative standard setting processes like the Carne Natural (natural beef) initiative and increased transparency of ranch locations and other geospatial data may set the stage for sourcing criteria and monitoring protocols to allow Paraguay to expand and secure its export market

destinations. A wide variety of improvements across government agencies and meatpackers would be required, but there is potential to raise standards.

- Pressure for the private sector to self-regulate. The proactive response of the private sector to a real or expected negative impact on exports and revenue suggests a potential avenue for risk reduction in other realms, namely the potential barriers of export market access that deforestation and violation of indigenous land rights may portend. Efforts by the private sector alone, or through pressure on the government may encourage greater efficiency and implementation of government policy, and even small improvements in data transparency can be helpful to a company seeking to reduce its risk.

- Data management and transparency by the beef sector and the government of Paraguay. A key element of an effective monitoring system involves data availability: ranch locations, accurate and legally sanctioned land use change data from the National Forestry Institute *(Instituto Forestal Nacional,* INFONA), comprehensive indigenous community locations and land claims (including those disputed or in process with the government or international legal system), environmental license data from the Secretariat of the Environment (*Secretaría del Ambiente*, SEAM), and property level data from the national cadaster.

1.0 INTRODUCTION

Cattle ranching is expanding in the Paraguayan Chaco. Beef production, especially by large cattle operations, has contributed to the degradation and loss of forests and associated ecosystem services. Up until the late 1880s, much of the Paraguayan Chaco was used by indigenous peoples although they now legally hold just a small fraction of their traditional land. Today, most land in the Paraguayan Chaco is private land with a significant amount of land also in large public protected areas. Deforestation rates on private lands are high, considerably higher than on indigenous lands and lands in the public protected estate. As cattle production expands, the risks of more deforestation on private lands is high. Protecting the land rights of indigenous peoples could help secure their livelihoods and protect forests.

This report provides an assessment of the deforestation and land rights risks to meatpackers sourcing cattle from the Paraguayan Chaco, and identifies some possible approaches to addressing these risks. Given the significant loss of indigenous land rights, particular attention is paid to indigenous peoples and their lands, both the lands that are legally held by indigenous peoples and those that are claimed by them but are now legally held by private landholders and the state. The Chaco has the greatest diversity of indigenous peoples in Paraguay, including the last uncontacted indigenous persons outside the Amazon.

The Gran Chaco (106,600,000 ha) is the largest biome in South America after Amazonia. The biome is divided between four countries - Argentina (62.19 percent), Paraguay (25.43 percent), Bolivia (11.61 percent), and Brazil (0.77 percent) where it connects with the Pantanal region.[1]

Figure 1: Gran Chaco (Source: https://upload.wikimedia.org/wikipedia/commons/7/7d/GranChaco Approximate.jpg)

The Gran Chaco is a hot, semi-arid lowland region of the Río de la Plata basin and comprises various habitats, from dry thorn forests and cactus stands to palm savannahs that are flooded during the wet season. The area is a biodiversity-rich biome, containing about 3,400 plant species, 500 birds, 150 mammals and 220 reptiles and amphibians, and is an important refuge for many migrating birds.[2]

The Paraguayan Chaco in the northwest part of the country covers the local government departments of Boquerón, Alto Paraguay and Presidente Hayes.

This area covers 24,155 ha (250,000 km^2) and constitutes about 60 percent of Paraguay's land area, but is home to less than 2 percent of the population. The Paraguayan Chaco borders Argentina along the Pilcomayo River in the west; Brazil over the mouth of Apa River to the southeast; Bolivia to the north; and the Paraguay River in the south.

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1 http://dapa.ciat.cgiar.org/is-the-paraguayan-gran-chaco-at-risk-for-extreme-habitat-destruction/

2 http://wwf.panda.org/what_we_do/footprint/agriculture/soy/soyreport/soy_and_deforestation/the_gran_chaco/

The Paraguayan Chaco is subdivided into the Alto Chaco (Upper Chaco) or Chaco Seco (Dry Chaco) - the western three-quarters of the region – and the Bajo Chaco (Lower Chaco) or Chaco Húmedo (Humid Chaco). The hills (less than 300 m) in the northwest are the highest parts of the Gran Chaco. The northwest is dry open forest and savanna while the southeast has wet seasonally flooded portions (the 1,500 km² Estero Patiño is the largest wetland in the country).

Historically, the Paraguayan Chaco was known as *tierra indígena*, and today remains the home of many indigenous peoples (indigenous persons make up 63 percent of the population of the Filadelfia Municipality in the Department of Boquerón[3]).[4] While many indigenous persons have integrated into non-indigenous society to varying extents, there remain a small number of indigenous persons living in voluntary isolation. While indigenous persons historically lived in and used much of the Paraguayan Chaco, little land has been formally recognized as theirs by the government.

The Gran Chaco has been gradually converted to other land uses over many decades, but the rate of conversion of natural vegetation has accelerated in recent years. Today, 12 to 15 percent of the biome has been converted into agricultural uses.[5] As controls have tightened on felling Atlantic forest remnants, particularly in Paraguay's eastern region (Región Oriental), pressure has intensified in the Chaco. Expanded investment in cattle ranching in the Paraguayan Chaco has accelerated deforestation and ecosystem degradation.[6]

Figure 2: Paraguay Departments (Source: https://en.wikipedia.org/wiki/Outline_of_Paraguay#/media/File:Un-paraguay.png)

This report aims to consolidate information that may help improve beef and leather supply chain management in the Paraguayan Chaco in ways that reduce deforestation and respect land rights, and to develop lessons and insights that can inform sector-wide improvements by the private sector for reducing deforestation through the Tropical Forest Alliance 2020 (TFA 2020). Similar issues have occurred in neighboring countries that were addressed through land regularization, transparency of land

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3 Personal communication – Filadelfia local government official, 16 December 2016

4 Alejandra M. Pero Ferreira, IFAD, Country Technical Note on Indigenous Peoples' Issues: Republic of Paraguay, IFAD (Nov. 2012) at 7, https://www.ifad.org/documents/10180/6f8cdf30-12a7-479a-9e02-aee9be26f784 .

5 http://wwf.panda.org/what_we_do/footprint/agriculture/soy/soyreport/soy_and_deforestation/the_gran_chaco/

6 https://paraguay.wcs.org/en-us/Wild-Places/Paraguayan-Chaco.aspx

holding, and other measures. For example, research shows that Brazil's environmental registry, *Cadastro Ambiental Rural* (CAR), has contributed to reducing deforestation rates in the Brazilian Amazon.

A central activity in this partnership is an assessment of deforestation and land rights-related risks in the beef supply chains in the Paraguayan Chaco.

This risk assessment report captures the principal findings of the research. It is organized into eight sections. Following this brief Introduction, a methods section outlines how the data and information were collected. This is followed by brief overviews of: cattle production; forests; and, land rights and tenure security in the Paraguayan Chaco. These overviews are followed by a section that examines the linkages between tenure and deforestation in the Paraguayan Chaco.

The following section provides possible interventions that can increase social and ecological sustainability of meatpacking operations while reducing or mitigating operational risks. It examines three broad buckets of approaches to reducing and mitigating deforestation and land rights risks: standards and practices; rules and regulations; and, monitoring for compliance.

2.0 METHODS

The data and information for this risk assessment were collected and analyzed using the following methods:

- Literature review. The WRI assessment team reviewed the literature in print and electronic formats on cattle production, deforestation, and land rights in the Paraguayan Chaco. The review included academic and scholarly articles as well as grey literature, such as reports by the Paraguayan government; multilateral organizations; development assistance; donor and lending agencies; local, national, and international civil society organizations; PhD dissertations; news articles in the media; and videos. The WRI team also reviewed literature on recently-developed approaches to mapping and assessing supply chain risks.

- Legal review. This was followed by a review of legislation relevant to cattle production, deforestation, and land rights in the Paraguayan Chaco. The effort involved reviewing the Paraguay Constitution, statutes, regulations, and court rulings, to the extent they were available. It also included reviewing relevant international conventions signed or ratified by Paraguay and ruling by international courts, such as the Inter-American Court of Human Rights. This included reviewing good quality translations of Paraguayan law and cross-checking the findings with articles and reports that reviewed and interpreted the legislation.

- Interviews. The WRI team conducted interviews of officials and leaders in national and local government; US Agency for International Development (USAID) and other development assistance agencies; the private sector (e.g., ranchers and meatpackers); local, national, and international civil society organizations; and, academics and scholars in Paraguay as well as country and subject matter experts in the US, Canada, and elsewhere (see Annex A). The two-person team from WRI - Ryan Sarsfield, Global Forest Watch-Commodities, Forests Program, and Peter G. Veit, Land and Resources Rights Initiative, Governance Center - met with experts individually and in groups. Interviews were conducted in person, by Skype or telephone, and by email. Discussions were conducted in English or Spanish, depending on the language preferred by the interviewee. WRI did not administer a formal survey, but focused the discussions on issues relevant to land rights and deforestation risks in the cattle sector in Paraguay.

- Site visits. The WRI team traveled to Paraguay twice to collect data and information for this assessment. The team first traveled to Asunción, Paraguay in September 2016, and returned in December 2016 for follow-up meetings in Asunción and to visit and meet with experts and key informants in the Chaco. In the Chaco, the WRI team visited the three main Mennonite colonies – Neuland, Filadelfia, and Loma Plata – and all three government departments in the Chaco. The WRI team also traveled to Toro Pampa in the far north on the border with Brazil to visit indigenous lands and cattle ranches.

- Geospatial data and GIS analysis. The WRI team assessed the availability and quality of geospatial information from Paraguay government agencies and from private individuals and organizations in country and outside. They also collected some geospatial information relevant to cattle production, indigenous land rights, and deforestation issues. These include shapefiles of: the boundaries of indigenous lands developed by the European Union-funded *Proyecto de Desarrollo Sustentable del Chaco Paraguayo* (Prodechaco); the location of indigenous homes and compounds from the 2012 National Population and Housing Census, provided to WRI by *Instituto Paraguayo del Indígena* (INDI); and, the protected areas from the World Conservation Monitoring Centre's

World Database on Protected Areas. Some preliminary GIS analysis was conducted using these shapefiles and the deforestation data on Global Forest Watch. Other shapefiles and databases, such as the land use plans in environmental licenses (for cattle operations and other enterprises) exist but are not in the public domain and, therefore, were not collected for this assessment.

3.0 CATTLE PRODUCTION IN THE PARAGUAYAN CHACO

3.1 GENERAL INFORMATION AND BRIEF HISTORY

The story of cattle ranching in the Paraguayan Chaco parallels the story of the non-indigenous settlement of the Chaco. Even now, ranching remains the primary non-forest land use and economic activity by non-indigenous people over an area greater than half of the country, and future development plans likewise focus on further expansion of the cattle industry.

Extensive cattle ranching began in the 1960s. Over time, as the population in the Chaco has grown and international beef markets have expanded, previously (locally) powerful, but small-scale cooperative farm groups have transformed into much larger cattle agribusinesses.[7] Furthermore, in the early 2000s, Brazilian and other foreign ranchers began to buy large tracts of land in the Chaco exclusively for livestock production, particularly because of the low price of land.[8] The result has meant the transition of the Chaco in the minds of Paraguayans living in the capital or the eastern region from a distant wilderness to a region with significant economic influence, nearly all of which is concentrated in cattle-oriented agribusiness.

3.2 NATIONAL STRATEGY

The political posture of the current Paraguayan government appears to be strongly pro-development towards agribusiness generally, and cattle production and expansion in the Chaco specifically. Paraguay's National Development Plan for 2030 considers productivity and competitiveness of beef production to be a focal area for the country's agricultural policy[9]. Given Paraguay's relatively small population, export markets (and their associated price premiums) remain a major focus for the cattle industry, and there is an awareness of the risks of relegation to lower-value markets (relative to other beef exporting countries). The awareness of the importance of environmental and social reputational risks as a determinant of market position and share in the future is currently limited, but will likely grow given international brands' increasing commitments to deforestation-free commodity production.[10]

3.3 CATTLE PRODUCTION CHAINS

Cattle production in Paraguay, unlike timber, annual crops, and even other animal protein industries, involves a multi-stage production and supply chain. Whereas soybean production concerns only the field

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7 Inter-American Court of Human Rights, Xákmok Kásek Indigenous Community v. Paraguay, Judgment of Aug. 24, 2010, ¶58, http://www.corteidh.or.cr/docs/casos/articulos/seriec_214_ing.pdf; Marcellus M. Caldas et al., *Land-Cover Change in the Paraguayan Chaco: 2000-2011*, Journal of Land Use Science (2015), http://125.235.8.196:8080/dspace/bitstream/CEID_123456789/32929/5/Journal%20of%20Land%20Use%20Science%201%20-%2018.pdf.

8 FAO, The Land Market in Latin America and the Caribbean 13 (2012), http://www.fao.org/3/a-i4172e.pdf.

9 http://www.stp.gov.py/pnd/wp-content/uploads/2014/12/pnd2030.pdf

10 http://www.supply-change.org/commodity/cattle

of harvest, cattle may be born on one ranch, sold to another rancher, and fattened and "finished" elsewhere prior to a final sale to a slaughterhouse. Unlike the feedlot system common in the United States, most Paraguayan production remains pasture-raised by default, with only 12 to 15 percent finished (i.e. fattened for slaughter) on grain.[11] This system creates numerous difficulties for tracking and tracing the origin of any one animal, and often involves the channeling of production from smaller, informal producers into the formal market via larger producers and finally to a small number of slaughterhouses. Meatpackers are by nature flexible and variable in their supplier connections; the broader landscape in which these companies may be sourcing from is generally far beyond their current footprint. This complex supply chain and lack of long-term supplier-buyer fidelity create significant difficulties in establishing clear connections and traceability between the cattle production landscape and slaughterhouses.

3.4 CATTLE PRODUCERS IN THE CHACO

There is a lack of comprehensive information about the various companies operating in the Chaco, making the extent of their involvement in deforestation or conflicts with indigenous land claims difficult to ascertain. However, a few key actors can be identified.

As the default (non-forest) land use in Paraguay, cattle production takes place at multiple levels and ranges from smallholders who may produce a handful of calves every year, to larger ranches that produce cattle but which are not strictly commercial concerns, to even larger corporate entities and vast cattle-focused ranches across a range of sizes and capitalization. Furthermore, ranching is the traditional status symbol (and often secondary) economic activity of wealthy Paraguayans. Cattle may be sold among any of these entities, often more than once within the lifetime of a single animal. Given the concentration of land in relatively few hands in Chaco, production volumes are skewed towards a smaller number of very large producers.

The Argentinian company Carlos Casado S.A. has long controlled vast areas of the Chaco and is still active in Paraguay. It reports that it sold its 400,000 hectares along the Paraguay river and is acquiring new land in Boquerón; its parent company Grupo SanJose reports it currently has 254,000 hectares in the Paraguayan Chaco.[12] This includes 45,000 hectares on which subsidiary Parsipanny Corp. S.A. is engaged in stock-breeding.[13] Other company sources suggest that the company also recently acquired 117,307 hectares in conjunction with Brasilagro/Cresud S.A. via the joint venture Cresca S.A., for a combined agricultural and livestock project.[14] Activist groups have been vocal critics of Carlos Casado S.A., claiming it has contributed to deforestation on Ayoreo land and is endangering tribes in voluntary isolation.

Brazilian and other non-Paraguayan ranchers have acquired sizable tracts of land in the Chaco. A prominent example includes Yaguareté Porã Ltd, which has also been particularly criticized for clearing

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[11] https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Annual_Buenos%20Aires_Paraguay_8-22-2016.pdf

[12] Carlos Casado S.A., Farming and Livestock Breeding, last accessed Sept. 6, 2016, http://carloscasadosa.com/en/stockbreeding/; Grupo SanJose, Carlos Casado, last accessed Sept. 6, 2015, http://www.grupo-sanjose.com/english/carlos_casado.php

[13] Grupo SanJose, Activity Report: 2015, http://www.grupo-sanjose.com/data/pdf/1468492674_1645605322.pdf

[14] Quarterly Information – ITR, BrasilAgro, Mar. 31, 2016, at 15, http://www.brasil-agro.com/brasilagro2011/web/conteudo_en.asp?idioma=1&conta=44&tipo=44630&id=0&submenu=0&img=0&ano=2016; Carlos Casado S.A., Cresca S.A. (Feb. 2012), http://carloscasadosa.com/en/news/article.php?cresca-sa-agreement-with-cresud-7; BrasilAgro, News, Dec. 16, 2013, http://www.brasil-agro.com/brasilagro2011/web/conteudo_en.asp?idioma=1&tipo=36929&conta=44&id=185769 .

indigenous land. [15] The Mennonites have continued to expand their operations, leading to conflicts with indigenous communities.[16] Tranquilo Favero, a Brazilian whose company is dominant in soy production in Eastern Paraguay, also owns 615,000 acres in the Chaco.[17] Some of the Carlos Casado S.A. land was sold to the Korean Unification Church (known as the Moonies), and although some of this was expropriated following the group's failure to fulfill development promises, it still holds 240,000 hectares under unclear use.[18]

Given the incomplete and often poor quality of land ownership data available publicly via government sources (see below), a systematic account of land holdings is no simple task. However, local understanding of land ownership is usually quite comprehensive as to who the relevant parties may be in control of nearby tracts of land.

3.5 MEATPACKERS

A relatively small number of meatpackers dominate the meatpacking sector in Paraguay, and their concentration of about a dozen plants in three general locations (the vicinity of Filadelfia, Concepción, and the vicinity of Asunción) create a competitive convergence in pricing, whereby prices offered by each plant tend to be quite similar and slight variations in pricing often determine a rancher's sale to one plant or another.

The Mennonite-founded cooperative meatpackers include Neuland, Chortitzer (Menno Colony), and Frigochaco (of the Fernheim Cooperative). The Brazilian multinationals JBS and Minerva are both significant players in Paraguay, and local meatpackers Concepción, Frigonorte, and Guaraní are also major buyers.

3.6 MARKETS

Paraguay currently exports to a variety of international markets, with the top three buyers – Russia, Chile, and Brazil – accounting for 65 to 80 percent of the total exports in the last three to four years. Of the three, Chile offers the highest price per kilo, while Russia the lowest.[19] In terms of future projections, "In 2017 Paraguay is projected to continue exporting primarily to Chile, the Russian Federation and Brazil, but it will seek to expand further beef exports to Middle East and Asian countries such as Taiwan [….], Egypt, Iraq, Iran, and Qatar. [….], Exports to Vietnam have increased in 2016, but exports to Hong Kong have dropped quite significantly. The Chinese market continues to be closed due to diplomatic issues. Exports to the EU are also expected to continue, especially fulfilling the 1,000 ton (product weight) Hilton Quota."[20]

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15 Survival International, Submission to the Committee on the Elimination of Racial Discrimination, Aug. 2016, at 12 (May 31, 2016), http://tbinternet.ohchr.org/Treaties/CERD/Shared%20Documents/PRY/INT_CERD_NGO_PRY_24123_E.pdf.

16 Forest Peoples Programme, Security Forests, Securing Rights 94 (Mar. 2014) http://www.forestpeoples.org/sites/fpp/files/private/publication/2014/09/prreport.pdf

17 Simon Romero, "Vast Tracts in Paraguay Forest Being Replaced by Ranches," N.Y.Times, Mar. 24, 2012, http://www.nytimes.com/2012/03/25/world/americas/paraguays-chaco-forest-being-cleared-by-ranchers.html

18 Land Matrix, Paraguay, last accessed Sept. 6, 2016, http://www.landmatrix.org/en/get-the-detail/by-target-country/paraguay/?order_by=&starts_with=P.

19 https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Annual_Buenos%20Aires_Paraguay_8-22-2016.pdf

20 Ibid.

4.0 FORESTS IN THE PARAGUAYAN CHACO

4.1 PARAGUAY'S FOREST AND AGRICULTURAL CONTEXT

Paraguay's native forests once covered nearly the entire country, and ranged from dense wet tropical forests of the eastern region (considered to be part of the Atlantic Forest biome), to the dry and scrubby Chaco in the west, with considerable variation across the country in forest type, density, and species composition. Given Paraguay's low population density and reliance on small-scale subsistence agriculture in the countryside, these forests largely remained standing through the mid-20th century, with forests covering significant remnants of Atlantic forest and most of the Chaco. Recently, however, the expansion of market-oriented agriculture (annual crops and cattle) has incentivized enormous forest clearing.

Decades of unrestrained agricultural expansion, often at the expense of Paraguay's tropical and sub-tropical forests, has made Paraguay one of the world's top exporters of soy (ranked fourth) and cattle (fifth). The remaining Atlantic forest has been lost to annual crop production (especially soybeans in a number of departments in the far east of the country), while the biodiverse Gran Chaco, the second largest forest in Latin America after the Amazon, has been particularly hard-hit, losing nearly three million hectares (7.4 million acres) of forest in the past ten years alone, mostly to pasture. Having moved through the south of Argentina and east of Paraguay with large-scale soy production and cattle ranching, agribusiness (in particular cattle ranching) has expanded extensively into the Chaco.

4.2 DEFORESTATION DYNAMICS

While Paraguay as a whole has among the highest deforestation rates in the world – and is too often overlooked by the international media and environmental advocates in favor of the Brazilian Amazon or Indonesia – the Paraguayan Chaco has astronomical rates of tree cover loss, due almost entirely to the expansion of cattle ranching. In the three *departamentos* that compose the Paraguayan Chaco, between 2001 and 2014, 17 percent of forest cover was lost in Alto Paraguay, 14 percent in Presidente Hayes, and an astounding 24 percent in Boquerón, according to the University of Maryland analysis of Landsat data on Global Forest Watch.[21] The total loss in the Paraguayan Chaco alone is nearly 3.5 million hectares, more than the entire land area of the Netherlands.

A particularly glaring shift in the status of Paraguay's forests is revealed by a recent paper looking at the reduction in "Intact Forest Landscapes" (IFL) i.e. large expanses of contiguous and relatively undisturbed forest (see Figures 3 and 4). No country with significant extent of IFLs, and no tropical forest country, was anywhere close to Paraguay's loss over the period 2000 - 2013[22]. The paper warns, "Assuming that the loss of IFLs continues at the average rate between 2000 and 2013, Paraguay, Laos, Cambodia, and Equatorial Guinea will lose their entire IFL area during the next 20 years."

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21 Global Forest Watch. 2014. World Resources Institute. www.globalforestwatch.org.

22 Potapov, Peter, et al. "The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013." *Science Advances* 3.1 (2017): e1600821.

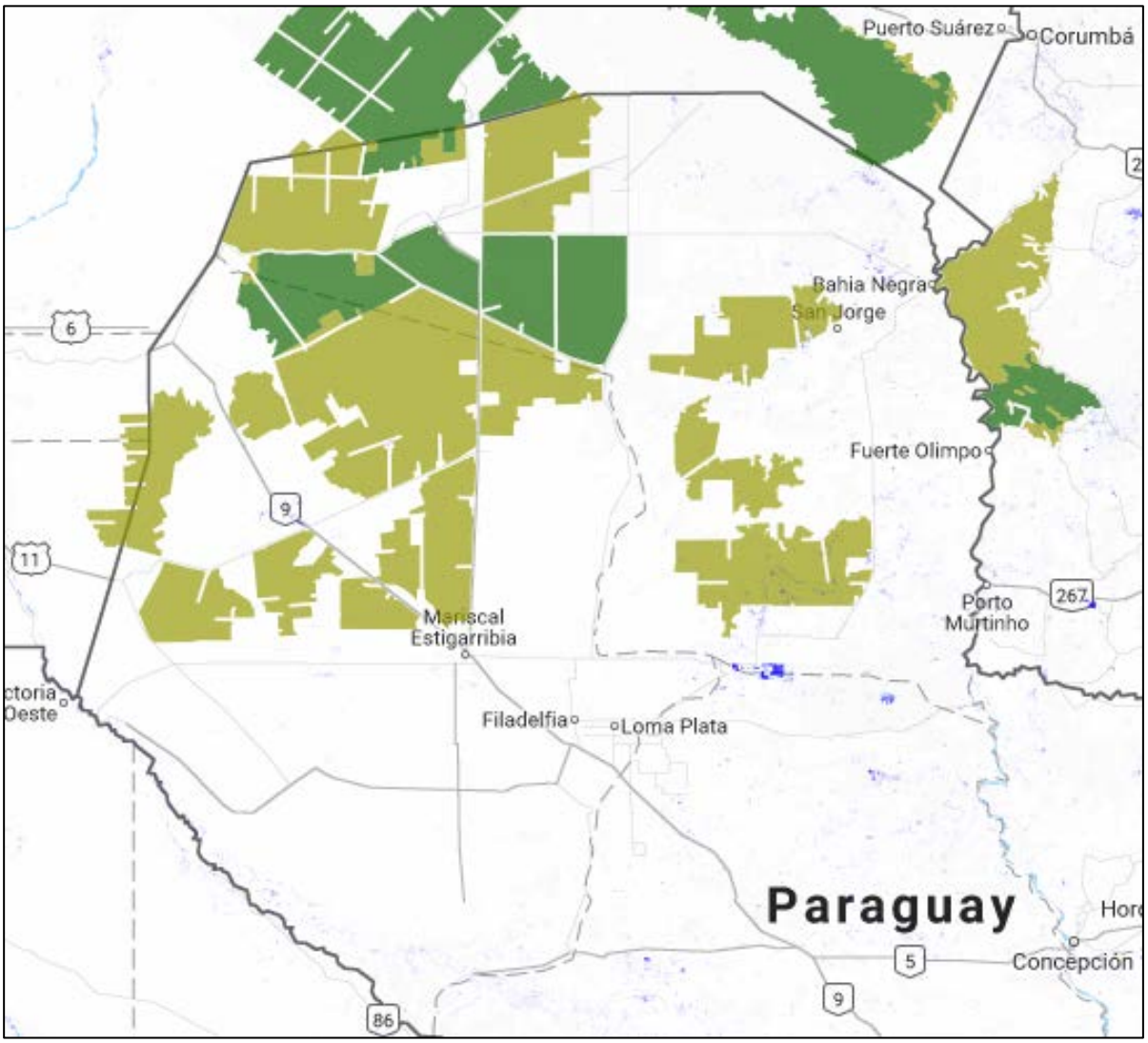

Figure 3: IFLs between 2000 and 2013 Note that the light green illustrates areas formerly considered "intact" forest but that have since experienced degradation and deforestation. The remaining IFLs are in dark green. [Source: Global Forest Watch]

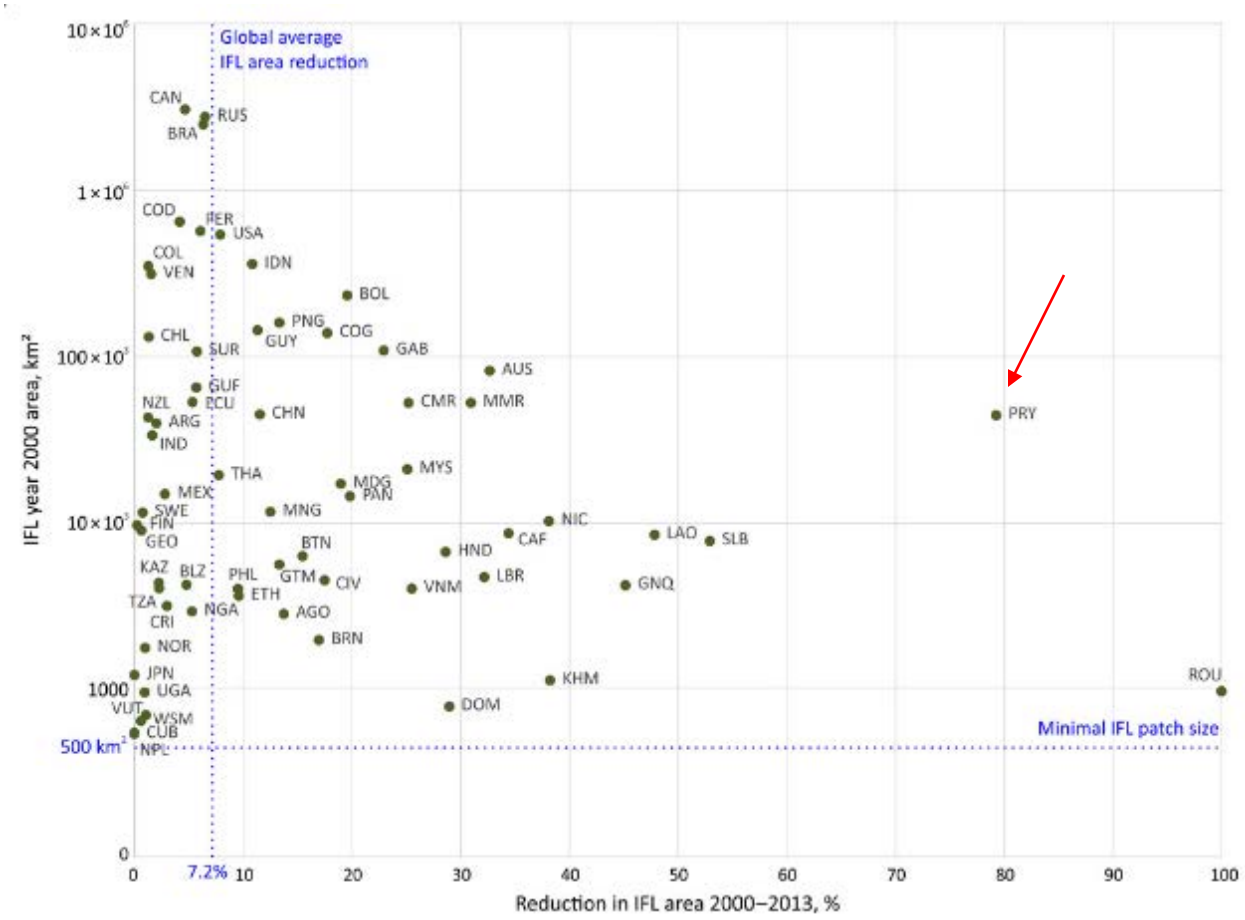

Figure 4: The percent reduction in extent of IFLs by country, relative to the total intact forest landscape area in 2000. (Note Paraguay (PRY) as a solitary point in the upper right [with red arrow added in this report for clarity]., having lost more of its intact forest landscape than any other country with significant intact forest landscapes (Potapov et al.,, 2017).)

4.3 DRIVERS OF DEFORESTATION

Cattle ranching is the primary cause of deforestation in the Paraguayan Chaco.[23] The region lacks good soils, is arid and hot, and has little road or other infrastructure, creating conditions that are unfavorable to row crop agriculture. Soybean cultivation has not been common as it is in eastern Paraguay, and other agricultural activities declined as the cattle industry took off.[24] Experimental plots of more resistant soybean varieties are currently being evaluated for suitability, aided by technicians of the US Department of Agriculture.[25]

Deforestation has been occurring in the Chaco central region since the 1940s, due to extensive mechanization processes by the Mennonite communities in that region. [26] However, since the 2000s,

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23 Caldas et al., *supra* note 7.

24 Caldas et al., *supra* note 7.

25 http://www.ultimahora.com/experimentan-variedad-soja-local-el-chaco-n1048958.html

26 María Fátima Mereles & Oscar Rodas, *Assessment of rates of deforestation classes in the Paraguayan Chaco (Great South American Chaco) with comments on the vulnerability of forests fragments to climate change*, CLIMATIC CHANGE 60 (2014), http://link.springer.com/article/10.1007/s10584-014-1256-3.

land use change has intensified in other parts of the Chaco, such as the department of Alto Paraguay, where Brazilian investors are interested in meat production.[27] Large deforested plots predominate in the Paraguayan Chaco, and increased in size between 1976 and 2012. This suggests that large land holdings with a high level of mechanization are the primary deforestation actors.[28] The pattern of land use change is striking when viewed on the map; unlike areas of the world with fallow agriculture or the "fishbone" road network driven patterns of loss, the Chaco features vast geometric swaths of carefully surveyed forest removal, corresponding to the highly concentrated patterns of land use authority. Rather than tens or hundreds of thousands of small farmers clearing at the margins of their properties, there are relatively few individuals clearing vast areas of land, virtually all of it to produce beef and leather.

One survey tracking forest loss through 2001 found relatively moderate forest loss in the Chaco (9.8 percent and 6.4 percent forest loss in the Humid Chaco and Chaco ecoregions, respectively), except for near the major population center of Filadelfia, which had high deforestation rates.[29] But through the 2000s, this has changed: while in Eastern Paraguay there has been significant slowdown in deforestation since 2004, deforestation accelerated in the late 2000s in the Chaco, such that by mid-2009, 19.2 percent of the whole Chaco region had been converted from forest to pasture.[30] Similarly, while cropland and pastureland expansion in the broader Latin American region slowed after 2007, as of 2013 no such slowdown occurred in the Paraguayan Chaco, where high deforestation rates continued.[31]

Ecological consequences of deforestation in the Chaco include wind erosion, the formation of sand dunes, and soil salinization.[32] With the reduction of forest cover, there has been an increase of invasive species, as well as an increased risk of extinction of some endangered plants alongside wildlife habitat reduction.[33]

4.4 INSTITUTIONAL AND LEGAL BACKGROUND

The two primary governmental institutions which regulate deforestation in the Chaco are the National Forestry Institute (INFONA) and the Secretariat of the Environment (SEAM). SEAM is responsible for overseeing environmental regulation: an environmental impact assessment process and issuance of an environmental license is required by the Environmental Impact Assessment Act, which has a broad scope covering most economic activities.[34] Non-compliance with the licensing requirement means that the property may be considered an unproductive *latifundio* (large landholding) and subject to

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27 Mereles & Rodas, *supra* note 26, at 60.

28 Maria Vallejos, "Transformation Dynamics of the Natural Cover in the Dry Chaco Ecoregion," *Journal of Arid Environments* (2015), http://www.sciencedirect.com/science/article/pii/S0140196314002420.

29 R.G. Townshend et al., *Assessment of Paraguay's Forest Cover Change using Landsat Observations*, GLOBAL & PLANETARY CHANGE 10 (2009), https://www.researchgate.net/profile/Angel_Yanosky/publication/223543036_Assessment_of_Paraguay's_forest_cover_change_using_Landsat_observations/links/541342cb0cf2788c4b3594ec.pdf .

30 Alberto Yanosky, *Paraguay's Challenge of Conserving Natural Habitats & Biodiversity with Global Markets Demanding for Products*, CONSERVATION BIOLOGY 115-16 (2013), http://observatoriosoja.org/wp-content/uploads/2015/03/14_Yanosky_Voices_from_the_Tropics_2013.pdf .

31 Jordan Graesser et al., *Cropland/ pastureland Dynamics and the Slowdown of Deforestation in Latin America*, ENVIRONMENTAL RESEARCH LETTERS 8, http://iopscience.iop.org/article/10.1088/1748-9326/10/3/034017/pdf .

32 Mereles & Rodas, *supra* note 26, at 60.

33 Mereles & Rodas, *supra* note 26, at 67-68.

34 *See generally* Law 294/93

expropriation.[35] Failure to obtain permits is generally an administrative matter, but criminal prosecutions for environmental crimes may also be brought under the relevant laws (although critics argue such sanctions are weak).[36]

INFONA was established in 2008, replacing the National Forest Service (SFN) as the primary institution responsible for the administration, promotion, and sustainable development of forestry resources.[37] INFONA approves land use plans that involve the conversion of forested land to land for livestock.[38] The institute is also responsible for forest management, although it has not yet established a strong forest management system.[39] INFONA has responsibility for implementing laws related to the forestry sector, but the delineation of responsibilities between SEAM and INFONA is not always precise: both institutions have issued regulations regarding forest protection.[40] In practice, both sets of regulations are relevant, since enterprises which clear forest land for livestock projects must obtain approval from both SEAM and INFONA.

A landowner seeking formal permission to deforest his or her land for agricultural use must obtain an environmental license from SEAM, which will review the property for certain legal criteria (legal status, overlap with protected areas, indigenous communities) and consider the likely environmental impact and appropriate steps to mitigate these impacts. In the case of the presence of an indigenous community, a public audience (*audiencia pública*) is required for the process to continue, though it is unclear how often this process is invoked.[41] Once a license is granted, the permission to deforest is requested of INFONA, which generally grants the licenses for the Chaco given the legal sanctioning of forest clearing in the west of the country. Subsequently, INFONA monitors forest loss across the country and may evaluate individual properties for non-permitted forest loss, but its enforcement capacity is quite limited, as is its technical capacity for monitoring on a systematic and ongoing basis. The institute does not systematically review forest loss in indigenous lands, nor does it have cartographic resources indicating where those lands are located.

In the eastern region of Paraguay (i.e. east of the Paraguay river), a zero deforestation law has been in effect since 2004 (Ley 2524/04), though enforcement is minimal and much of the remaining forest has since been cleared. This law was subsequently extended until 2018 when it will be reviewed.

The Forestry Law requires that 25 percent of rural properties in forest zones must be kept as natural forest.[42] This law applies nationally, and is taken into consideration during the process of permitted deforestation in the Chaco. Rural properties over 20 hectares must retain 25 percent *of the natural forest area* on the property, as it stood on December 17, 1986. If the land is deforested without permission, the owner must reforest the land to an area equivalent to five percent of the surface of the

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35 Sheila Abed, Paraguay, *in* THE ROLE OF THE JUDICIARY IN ENVIRONMENTAL GOVERNANCE, Louis J. Kotzé & Alexander R. Paterson, eds., 302 (2009).

36 *Id.* at 306-307; Global Forest Coalition, Country Monitoring Report on Paraguay 19 (2008) http://globalforestcoalition.org/wp-content/uploads/2010/11/Im-Report-Paraguay1.pdf.

37 Art. 4 of Law 3464/08 ("El INFONA tendrá por objetivo general la administración, promoción y desarrollo sostenible de los recursos forestales del país, en cuanto a su defensa, mejoramiento, ampliación y racional utilización.")

38 *See* Law 422/73; SFN Resolution N. 224/01.

39 Mansourian et al., *supra* note 45.

40 Art. 5 of Law 3464/08 ("El INFONA será el órgano de aplicación de la Ley N° 422/73. y las demás normas legales relacionadas al sector forestal.")

41 SEAM official, personal communication, December 13, 2016.

42 Art. 42 of Law 422/73

property.[43] Decree 18831/86 provides additional regulations, including that 100 meter strips be left between cleared land parcels of 100 hectares.[44]

Previously, these provisions were undermined by loopholes in the Forestry Law and were prone to abuse. Some landowners, after leaving 25 percent of their land forested, transferred that land to another owner, who would then clear another 75 percent of the remaining land.[45] Similarly, the Forestry Law only required that five percent of improperly cleared land be reforested, providing a possible incentive for violating the law. However, these problems were largely fixed by SEAM Resolution N. 531/2008, which clarified that where deforestation portions were sold, they must be reforested up to 25 percent of the *original* forests on the property as of December 17, 1986.[46] The Resolution also clarified that failure to fulfill obligations must be compensated by reforesting with native species or acquiring certifications of environmental services, which can be bought from landowners who exceed the 25 percent minimum requirement.[47]

Sanctions for violations of forestry regulations are limited in practice.[48] Similarly, as has been noted in the context of indigenous consultation for the issuance of environmental permits, the permitting process has not been sufficiently rigorous, and revocations of permits by the court have not been respected in at least one instance.[49] By contrast, the 25 percent requirement is now "followed scrupulously."[50] But decision-making regarding the manner in which 25 percent of forested land is preserved during ranching is left to the rancher, and beyond this there is little coordinated management or oversight regarding land use in the Chaco more generally.[51] Adherence to the legal requirement does not necessarily translate into proper consideration for effective forest preservation.

INFONA imposes additional requirements that must be met to obtain approval of land use changes. INFONA Resolution 1136/11, after noting the problem of deforestation for cattle ranching in the Chaco, requires that changes to land use for livestock activities must be in accordance with a silvopastoral system. The minimum number of standing trees per hectare wis determined in accordance with the original forest density of the land under the use plan, with a minimum of 30 percent of the total number of trees originally inventoried.[52] The regulation also requires that for properties in the Chaco

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43 "Todas las propiedades rurales de más de veinte hectáreas en zonas forestales deberán mantener el veinticinco por ciento de su área de bosques naturales. En caso de no tener este porcentaje mínimo, el propietario deberá reforestar una superficie equivalente al cinco por ciento de la superficie del predio." Art. 42 of Law 422/73; *see also* SEAM Resolution N. 531/08.

44 Art. 5 of Regulatory Decree 18831/86 ("Prohíbase los desmontes sin solución de continuidad, en superficies mayores de 100 (cien) hectáreas, debiendo dejarse entre parcelas, franjas de bosque de 100 (cien) metros de ancho como mínimo.")

45 Stephanie Mansourian et al., A Comparison of Governance Challenges in Forest Restoration in Paraguay's Privately-Owned Forests & Madagascar's Co-managed State Forests, FORESTS (2014), http://www.mdpi.com/1999-4907/5/4/763/forests-05-00763.pdf

46 UNDP Paraguay Project Document, ¶42, http://www.undp.org/content/dam/undp/documents/projects/PRY/PIMS%204836%20LD%20BD%20Paraguay%20Green%20Production%20Landscapes%20ProDoc.docx

47 *Id*.; Becca Madsen et al., State of Biodiversity Markets 32 (2010), http://www.forest-trends.org/documents/files/doc_2411.pdf

48 De Waroux et al, *supra* note 54.

49 Art. 18 of Law 904/81; U.N. Human Rights Council, Report of the Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, A/HRC/30/41/Add.1, 13 August 2015, at ¶19..

50 Yanosky, *supra* note 30 pg 117-18

51 Yanosky, *supra* note 30 pg 117.

52 "Establecer, que los cambios de Uso de la Tierra para la actividad Ganadera se realicen con el Sistema Silvopastoril, en el cual el número mínimo de arboles en pie por hectáreas sera determinado de acuerdo a la densidad original del bosque

exceeding 2,000 hectares, more than 25 percent of the authorized area cannot be cleared per year. This percentage is further lowered where the land is within a specified proximity to protected forest areas, rivers, etc.[53]

Environmental management plans for the Chaco designed by SEAM (in partnership with civil society) include non-binding recommendations that trees in certain areas should not be removed.[54] Initiatives to establish a Chaco Environmental System and land management plans in the Chaco have also been created, although monitoring and implementation is a significant problem.[55] A law to promote reforestation was enacted in 1995, offering significant government financial support for reforestation projects, but the Government has not had sufficient financial resources to maintain these programs.[56]

Under the old Agrarian Statute, natural forests could be considered unproductive *latifundio* (large landholdings) and could accordingly be expropriated as such, providing a perverse incentive for deforestation in a speculative manner, as landholders attempted to guard their land against expropriation.[57] Under the 2002 Agrarian Statute, however, natural forests are not included when calculating the percentage of a property that is unproductive.[58] This is a positive change, but it may not be entirely effective in practice: speculation is high and land is still cleared to justify its use.[59]

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bajo Plan de Uso, considerando como minimo el 30% de la cantidad total da número de arboles sobre el inventario realizado." Art. 1 of INFONA Resolution 1136/2011.

53 Art. 2 of INFONA Resolution 1136/2011.

54 De Waroux et al., Land-Use Policies & Corporate Investments in Agriculture in the Gran Chaco & Chiquitano, PNAS (2015), http://www.pnas.org/content/113/15/4021.full.

55 Forest Carbon Partnership, Readiness Preparation Proposal for Reducing Emissions from Deforestation and Forest Degradation, June 9, 2014, at 11.

56 Mansourian et al., *supra* note 45

57 *Id.*

58 Art. 10 of Law 1863/02.

59 Lovera, *supra* note 74.

5.0 LAND RIGHTS AND TENURE SECURITY IN THE PARAGUAYAN CHACO

5.1 BRIEF HISTORY OF LAND RIGHTS IN THE PARAGUAYAN CHACO

The current pattern of land rights and tenure security in the Paraguayan Chaco has roots in land grants issued by the government in the 19th century. At this time, the Chaco was inhabited principally by indigenous peoples. In 1825, the government issued a decree mandating that all citizens present titles to the lands they occupy. Lands without titles, such as those held and used by indigenous peoples, were declared state property. The decree allowed the government to take "legal" possession of the Chaco, although it did not lead to an immediate occupation or use of this land.[60]

This all changed in the late 1800s. To pay for Paraguay's debt following its defeat in the 1865-70 War of the Triple Alliance with Uruguay, Brazil, and Argentina, the government sold large tracts of land to foreigners, mostly Argentines. These actions concentrated land holdings that are still present today.[61] Two-thirds of the Chaco was sold on the London Stock Exchange in the late 1880s.[62] Argentinean banker, Carlos Casado, acquired 5,635,000 ha and the Carlos Casado company remains a prominent landholder in the region today.[63] As a result, Paraguay's economy was essentially controlled not by a local landed elite, but by foreign companies. Many Paraguayans grew crops and worked as wage laborers on these foreign-owned *latifundios* (large landholdings).[64]

The government sold more land to pay for reparations and to promote colonization as a security measure after the 1932-35 Chaco War with Bolivia, which was fought in large measure over possible oil deposits in the Chaco.[65] Land grants were given to European settlers - British, German, Italian, and Spanish, as well as Mennonites from Russia, Canada, and elsewhere. The Mennonites began settling in the Chaco in the 1920s and 1930s to both bolster the population and develop the local economy.[66] The influx of settlers resulted in the displacement of many indigenous people in the Chaco.[67] Increasingly,

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60 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

61 The Never-Ending War, Dec. 19, 2012, THE ECONOMIST, http://www.economist.com/news/christmas/21568594-how-terrible-little-known-conflict-continues-shape-and-blight-nation.

62 Caldas et al., *supra* note 7

63 Valentina Bonifacio, *Meeting the Generals*, ANTHROPOLOGICA (2013), https://www.researchgate.net/publication/284189879_Meeting_the_Generals_a_political_ontology_analysis_of_the_Paraguayan_Maskoy_struggle_for_land.

64 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

65 Inter-American Court of Human Rights, Sawhoyamaxa Indigenous Community v. Paraguay, Judgment of Mar. 29, 2006, ¶73(3), http://www.corteidh.or.cr/docs/casos/articulos/seriec_146_ing.pdf.

66 Caldas et al., *supra* note 7 and http://gosouthamerica.about.com/cs/southamerica/a/ParMennonites.htm

67 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

indigenous peoples became workers on the large agri-business estates (including the Mennonite estates), becoming more sedentary but also continuing some of their traditional subsistence activities.[68]

From 1954 to 1989, Paraguay was ruled by General Alfredo Stroessner and his Colorado Party (which remained in power after his exile until 2008).[69] Despite a commitment to land reform (particularly on behalf of smallholder farmers [*campesinos*]), during the 35 years of the Stroessner regime, eight million ha of state-owned land (20 percent of the total land) was given away or sold at negligible prices primarily to military officials, civilian supporters, foreign corporations, and other allies (these allocations were in addition to the land sales following the War of the Triple Alliance and the Chaco War).[70] Other analysts have argued that as many as 10 million ha (25 percent of Paraguay's land) was allocated by Stroessner.[71] Smaller lots were granted to local Colorado Party leaders to build grassroots support for the regime in the rural areas.[72] The dispossession of indigenous peoples was a fundamental part of Stroessner's policy.[73] Overall, during the 54-year rule of the Colorado Party (1954-2008), 75 percent of the land in the Chaco was privatized, most for the establishment of cattle ranches (*estancia*).[74]

Box 1: The Mennonites in Paraguay

Mennonite settlers came to Paraguay from Germany, Canada, Russia, and other countries for various reasons, including religious freedom, the opportunity to practice their beliefs, and abundant land. In 1921, the government passed a law which allowed the Mennonites to essentially create a state within the state of Boqueron where they had the right to administer their own educational, medical, social organizations and financial institutions. Although German immigrants had settled in Paraguay before the turn of the 20th century, it was not until the 1920s and 30s that several thousand Mennonites arrived. Many immigrants from Russia were fleeing from the ravages of the Bolshevik Revolution and later the Stalin repressions. They traveled to Germany and to other countries, and eventually joined the emigration to Paraguay.

In 2014, there were about 40,000 Mennonites in Paraguay with about half in the Chaco. The Central Chaco region probably has the highest concentration of ethnic Mennonites anywhere in Latin America, comprising 32 percent of the total population of the Central Chaco as of 2005. Mennonites live in 19 colonies as well as Asunción. About 25 percent of the Mennonites in Paraguay came directly from Russia, 51 percent from Russia via Canada, and 22 percent from Russia via Mexico (some from Mexico via Belize). Another 2 percent are descendants of Amish immigrants from the United States, who came originally from Switzerland and southern Germany.

Sources:
http://gosouthamerica.about.com/cs/southamerica/a/ParMennonites.htm and http://gameo.org/index.php?title=Paraguay&oldid=122621

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68 Sawhoyamaxa Judgment, *supra* note 65, at ¶73(4).

69 Timeline: Paraguay, July 3, 2012, BBC, http://news.bbc.co.uk/2/hi/americas/country_profiles/1224216.stm and https://www.theguardian.com/global-development/2016/may/03/paraguay-battles-over-land-rights-in-the-courts-and-across-the-airwaves

70 http://www.ipsnews.net/2008/11/paraguay-the-struggle-for-land/ and https://www.oxfamamerica.org/static/media/files/Paraguay_background.pdf. The Truth and Justice Committee (CVJ), created to investigate human rights abuses carried out between 1954 and 2003, noted that under Colorado Party leadership, wealthy Paraguayans and foreigners had illegally acquired over 64 percent of their lands through government handouts or simply by seizing the land from campesinos. http://www.coha.org/land-reform-issues-intensify-as-paraguay-enters-into-a-political-crisis/

71 https://www.oxfam.org/sites/www.oxfam.org/files/bp180-smallholders-at-risk-land-food-latin-america-230414-en_0.pdf

72 http://www.coha.org/land-reform-issues-intensify-as-paraguay-enters-into-a-political-crisis/

73 http://www.verdadyjusticia-dp.gov.py/pdf/informe_final/Tomo%203.pdf. This has led to numerous conflicts over land, thousands of men and women farmers imprisoned, and more than 130 extrajudicial executions of community leaders since the end of the dictatorship https://www.oxfam.org/sites/www.oxfam.org/files/bp180-smallholders-at-risk-land-food-latin-america-230414-en_0.pdf

74 Miguel Lovera, The Impacts of Unsustainable Livestock Farming & Soybean Production in Paraguay, at 2, http://globalforestcoalition.org/wp-content/uploads/2014/05/Impacts-Soy-Cattle-3-ML-11.pdf.

In the 1960s, Paraguay experienced moderate economic growth with real GDP growth averaging 4.2 percent a year. In the 1970s, real GDP grew at over eight percent a year and from 1976 to 1981, at more than 10 percent. In 2013, Paraguay's economy grew at 13 percent, making it the fastest growing economy in Latin America. Paraguay's economic development is based on agriculture and livestock, principally soy and beef, which comprise nearly 80 percent of total exports. Today, Paraguay is the world's sixth largest producer and the fourth largest exporter of soy.[75]

Many of Paraguay's smallholder farmers and indigenous peoples, however, have missed out on this economic development. Income distribution became more inequitable during the 1970s in both relative and absolute terms. In 2013, Paraguay's human development index was the lowest in South America with 40 percent of its 6.8 million people living in poverty. Today, one in every two Paraguayans living in rural areas is poor, and one in every three is considered extremely poor—three times higher than in urban areas.[76] Infrastructure and social services are inadequate in the rural regions. Available data indicate that the rates of poverty and extreme poverty among indigenous peoples are 75 percent and 60 percent, respectively, exceeding the national average. Among indigenous children under the age of 5, the rate of extreme poverty is 63 percent (compared to the national average of 26 per cent), and the chronic malnutrition rate is 41.7 percent (compared to 17.5 per cent). The lack of food security and of access to drinking water, especially in the Chaco, are serious and recurrent problems.[77]

The influx of multinational agribusinesses, foreign investors, and Paraguayan colonists has increased competition for land, first in the eastern border region (soy) and then in the Paraguayan Chaco (cattle). Today, land in Paraguay is more inequitably distributed than anywhere in Latin America.[78] By the 2008 census, 80 percent of agricultural land is held by 1.6 percent of landowners, with the 600 largest properties encompassing 40 percent of the total productive land. Smallholder farmers account for 40 percent of the population but own just five percent of all arable farmland.[79] More than 300,000 people in the country are thought to be informal occupants – people who do not have legal rights to any land.[80]

5.2 LAND RIGHTS AND TENURE SECURITY

Today, more than 95 percent of land in Paraguay is held as private property.[81] In the Chaco, most land is privately owned, principally by individuals, corporations, and cooperatives. Some land is public land, such as some land in the protected areas and the lands alongside roads and power lines. While estimates vary, a relatively small amount of land in the Paraguayan Chaco – less than 5 percent - is legally held by indigenous peoples (although they claim considerably more land). There are also a number of smallholder farmers living in the Chaco. This section will provide a brief overview of each tenure type.

5.2.1 Private Lands

Most land in the Paraguayan Chaco is privately owned by Paraguayan and foreign individuals, companies, and cooperatives. Many owners hold large tracts of land and are involved in cattle production. Extensive cattle raising covers 60 percent of the Paraguayan Chaco (the Chaco includes just 2.7 percent of the

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75 https://www.oxfamamerica.org/static/media/files/Paraguay_background.pdf

76 https://www.oxfam.org/sites/www.oxfam.org/files/bp180-smallholders-at-risk-land-food-latin-america-230414-en_0.pdf

77 http://unsr.vtaulicorpuz.org/site/index.php/documents/country-reports/84-report-paraguay

78 https://www.oxfamamerica.org/static/media/files/Paraguay_background.pdf

79 http://www.coha.org/land-reform-issues-intensify-as-paraguay-enters-into-a-political-crisis/

80 https://www.oxfamamerica.org/static/media/files/Paraguay_background.pdf

81 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

12,244 km^2 total of cultivated land in the country).[82] More foreigners – from Brazil, Uruguay, Western Europe, and the US – are investing in the Chaco because of the relatively inexpensive land, no foreign land ownership restrictions, and the region's most favorable tax regime (10 percent personal income tax, 10 percent value added tax).[83] In many parts of the Chaco, large ranches adjoin each other and come to the edge of roads. Along many roads, informal smallholders reside on the narrow strips of public land between the roads and ranches (see below).

Experts interviewed believe that most, if not all, large landholdings in the Chaco are registered and titled. Most large ranching operations are also believed to have an environmental license, which includes a land use plan (see above). Acquiring title documents for land, however, can take some time - in some cases up to two years or more.[84] The World Bank's 2016 *Doing Business Report* ranks Paraguay 78 of 189 for ease of "Registering Property," noting the process requires six steps, averages 46 days, and costs 1.9 percent of the property value.[85] Banks in Paraguay accept titles as collateral for loans.[86]

The 1992 Constitution guarantees the right of private property ownership although there is a lack of consistent property surveys and registries.[87] The national cadaster – the Cadastre and Registry Information System (SICAR) – is incomplete, in places inaccurate, not current, and poorly maintained.[88] Some local governments (e.g., municipalities) do maintain good records (although not public) of all physical, economic and legal data on properties in the jurisdiction, for example Filadelfia. As a result, it is difficult to precisely establish land plot boundaries and to understand whether all holders have title to their land.

By some measures, private property in Paraguay is not particularly secure. Paraguay scores only a 30 out of 100 in the property rights index (100 is most secure), a component of the Index of Economic Freedom developed by the Wall Street Journal and Heritage Foundation.[89] The property rights index measures the degree to which a country's laws protect private property rights, and the government enforces those laws. It also assesses the likelihood that private property will be expropriated.[90] Paraguay scores just 5.4 out of 10 in the physical property rights in the International Property Rights Index. This ranks the country just 88 of 128 countries globally and 14 of 22 countries in Latin America and the Caribbean.[91]

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82 http://dapa.ciat.cgiar.org/is-the-paraguayan-gran-chaco-at-risk-for-extreme-habitat-destruction/

83 https://www.linkedin.com/pulse/20140614182752-145572124-paraguayan-chaco-the-story-of-thorn-forest-or-cattle-ranchers and http://www.rawfarmlandinvestmentsforsale.com/

84 https://www.export.gov/article?id=Paraguay-Protection-of-Property-Rights

85 http://www.doingbusiness.org/reports/global-reports/doing-business-2016

86 https://www.export.gov/article?id=Paraguay-Protection-of-Property-Rights

87 https://www.export.gov/article?id=Paraguay-Protection-of-Property-Rights

88 The World Bank, IDB and other donors have made significant investments to improve land administration in Paraguay.

89 http://www.heritage.org/index/country/paraguay. The Index of Economic Freedom is an annual index and ranking created by The Heritage Foundation and The Wall Street Journal in 1995 to measure the degree of economic freedom in the world's nations. The index takes an approach similar to Adam Smith's in The Wealth of Nations, that "basic institutions that protect the liberty of individuals to pursue their own economic interests result in greater prosperity for the larger society."

90 The property rights index also analyzes the independence of the judiciary, the existence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts

91 http://internationalpropertyrightsindex.org/country?s=paraguay. The International Property Rights index is an international comparative study that measures the three main components of a sound property rights system: the Legal and Political Environment (LP), Physical Property Rights (PPR), and Intellectual Property Rights (IPR). The Index provides the public, researchers and policymakers, from across the globe, with a tool for comparative analysis and future research on global property rights.

Despite these scores, the poor national cadaster, and overlapping land rights and claims, including the land claims of indigenous peoples, many large landowners in the Chaco behave as if they have secure tenure:

1. Investments. While most ranchers practice extensive cattle raising, all ranchers make investments in their lands (pastures), herds, and infrastructure. Some ranchers make significant investments in their lands and operations, especially the younger generation of Paraguayan ranchers as well as the foreign operators. Some older Paraguayan ranch owners make minimal investments in their ranch operations and, as a consequence their operations are relatively inefficient by international standards (see above).

2. Land market. There is an active land market in the Paraguayan Chaco with ranchland exchanging hands and prices rising. Paraguay has the second lowest land valuation in Latin America, after Bolivia. Many established ranchers are expanding their holdings in the Chaco, and new actors are coming to invest. While prices vary, ranch land cleared of forest in the Paraguayan Chaco sells for USD$500-2,000 per hectare, while virgin, still forested ranch land sells for USD$150-600 per hectare. Several real estate companies offer land for sale in the Paraguayan Chaco.[92] By comparison, eight to ten years ago, forested land in the Chaco sold for perhaps $70/ha and 20 years ago that same hectare of land sold for just $20/ha.[93]

3. Expropriation. Few large ranchers have lost land to the state through expropriation or to others by irregular acquisition, indeed, there is little national government presence in the Paraguayan Chaco. The government has acquired some land for indigenous peoples (see below), but such acquisitions have slowed considerably in recent years. The Director of INDI told the assessment team that he will not ask the government for any funds to acquire land for indigenous peoples in 2017, arguing that INDI's purchases of land for indigenous people has contributed to driving up land prices and this had to stop. Even the land in some protected areas remains in private hands (see below).

4. Protective measures. Many ranchers take measures to protect their lands. For example, most ranch land is fenced and monitored, if irregularly. Some large ranchers negotiate with indigenous persons who claim some of their land while others have used the law to protect their land from such claims. Under Law 352/94, private protected areas (see below) cannot be expropriated.[94] Some companies may be using this law to the disadvantage of indigenous land claims. Some companies have requested that the parts of their property being claimed by indigenous people be declared private protected areas (see below), which exempts them from expropriation on behalf of indigenous persons.[95] For example, in response to indigenous land claims, Yaguareté Porã Ltd has proposed a private protected area to serve as a biological corridor and passageway for indigenous persons.[96] Although ideally this would serve a conservation purpose, the enforcement challenges in the Chaco raise concerns that such protected areas will serve as a

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92 See plots for sale - http://southlandbrokers.net/paraguay/en/farmlands/; http://www.ventacamposparaguay.com/farmland.htm; http://www.rawfarmlandinvestmentsforsale.com/; and http://www.agro.pvoss.de/ By comparison, an intensively operated soybean farm in the east has processing factory costs of about US $6,000-10,000 per hectare.

93 http://www.bbc.com/news/world-latin-america-14032060

94 http://www.ipsnews.net/2010/04/paraguay-native-group-defends-land-claim-before-inter-american-court/

95 IFAD Technical Note, *supra* note 4, at 13.

96 U.N. Human Rights Council, Report of the Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, Aug. 13, 2015, U.N. Doc. A/HRC/30/41/Add.1.

screen for continued deforestation or activities (possible because the government has limited capacity to monitor compliance to the environmental licenses of ranches) and a defeat of indigenous land claims.

5.2.2 Protected Areas

Paraguay's first protected area – National Reserve Cerro Lambaré in Asunción – was created in 1948 and its first national park, Tinfunqué, in 1966, although it was not until 1994 (Law N° 352) that the Sistema Nacional de Áreas Silvestres Protegidas (National System of Protected Wild Areas or SINASIP) was established. In December 2015, SINASIP included 2,738,346 hectares, slightly less than seven percent of Paraguay's land, with 91 conservation areas.[97] Today, there are 94 protected areas in Paraguay (Figure 5 shows the protected estate in 2014).

Paraguay recognizes three types of protected areas: public protected areas; private protected areas; and, protected areas under special management. There are nine different management categories: scientific reserve; national park; national monument; wildlife refuge; protected landscape; reserve of managed resources; ecologic reserve; nature reserve; and, biosphere reserve.[98]

While legally secure, in practice, the nation's protected areas are not carefully managed or well protected. Few protected areas have approved management plans and few established plans have been implemented. By law (Law N° 352/94 'De Áreas Silvestres Protegidas'), each protected area must have a core conservation area and a buffer zone (for the sustainable use of natural resources). Many protected areas, however, either do not have a buffer zone or it is poorly managed. SEAM is under-staffed and under-resourced.[99] Moreover, the government has relocated people into some parks in the east.[100] As a consequence, the security of protected areas varies considerably across the country.

About half of Paraguay's protected areas and almost 90 percent of the protected land are public protected areas managed by SEAM. [101] Many public protected areas have strict conservation objectives (national park, scientific reserve, and ecological reserve), while others have fewer restrictions (resource management reserve and protected landscape).[102] The declaration of a public protected area does not necessarily mean that the government owns all of the park land. Some or even all the land of certain public protected areas is private land (see below). [103]

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97 http://nationalparksofparaguay.blogspot.com/2016/01/the-paraguayan-sinasip.html. In 2009, however, SEAM reported that Paraguay had 30 publically protected areas and 27 in private administration, totaling 6,170,201 ha or 15.2 percent of the national territory under legal protection) http://parksjournal.com/wp-content/uploads/2014/04/Cacciali%20PARKS%2021.2%2010.2305IUCN.CH.2014.PARKS-21-2PC.en.pdf.

98 http://parksjournal.com/wp-content/uploads/2014/04/Cacciali%20PARKS%2021.2%2010.2305IUCN.CH.2014.PARKS-21-2PC.en.pdf

99 Alberto Yanosky, Paraguay's Challenge of Conserving Natural Habitats & Biodiversity with Global Markets Demanding for Products, CONSERVATION BIOLOGY 115-16 (2013), http://observatoriosoja.org/wp-content/uploads/2015/03/14_Yanosky_Voices_from_the_Tropics_2013.pdf. New donor investments are supporting international and local NGOs to strengthen the management of the Defensores del Chaco and a few other parks.

100 http://www.ipsnews.net/2012/02/paraguay-land-conflicts-threaten-to-boil-over/

101 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

102 http://nationalparksofparaguay.blogspot.com/2016/01/the-paraguayan-sinasip.html

103 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

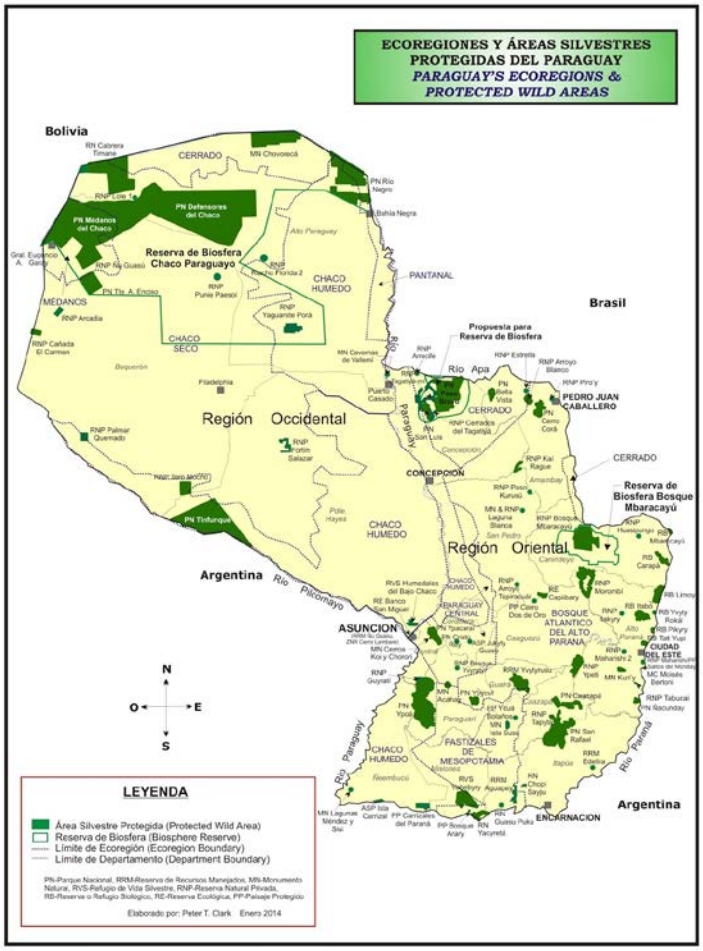

Figure 5: Protected Areas in 2014 (Source: **http://nationalparksofparaguay.blogspot.com/2016/04/social-and-environmental-impacts-of.html**

The Paraguayan Chaco has several national parks, including Defensores del Chaco, Médanos del Chaco, Tinfunqué, Lago Ypoa, Teniente Enciso, Ypacaraí, Rio Negro, and Bellavista.[104] The Defensores del Chaco (720,000 ha) and Médanos del Chaco (514,233 ha) – Paraguay's two largest protected areas - together cover over 45 percent of all land within SINASIP.[105] The Defensores del Chaco (Decree N° 16.806) was established in 1975 and is located in the far north of the country.[106] Most, if not all of the land in this park is public land. In 2005, the park was recognized by UNESCO as a Biosphere Reserve.[107] Until the end of the 19th century, this was the land of the indigenous Ayoreo who named the area Chaco (derived from the Quechua language word chacu, which means hunting place). Today, Ayoreo live inside and use the national park, including those who live a traditional lifestyle in voluntary isolation.[108]

Despite weak management, the Defensores del Chaco park has not experienced any significant encroachment, although cattle ranching is expanding to the park's edges.[109] Hunting is the most widespread threat to Defensores del Chaco (and other Chaco parks). Hunters access the parks via roads constructed by oil companies and a road in the south of the park, used for an automobile rally, which also disturbs wildlife.[110] The government had issued environmental

104 http://dapa.ciat.cgiar.org/is-the-paraguayan-gran-chaco-at-risk-for-extreme-habitat-destruction/

105 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

106 The name "Defensores del Chaco" (Defenders of the Chaco) is in memory of the soldiers who fought in the Chaco War against Bolivia

107 Biosphere reserves are areas comprising terrestrial, marine and coastal ecosystems. Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use (http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/).

108 http://defensoresdelchaconationalpark.blogspot.com/

109 http://defensoresdelchaconationalpark.blogspot.com/

110 http://www.expomaquinarias.com/wherewework/southamerica/paraguay/protectedarea/chaco.html

licenses for oil exploration activities in the park, but in 2015, with pressure from Iniciativa Amotocodie (IA) and other local non-governmental organizations (NGOs), it recognized the presence of isolated indigenous groups in the park, and canceled the licenses.

Further to the south on the border with Argentina is the Nacional Park Tinfunqué (280,000 ha). This park, a recognized RAMSAR (International Convention on Wetlands) site,[111] was created in 1966 but it has never been protected. In contrast to the Defensores del Chaco, all land in Tinfunqué is private land. As a consequence, there are calls to change the category of Tinfunqué from a national park to a nature reserve (see below). While the land is likely legally held by the private landholders (see above), the government has not developed any clear guidance to regulate the use of private land in a public protected area[112] and has little control over how the landholders use their land in Tinfunqué. As a consequence, this private land is probably securely held by the landowner despite being in a national park.

While protected areas have predominantly been established by the government, over the last two decades, private actors, including individual property owners, NGOs, and other entities, have appropriated tracts of their lands, often parts of large estates, and created private protected areas. These areas are owned, administered, and managed by private entities under the management category of nature reserves.[113] While not confirmed, it is likely most of this land is titled and secure. Today there are at least 34 private nature reserves covering 315,121 ha in Paraguay. This area is 11.5 percent of the total area under protection in the country (0.8 percent of the country). In the Chaco, some of the largest private protected areas include Ñu Guasú (50,000 ha) and Yaguareté Porã (27,508 ha).[114]

Finally, another 50,000 ha of land in Paraguay are in protected areas under special management.[115] These areas are managed by entities that do not fall into the other two subsystems, such as companies and autonomous institutions.[116] It is unclear if this land is titled and securely held.

5.2.3 Indigenous Lands

According to International Work Group for Indigenous Affairs (IWGIA), there are 112,848 indigenous persons living in Paraguay (around 1.7 percent of the population), belonging to 19 indigenous peoples from five different linguistic families.[117] The Región Oriental (eastern region) is home to the highest proportion of indigenous persons (52.3 percent) while the Chaco has the greatest diversity of indigenous peoples (ndigenous persons make up 63 percent of the population of the Filadelfia Municipality in the Department of Boquerón in the Paraguayan Chaco[118]). Overall, there are 531 communities and 241 villages.[119] The Chaco is home to nine indigenous peoples: the Ayoreo,

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111 The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources (http://www.ramsar.org/).

112 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

113 http://nationalparksofparaguay.blogspot.com/2016/01/the-paraguayan-sinasip.html

114 http://nationalparksofparaguay.blogspot.com/2016/04/social-and-environmental-impacts-of.html

115 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

116 http://nationalparksofparaguay.blogspot.com/2016/01/the-paraguayan-sinasip.html

117 Government figures show slightly fewer indigenous people and communities.

118 Personal communication – Filadelfia local government official, 16 December 2016

119 http://www.iwgia.org/regions/latin-america/paraguay

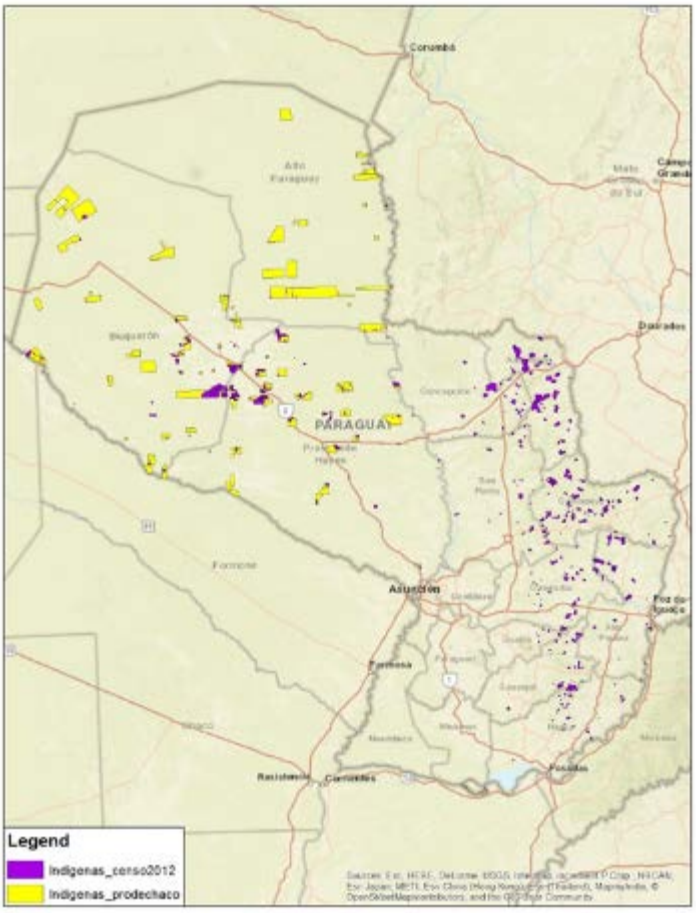

Figure 6: Indigenous Lands (Source: Prodechaco and 2012 National Census)

Chamacoco, Enxet, Nivakle, Manjuy, Maka'a, Toba Qom, Nandeva, and Guarayo.[120] The Paraguayan Chaco is also home to the last uncontacted indigenous persons outside the Amazon.[121]

It is not clear how much land is currently held legally by indigenous peoples in Paraguay or the Chaco specifically, or how much land is used and/or claimed by them under customary tenure arrangements alone. In 2003, the International Labor Organization (ILO) reported that 1.8 percent of the land in the Chaco officially belonged to indigenous peoples.[122] In the late 1990s, the Prodechaco project mapped 1,035,351 ha of indigenous land in the Chaco (4.3 percent of the Chaco), including indigenous lands that were either formally recognized or in the process of being documented and registered. By many accounts, the situation has not changed significantly. Today, indigenous people legally hold only a small amount of land in the Chaco, relative to the amount they held in the 19th century (see above). Some indigenous peoples live on state-owned lands, such as the Defensores del Chaco national park and other protected areas, many with the informal approval of government. Other indigenous peoples claim – but do not live on or use – lands in the Paraguayan Chaco that are now private lands.

In 2015, the government reported that 357 out of 493 indigenous communities in the country have their own land, of which 343 held titles.[123] Other sources, however, report that according to the 2012 census, 375 communities had put forward land claims, while 134 communities were without formal

120 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

121 http://www.survivalinternational.org/tribes/ayoreo

122 International Labour Conference: Observations and information concerning particular countries, 91st session, 2003, provisional record. Cited in: Amnesty International, Paraguay, Submission the the U.N. Committee on the Elimination of Racial Discrimination, 79th Session, Aug. 2011 (July 2011), http://tbinternet.ohchr.org/Treaties/CERD/Shared%20Documents/PRY/INT_CERD_NGO_PRY_79_9955_E.pdf

123 Paraguay Periodic Report to the Committee on the Elimination of Racial Discrimination, Oct. 20, 2015, CERD/C/PRY/4-6 at ¶57.

rights to land, and 145 communities were experiencing land conflicts, such as overlapping land titles or appropriation of their land by government agencies, businesses, or smallholder farmers.[124]

Paraguay's Constitution, legislation, and all international human rights and environmental treaties ratified by the state form a substantial body of law with protections for indigenous peoples' rights and offer a strong basis from which to make land claims.[125] Article 63 of the 1992 Constitution provides, "The indigenous peoples of the Paraguay are guaranteed the right to preserve and develop their ethnic identity in their own habitat." And Article 64 states, "The indigenous peoples of Paraguay have the right to ownership of land in quantity and quality sufficient for the conservation and development of their particular ways of life. The State will provide to them these lands free of cost...Transfer of ownership of these lands is forbidden without the expressed consent of the indigenous populations."

National laws are also supportive of indigenous rights, including land rights, but with limits. Article 1 of the 1993 *Statute of Indigenous Communities* (Law 234/93) guarantees land to indigenous communities and Article 20 provides that this land will be granted in quantities of "not less than 100 hectares per family." Law 43/89 allows indigenous groups to obtain court orders preventing encroachment upon lands that they claim. As such, clearing or farming of land claimed by indigenous groups is barred without their consent.[126]

Further, the government has also ratified the main international human rights conventions. Article 14 of the ILO Convention 169 recognizes the right of indigenous groups to the land they "traditionally occupy." Paraguay also voted in favor of the United Nations Declaration on the Rights of Indigenous Peoples in 2007.[127]

Despite this supportive legislation, indigenous civil, cultural, economic, social, and political rights are commonly violated, poorly applied, or neglected.[128] In practice, indigenous peoples have had great difficulty obtaining the rights to their traditional lands. Many indigenous peoples in the Chaco are engaged in a protracted struggle with the government and private landowners to obtain title to their ancestral territories.[129] The political will to implement is often missing, at times from lack of institutional resources (human and financial), or the failure to harmonize inconsistencies in the laws.[130] As such, indigenous persons are the poorest, most excluded, and most marginalized peoples in Paraguay.[131]

Most land in Paraguay and the Chaco is private land. The acquisition and titling of indigenous land by the government is bureaucratic, complex, expensive, and slow. There are many overlapping land deeds resulting in conflicted ownership claims. Such conflicts are often settled in favor of business enterprises, not indigenous groups.[132] Geographic and sociopolitical isolation of many indigenous communities makes establishing land title extremely difficult, and indigenous communities are hesitant to cooperate with

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124 U.N. Human Rights Council, Report of the Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, Aug. 13, 2015, U.N. Doc. A/HRC/30/41/Add.1.

125 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

126 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

127 http://www.iwgia.org/regions/latin-america/paraguay

128 http://www.iwgia.org/regions/latin-america/paraguay

129 https://www.culturalsurvival.org/publications/cultural-survival-quarterly/indigenous-paraguayan-chaco-struggle-land

130 http://www.forestpeoples.org/topics/redd-and-related-initiatives/news/2015/12/situation-indigenous-peoples-paraguay-their-lands-a

131 http://unsr.vtaulicorpuz.org/site/index.php/documents/country-reports/84-report-paraguay

132 U.N. Human Rights Council, Report of the Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, Aug. 13, 2015, U.N. Doc. A/HRC/30/41/Add.1.

government even when contacted.[133] The expropriation process by which claims for indigenous land are to be satisfied is expensive due to relatively high land prices and limited INDI government resources. In recent years, INDI has focused almost exclusively on satisfying the Inter-American Court judgements on indigenous lands. Paraguay is the Latin American country facing the largest number of complaints in the Inter-American Court regarding failure to respect indigenous land rights[134].

Land titles issued to indigenous groups are typically small non-contiguous parcels. These plots do not reflect the extent of their traditional territories and are not practically useful to communities interested in maintaining their traditional lifestyle which included hunting, gathering, and some farming and animal husbandry.[135] Fragmented territories and peoples leave the lands exposed to private parties (cattle ranchers, agro-industrialist).[136] Moreover, the law restricts the use and management of titled indigenous lands, thus limiting the economic value of this land and hindering indigenous persons from capitalizing on economic opportunities.[137] For example, indigenous people are not allowed to sublease lands allocated to them by INDI, limiting their ability to capitalize on economic opportunities.

While titled indigenous lands are legally secure, many of these lands have been encroached on and used by intruders. Still, such titled land is more secure than traditional land which indigenous peoples are seeking to obtain formal rights to. Much of the land that indigenous peoples are claiming as their ancestral land is now private land, titled to and securely held by the landowner. Many who have lost their land now work as laborers on cattle ranches and some live on the ranches. Other indigenous persons live in and use the natural resources in public protected areas, such as the Defensores del Chaco National Park (see above). Much of this land is state land with government allowing indigenous persons to reside in and use the land and resources. Since such use of state lands can easily be terminated, it creates insecurity for the indigenous persons.

5.2.4 *Campesinos* and Informal Occupants

An estimated 230,000 *campesinos* or peasant farmers – most in eastern Paraguay – have farms of up to 50 hectares and hold four percent of the country's arable land.[138] These small-scale farmers produce around three-fourths of the country's staple foods and make important contributions to national food security. Their smallholdings, however, often fail to generate sufficient income for the families and, as such, many are also engaged in other economic activities, including charcoal production and wage labor.

Many *campesinos* in the east who did not have titles to the lands were pushed to more marginal areas, including the Chaco. The government has no official record of the number of people who do not hold land legally, but studies indicate that there are about 120,000 such families, and a similar number of families with less than five hectares.[139] Other studies put the number much higher. For example, according to Oxfam, more than 300,000 family farmers do not formally hold any land.[140]

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133 Cheryl Duckworth, President Lugo and the Indigenous Communities of Paraguay 70, *in* LAND, INDIGENOUS PEOPLES AND CONFLICT, Alan C. Tidwell & Barry Scott Zellen, eds. (2016).

134 http://www.ipsnews.net/2010/04/paraguay-native-group-defends-land-claim-before-inter-american-court/

135 U.N. Human Rights Council, Report of the Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, Aug. 13, 2015, U.N. Doc. A/HRC/30/41/Add.1.

136 http://www.forestpeoples.org/topics/redd-and-related-initiatives/news/2015/12/situation-indigenous-peoples-paraguay-their-lands-a

137 Some titled indigenous lands are lands that were granted to indigenous persons by Mennonites. These title do not have the same land use restrictions on them as the government-titled indigenous lands.

138 https://www.giz.de/en/worldwide/23423.html

139 http://www.ipsnews.net/2008/11/paraguay-the-struggle-for-land/

140 https://www.oxfamamerica.org/static/media/files/Paraguay_background.pdf.

Figure 7: Informal occupants on public land on either side of public roads in the Chaco (Source: Google Maps)

In the Chaco, many of these informal occupants live on and use public land, especially along public roads but also in public protected areas. They are often wedged between roads and ranches. These people do not have formal rights to this land and have no legal security. They are essentially squatters who are unlawfully occupying unused government land. As such, these people are at the will of the government, which can remove them at any time although there is not a history of the government doing so. Many of these people are involved in a range of economic activities, including subsistence and cash cropping, animal husbandry, charcoal production (sold for USD$1/kg), making and selling small bags/bracelets and wage labor.

6.0 TENURE-DEFORESTATION LINKS IN CATTLE PRODUCTION IN THE PARAGUAYAN CHACO

An INFONA official succinctly summarized the inherent link between tenure clarity and environmental enforcement as follows (paraphrased here): "If you can't register the presence of people on the landscape, you can't have a title, you can't have a use plan, and you can't enforce anything or know who is responsible." Within a context of substantial potential for profit, the complicated layering of multiple claims to land and the levels of historical marginalization involved in the process are not large enough barriers to the state-sanctioned clearing of forest for cattle ranching.

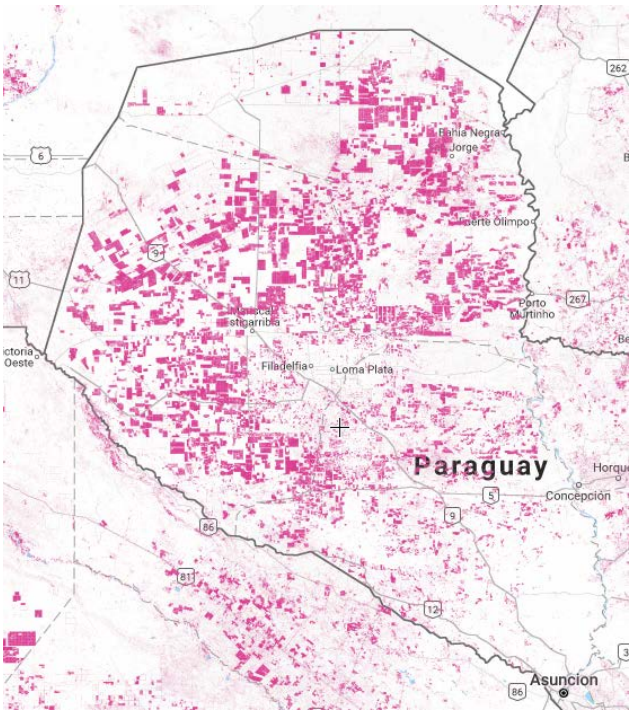

Figure 8: GFW Forest Cover Loss (2001-2014) in the Paraguayan Chaco (Source: GFW [2001-2014])

The combination of entrepreneurial and often self-capitalized ranchers with a governmental posture favorable to ranching as a development path and export driver is leading to the rapid expansion of cattle production, often at the expense of indigenous peoples and other competing interests. Because land and forest management tends to correlate with the demographic in control of the land, deforestation rates vary widely according to the tenure type of each parcel. As the vast majority of the Chaco land is effectively claimed and controlled by ranching interests, unabated forest removal continues to be the norm – despite the environmental licenses with their land use plans. Government monitoring and enforcement of the environmental licenses has been weak due to limited capacity (limited human and financial resources) and the absence of political will.

6.1 DEFORESTATION IN THE CHACO

To better understand the tenure-deforestation links, the WRI team conducted research to calculate deforestation rates in the Paraguayan Chaco, for the region as a whole and, where possible, by tenure type. The deforestation rates are based on the data and information provided on Global Forest Watch (GFW), the Prodechaco data on indigenous lands from 2012, and data from the World Database on

Protected Areas (WDPA)[141] on public protected areas in the Paraguayan Chaco. The overall findings are provided in the table below.

Based on the calculations, the Paraguayan Chaco lost an average of 245,746 ha of forest/year between 2001 and 2014, for a total loss of 3,440,441 ha in this 14-year period. This translates into an annual average deforestation rate of 1.4 percent, resulting in a 14 percent total decline of forest area in the Chaco. These figures are in general agreement with those provided by other researchers.

A more detailed discussion of deforestation rate by tenure type is provided further below. In summary, public protected areas experienced the lowest annual average rate of average deforestation rate of 0.3 percent/year from 2001-2014 and indigenous lands had an average deforestation rate of 0.6 percent/year. Private lands had the highest average deforestation rate at 1.5 percent/year.

Table 1. Deforestation Rate by Tenure Type

Territory	Total Area of Territory (ha)	Forested area in 2014 (No forest loss) (ha)	Pct of forest intact after 2014	AVERAGE annual forest loss 2001-2014 (ha)	PCT Average annual forest loss 2001-2014	SUM Forest Loss 2001-2014 (ha)	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total area forested in 2000	Pct total area forested in 2014	Pct total area with forest loss 2000-2014
Indigenas Prodechaco	1,035,351	736,107	91%	5,079	0.6%	71,113	807,220	9%	78%	71%	-7%
Protected Areas	1,565,659	1,415,814	95%	4,979	0.3%	69,704	1,485,518	5%	95%	90%	-4.5%
Private Chaco (excluding Indigenas Prodechaco and Protected Areas)	21,554,883	12,355,612	79%	235,687	1.5%	3,299,624	15,655,235	21%	73%	57%	-15%
TOTAL - Entire Chaco	24,155,893	14,507,532	81%	245,746	1.4%	3,440,441	17,947,973	19%	74%	60%	-14%

As noted, key drivers of deforestation in the Chaco include population growth, land colonization, cattle raising, agricultural activities, and a near absence of land use control. This is despite the existence of strong legal frameworks to protect forests such as the National Environmental Policy, Zero Deforestation Law (2004), Forestry Law, the 1993 Statute of Indigenous Communities (Law 234/93) and other laws that protect the rights of indigenous peoples. The main problem lies in the fact that the responsible public institutions remain weak and the Chaco lacks institutional coordination and adequate land use planning.[142]

In contrast and contradiction, other government plans, policies, and national laws make clear the government's intent to expand cattle production in the Chaco, including in the National Plan for Meat. Federación por la Autodeterminación de los Pueblos Indígenas (FAPI) argues that these documents establish that the government will be issuing licenses for another 5 million ha to expand cattle ranching in the Chaco, despite Paraguay's climate change commitments and the government's Green Commodities agreement with the United Nations.[143]

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141 https://www.protectedplanet.net/

142 http://dapa.ciat.cgiar.org/is-the-paraguayan-gran-chaco-at-risk-for-extreme-habitat-destruction/

143 Ines, Rainforest Foundation-Norway, January 2017

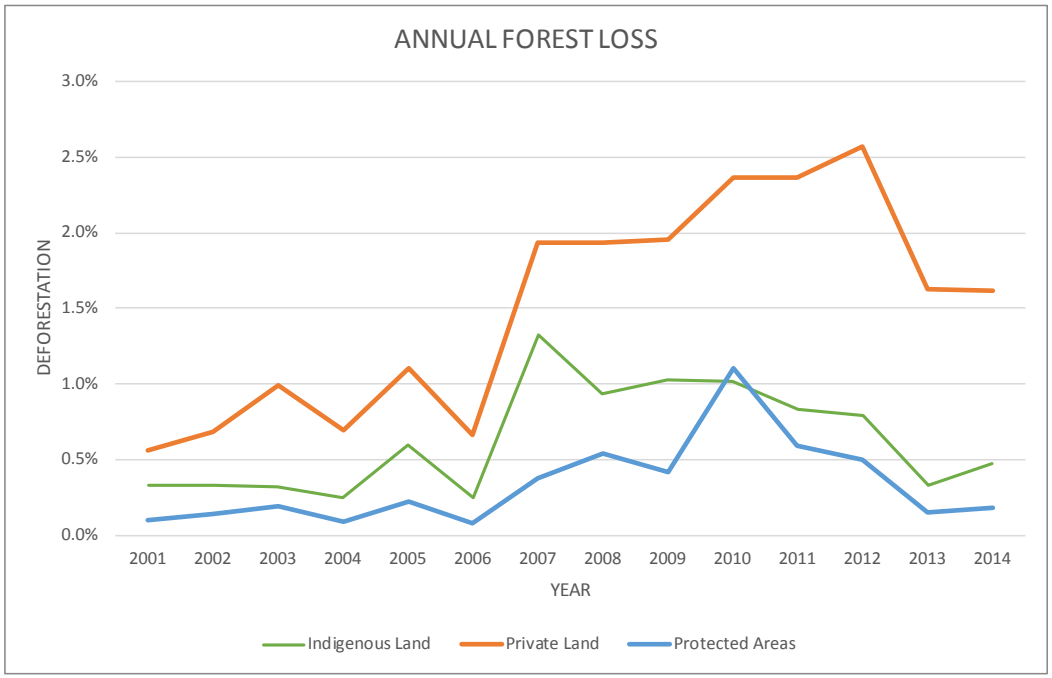
6.2 DEFORESTATION BY TENURE TYPE IN THE PARAGUAYAN CHACO

To better understand the relationship between tenure and deforestation in the Paraguayan Chaco, the assessment team conducted GIS analysis to calculate forest loss and deforestation rates by tenure type. The research focused on private lands, protected areas, indigenous lands, and *campesinos* and informal occupants.[144]

6.2.1 Deforestation and Private Lands

While most of the land in the Paraguayan Chaco is private land, no geospatial data on the boundaries of the many private holdings was available for this risk assessment. The national cadaster is not complete and the three departments in the Chaco do not have online platforms that provide this information. For purposes of this exercise, the protected areas (World Database on Protected Areas – see below) and the indigenous lands (Prodechaco – see below) were removed and the rest was considered to be private land. Calculating the deforestation rates on this land (21,554,883 ha) provides a more accurate estimate of deforestation rates on private lands than calculating the deforestation rates for the whole of the Chaco (24,155,893 ha).

Graph1: Deforestation Rates over Time



Of the 21,554,883 ha of "private land" in the Paraguayan Chaco, 12,355,612 ha was forest in 2014. Between 2001 and 2014, an average of 235,687 ha of forest was lost each year for a total loss of 3,299,624 ha (Figure 9). This translates to an average deforestation rate of 1.5 percent/year and a loss of 15 percent of the forest over the 14-year period. These percentages are higher than for the whole of the Chaco.

These numbers mask some variation across the three local government Departments of Boquerón, Alto Paraguay, and Presidente Hayes (see Annex B). The Department of Boquerón had the highest average annual deforestation rate at 1.7 percent between 2001 and 2014, and the Department of Presidente

[144] The GIS analysis did not include standard control variables or use of matching analysis to define a counterfactual. As a result, this analysis did not control for any other factors that may have contributed to deforestation.

Figure 9: Deforestation on Private Lands in Cattle Production (Sources: GFW [2001-2014] and Google Earth)

Hayes had the lowest average annual deforestation rate at 1.0 percent, possibly due to the longer history of cattle ranching in this Department and the considerable loss of forests prior to 2001. The average annual deforestation rates also varied over time with the lowest rate at 0.6 percent in 2001 and the highest rate at 2.6 percent in 2012 (Graph 1). The average annual deforestation rates across all three Departments were significantly lower in the time period from 2001 to 2006 when compared to the time period from 2007 to 2014.

A significant amount of privately held land in the Paraguayan Chaco has yet to be put under cattle production. In the next few years as new investors come in and establish ranching operations or as soy varieties suitable for the Chaco are identified, the deforestation rate on the private land in the Chaco will likely continue to stay high and perhaps even increase.

6.2.2 Deforestation on Public Protected Areas

While there are many protected areas, including public protected areas and private protected areas, in the Paraguayan Chaco, the WDPA provides data (shapefiles) of the boundaries of only six public protected areas: Cabrera Timane, Cerro Cabrera, Defensores del Chaco, Río Negro, Tentiente Agripino Enciso, and Tinfunqué National Parks. As a consequence, Médanos del Chaco National Park, at 514,233 ha Paraguay's second largest protected area, and other, smaller protected areas are not included in this analysis.

The six public protected areas in the Paraguayan Chaco for which there is data cover a total area of 1,565,659 ha, including 1,415,815 ha of forest in 2014. This total area constitutes the majority of land in the protected areas in the Paraguayan Chaco and over 57 percent of the protected estate in the country. Collectively, these six public protected areas lost an average of 4,979 ha of forest/year from 2001-2014 and an overall total of 69,704 ha over the 14-year period (a loss of 4.5 percent of the forest in these public protected areas). This translates into an average deforestation rate of 0.3 percent/year from 2001-2014. This low rate is not a result of strong government management and protection, but rather other factors, such as perhaps distance from major roads and urban centers. The Chaco is sparsely populated so overall pressure on the parks may be low (although growing as cattle production expands).

A closer look at the data reveals that the deforestation rates vary considerably by Public Protected Area and over time (see Annex B). Tinfunqué, which is principally private land, experienced an average deforestation rate of 1.1 percent/year, significantly higher than the five other Public Protected Areas which have little or no private land. A large amount of the private land in Tinfunqué has been deforested and is being used for cattle production.

In contrast, four Public Protected Areas, including the Defensores del Chaco National Park, had average deforestation rates of 0.0 or 0.1 percent/year. Further, deforestation rates peaked in the six-year period from 2007 to 2012. Prior to and after this period, annual deforestation rates ranged from 0.1 to 0.2 percent.

Figure 10: Little Deforestation in the Defense of the Chaco National Park
(Source: top - GFW [2001-2014]; bottom – Google Earth)

The Defensores del Chaco National Park is of particular importance because it is the home of Ayoreo indigenous people and the forest is critical to their way of life.[145] Consistent with the findings, Terra-i has not detected any significant anthropogenic habitat loss in this public protected areas, although cattle raising activities are moving closer to the park boundaries. Further, Terra-I also notes that only Tinfunqué of the Chaco protected areas has experienced a "moderate trend of increasing habitat change."[146]

The assessment team was not able to acquire the boundary data of any private protected area or protected area under special management in the Paraguayan Chaco. And indeed, the deforestation rates and conservation outcomes of these two categories of protected areas as well as the implications for people living in or around these areas are poorly understood. It is important to note, however, that some landholders seem genuinely interested in protecting some of their land. Some have created private protected areas and additional such conservation areas are in the process of being developed. Further, some landowners may be practicing conservation without wanting to enroll their land officially with SEAM.[147]

6.2.3 Deforestation on Indigenous Lands

The assessment team calculated deforestation rates on the indigenous lands mapped by the Sustainable Development of the Paraguayan Chaco (Prodechaco) project funded by the EU in the late 1990s. The

145 http://defensoresdelchaconationalpark.blogspot.com/

146 http://dapa.ciat.cgiar.org/is-the-paraguayan-gran-chaco-at-risk-for-extreme-habitat-destruction/

147 http://www.usaidgems.org/Documents/FAA&Regs/FAA118119LAC/ParaguayFAA%20118%20119%20FB%20Assessment%20July%202010%20.pdf

project mapped at least 113 indigenous lands which at the time included indigenous lands that were documented and formally recognized by the government, and indigenous lands that were in the process of being documented. They do not include lands held by indigenous persons under customary tenure arrangements alone (e.g., the lands used in the Defensores del Chaco National Park) or lands claimed by indigenous peoples but held and used by private landowners.

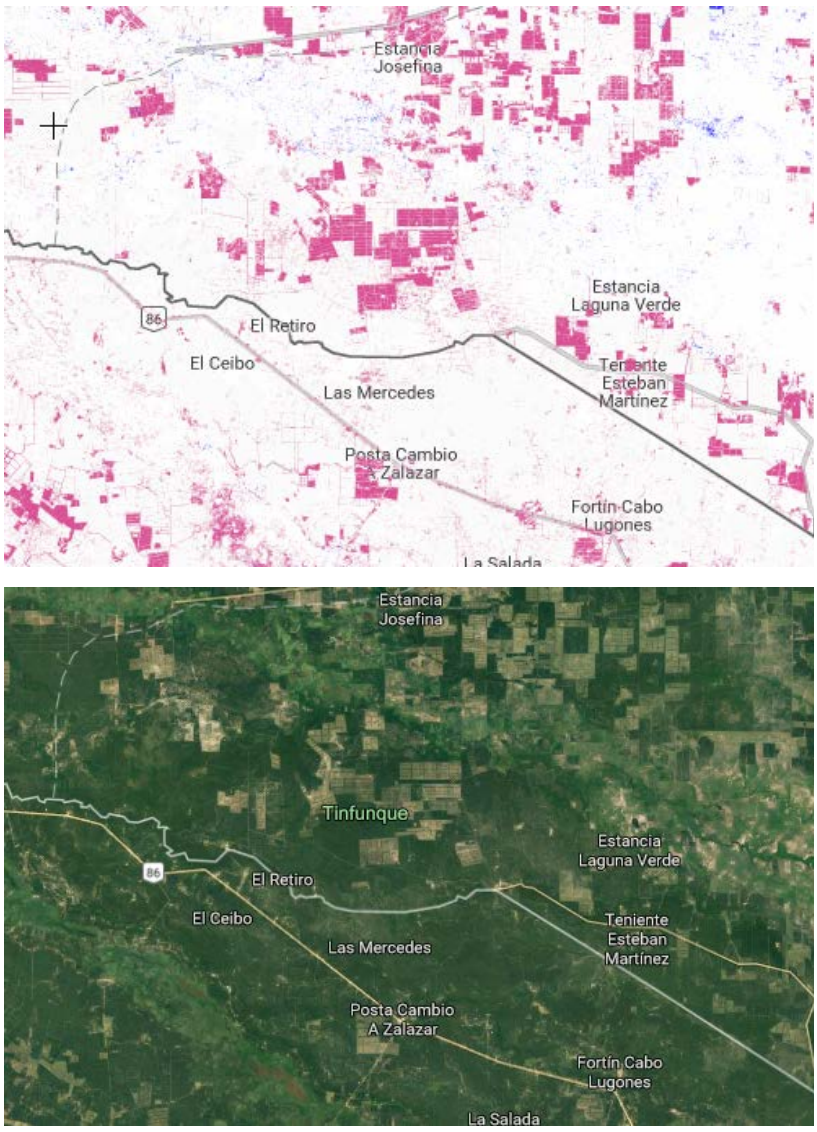


Figure 11: Private Lands in the Tinfunque National Park (Source: top - GFW [2001-2014]; bottom - Google Earth)

It is important to note that the Prodechaco maps are outdated and now not complete. The maps of indigenous lands prepared by Peter Sawatzky, Independent Researcher, Vancouver, Canada are likely the most accurate and complete, but were not available for this analysis. The assessment team also acquired the data (shapefiles) of indigenous households from the 2012 national census. These areas, however, are simply polygons drawn around the indigenous homesteads within the larger indigenous lands area, so do not represent indigenous lands. Indeed, many of these areas are within the boundaries of the Prodechaco maps.

The 113 indigenous lands cover a total area of 1,035,351 ha, including 736,107 ha of forest in 2014. Collectively, these indigenous lands experienced an annual loss of 5,079 ha of forest/year and a total loss of 71,113 ha from 2001 to 2014. This translates to an average deforestation rate of 0.6 percent/year and a loss of 7 percent of forest area in the 14-year period.

As with public protected areas, deforestation rates varied considerably by indigenous land and over time (see Annex B). Average annual deforestation rates for the many indigenous lands ranged from a low of 0.0 percent to a high of 5.9 percent. And, over time, average annual deforestation rates across all indigenous lands ranged from a low of 0.2 percent (in 2004 and 2006) to a high of 1.3 percent (in 2007).

While the average annual deforestation rates in indigenous lands from 2001-2014 are significantly lower than the rates for the Chaco as a whole and for private lands, care must be taken to not over-interpret these findings. It is unclear which indigenous lands are formally recognized and which are not, and which

indigenous lands are tenure secure and which are under threat. It is also unclear which indigenous lands are being actively used and managed by indigenous persons, as well as the how, why and by whom some indigenous lands have been deforested.

6.2.4 Deforestation by *Campesinos* and Informal Occupants

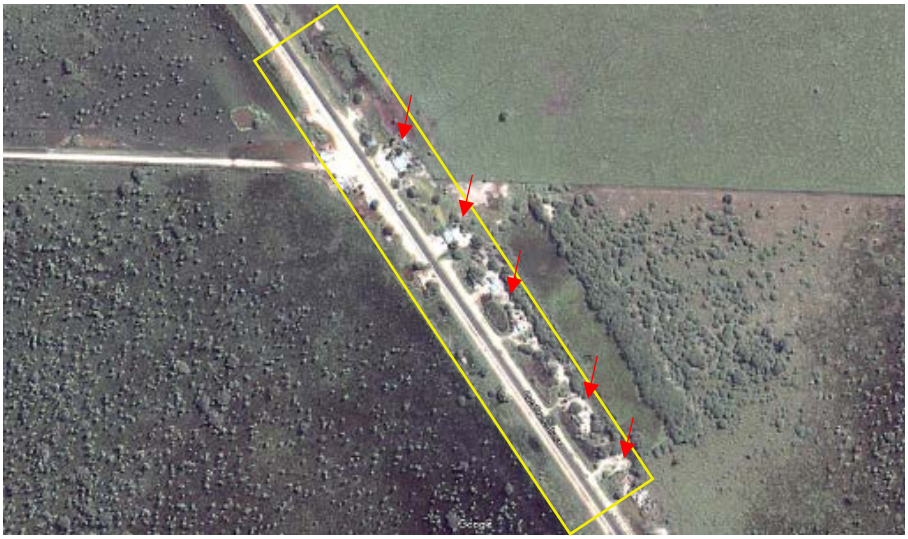


Figure 12: Public Lands used by Informal Occupants (Source: Google Earth)

The WRI team was not able to conduct GIS analysis of the lands held and used by *campesinos* and informal occupants in the Paraguayan Chaco, because of the lack of maps and geospatial data of these lands. Much of the land, principally public land, on the sides of roads in the Chaco is cleared of forests although individual trees are scattered throughout. It is unclear how much of this land was ever forested and how the forests were cleared. It is quite likely the land along the roads was cleared by the government or construction company when the roads were built and paved. Many of the people who live on these lands are likely engaged in charcoal production and, thereby, contribute to deforestation or at least to keeping these public lands clear of forests. Given their low numbers and the limited land available to them (between roads and ranches), the contribution to deforestation in the Chaco of informal occupants, however, is likely minimal.

7.0 ADDRESSING DEFORESTATION AND LAND RIGHTS RISKS IN THE PARAGUAYAN CHACO

7.1 STANDARDS AND PRACTICES – GLOBAL REVIEW

The last decade has seen an enormous shift in the generally accepted standard of agricultural commodity sourcing standards. While shifts towards higher standards of social and environmental criteria have been agreed upon and implemented in a piecemeal fashion across different commodities and geographies, there is nonetheless a clear direction towards greater scrutiny, and the perception that poor performance of supply chain actors implies a greater brand reputational risk and decreased market access.

The global beef and leather industries are arguably the least progressive among the major drivers of tropical deforestation, with neither a globally recognized certification or standard-setting body, and little uptake of basic sourcing criteria or global, time-bound commitments by major multinational players. The GRSB is relatively young and with little influence compared to the other major commodity roundtables (for example around timber, soy, and palm oil), and is resistant to any verified certification or standard setting regime. While major grain and vegetable seed oil traders (Wilmar, Cargill, ADM, etc.) have made global commitments,[148] the major meatpacking companies sourcing in the tropics have so far not done so.

7.2 THE BRAZILIAN AMAZON EXAMPLE

Despite the lack of global standards and commitments, there has been partial progress in the Brazilian Amazon Biome, where pressure from campaigning organizations (in particular, Greenpeace) and the Brazilian government forced the major meatpackers JBS (including Bertin, which it acquired), Marfrig, and Minerva to implement minimum sourcing criteria[149] for direct suppliers, with some degree of success[150] in curbing cattle sourcing from recently deforested land.

Foreign buyers of Brazilian beef (supermarkets, restaurants, and consumer goods companies) likewise received pressure to verify the origin of the Brazilian beef in their supply chain, encouraging follow up with their own suppliers (i.e. the meatpackers) and resulting in a higher priority for the issue in their environmental agenda and risk evaluation.

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148 http://supply-change.org/

149 http://www.greenpeace.org/brasil/Global/brasil/report/2009/10/criterios-m-nimos-para-opera-2.pdf

150 Gibbs, Holly K., et al. "Did Ranchers and Slaughterhouses Respond to Zero-Deforestation Agreements in the Brazilian Amazon?" Conservation Letters 9.1 (2016): 32-42.

The "minimum criteria" of this agreement (called the "G4 Agreement" after the original four meatpackers) functioned as a simple filter for non-compliant properties. A rancher interested in selling to one of the meatpackers would provide some degree of geographic information for his or her land (ideally a polygon of the boundary, or at minimum the coordinates of the corral) and the meatpackers, together with third-party geospatial consultants, would filter the location for recent deforestation (since October of 2009), overlap with protected areas or indigenous territories, labor violations (according to a black list[151] maintained by Brazil's Ministry of Labor and Employment), and environmental embargos[152] placed on the rancher by the government agency tasked with environmental enforcement.

While the screening system initially appeared to be too technically impractical given the low geospatial capacity of the meatpackers and the lack of geographic information for suppliers, the ranchers and meatpackers eventually adapted with the help of hired technical consultants to create a functioning system. Frequent complaints by meatpackers of problematic availability of up-to-date government data (indigenous and protected areas, embargo lists, and slave labor lists) encouraged increased transparency of these data resources, which facilitated timely screening and boosted public awareness of violations. The meatpackers were generally unhappy with the cost of maintaining the system (especially expenses related to the technical consultants), the "leakage" to smaller meatpackers who were not party to the agreement, and that their efforts provided only the reductions in reputational or regulatory risk, and no price premium. The ranchers likewise bristled at the increased scrutiny and transparency the system required, and shrewdly innovated ways to "launder" cattle by obscuring the true property owner or the true origin of the cattle,[153] which had often passed through multiple properties prior to the final sale to a meatpacker. The scrutiny of "direct suppliers" while leaving out "indirect suppliers" remains an enormous challenge to implement a true deforestation-free sourcing regime, despite the system being now cited by meatpackers eager to tout their environmental bona fides.

Amazonian forest and Amazonian deforestation has long been prominent in the minds of the international environmental community, and the focus on the problem and partial solution of the G4 Agreement obscured the continued expansion of cattle production in other tropical ecosystems in South America. The Brazilian Cerrado and the Paraguayan Chaco, in particular, continue to lose forest and are hardly known outside of their respective countries.

7.3 THE ROLE OF PROPERTY AND TENURE DATA IN BRAZILIAN COMMODITY SOURCING

Efforts to reduce the social and environmental impact of land use change and agricultural activity inevitably connect to the problem of identifying who controls and owns each property. The Brazilian government encouraged settlement and economic development of the country's less populated center-west and northern (i.e. Amazon) regions over many decades. The controlled and uncontrolled settlement of land and conversion of natural ecosystems for agriculture resulted in vast areas of rural Brazil with only weak ties to the processes of land titling, legal enforcement, and other state services.

The CAR system, or the "Rural Environmental Registry" (*Cadastro Ambiental Rural* in Portuguese) mandated by the revision of the Brazilian Forest Code in 2012 was developed in response to the extreme challenge of clarifying who is where on the landscape, and how they manage their land. The

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151 http://www.sdh.gov.br/assuntos/conatrae/programas/cadastro-de-empregadores-201clista-suja201d

152 https://servicos.ibama.gov.br/index.php/carta-de-servicos-ao-cidadao/351-lista-de-embargos

153 Gibbs, Holly K., et al. "Did Ranchers and Slaughterhouses Respond to Zero-Deforestation Agreements in the Brazilian Amazon?" Conservation Letters 9.1 (2016): 32-42.

implementation of the system has taken place over many years and remains incomplete and often inaccurate (vast areas of overlap among two or more properties, for example) but a CAR registration does provide some measure of increased transparency for environmental enforcement, given that the registry requires details on the amount of forest on the property, legal reserves, and related information. By 31 January, 2017, more than 3.95 million rural properties were registered, totaling an area of 401,055,948 hectares,[154] an area larger than India. The Brazilian government has mandated CAR registration to receive agricultural loans,[155] and the system is one of the main pillars of the Brazilian Forest Code, which regulates forest use and clearing. While not developed with agricultural commodity sourcing in mind, the potential of the system to provide transparency for commodity buyers (grain traders and meatpackers) has made the CAR an important operational asset for engaging with producers and verifying compliance, either legally, or with the trader's own sourcing policies. The major trader Cargill, for example, points out that 60 percent of soy farmers in its supply chain are registered in the CAR[156], providing a signal of its adherence to legal norms and because the information in the CAR (which may be provided to a buyer upon request) can be quite useful for mitigating environmental risk.

7.4 PARAGUAY'S CURRENT SOURCING CRITERIA AND PERCEPTION OF RISK

As Paraguay's cattle exports are not primarily to higher value markets (e.g., US, EU, or Japan), there has been little history of promoting progressive criteria for social and environmentally monitored beef production. In general, the respective markets for Paraguay export beef determine the relatively small differences in sourcing criteria, and these correspond to price differences. The European market is both the smallest and most demanding of markets, requiring higher levels of traceability and animal welfare requirements, while Chile also requires documentation of the corral location as part of its requirements. Russia, the leading export destination of Paraguayan beef in most years, imposes very few criteria on imports beyond sanitary controls (such as foot and mouth disease regulations).

Between export and import regulations and private sector sourcing criteria, export-oriented meatpackers operating in Paraguay have received very little pressure to impose regulations or national standards for solely environmental (such as deforestation-free) criteria. Similarly, there has been minimal pressure for more exacting controls on sourcing from disputed or recognized indigenous land. Environmental license data for ranches may be checked as part of vaccination and animal transport documents, but this rarely occurs in practice. One exception for the domestic market, however, is Neuland, one of the Chaco-based Mennonite colonies. They have prioritized the domestic market and require higher traceability standards as part of their effort to stake out a brand reputation as higher quality domestic beef. The branding effort appears to enjoy some success, as the Neuland logo often appears on restaurant walls to signal the particular source of the beef on the menu.

As a rule of thumb, the only rationale for adding additional criteria (and requiring more information and transparency) acceptable to meatpackers and their suppliers appears to be either price premiums (which are small and not always available) or a significant risk of being unable to sell at all (e.g. an export ban). Meatpackers and producers tend not to be aligned on these matters either, unless the meatpacker can offer a substantively better price relative to competing buyers at the time of sale to justify the shift.

While some meatpackers operating in Paraguay (JBS and Minerva in particular) are intimately familiar with monitoring systems given their experience in the Brazilian Amazon, neither they nor the other

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154 http://www.florestal.gov.br/numeros-do-car

155 http://revistagloborural.globo.com/Colunas/fazenda-sustentavel/noticia/2016/04/sem-car-produtor-perdera-direito-ao-credito-rural.html

156 https://www.cargill.com/doc/1432081204529/cargill-forests-report-2017.pdf

players have yet felt the need to implement similar systems for the Chaco, precisely because the perception of the risk of restricted market access is outweighed by the costs and difficulties in implementing such a system. With little to fear on reputational risk, meatpackers prefer to avoid implementing a costly system that would restrict and potentially alienate their rancher supply base. The party line from meatpackers is that any additional requirements (without a price differential to justify them) simply channel suppliers to other meatpackers who will not ask for as many documents. Again, the Brazilian experience with the G4 Agreement is instructive, as the three largest meatpackers agreed simultaneously to implement new criteria and requirements. Producers could sell elsewhere if possible, but the competitive losses are mitigated somewhat by implementing among the major players in lockstep.

Apart from the portion of the market that requires corral coordinates, the present perception of risk and the relatively permissive regulatory environment discourages additional measures to connect supply chains to ranch locations or inquiries into the land tenure of sourcing areas. Investment in geospatial data for day-to-day operations is likewise limited (against the general trend in the agricultural world), and the land use and land ownership history is of little concern for cattle buyers. Disputed titles and indigenous claims and their related controversies tend not to weigh in sales contracts that are more concerned with volume and price.

7.5 POTENTIAL AVENUES FOR IMPROVEMENT

Leveraging of Existing Cattle Sector Initiatives and Best Practices

The importance of the cattle industry in the Paraguayan economy and the potential for increased exports has started to influence the industry's perspective on branding Paraguayan beef and improving capacity to meet international standards. To that end, building upon existing initiatives and collaborative processes holds potential for raising the standard of acceptable sourcing practices in the sector. For example, the ranchers' association ARP (Asociación Rural del Paraguay), together with the international NGO Solidaridad, has developed a national certification protocol for "*carne natural*" that is, natural beef,[157] which includes guides to best practices for environmental management.

Provided that sufficient incentives come into play, especially from major buyers in export markets, collaborative standard setting processes like the *Carne Natural* initiative and increased transparency of ranch locations and other geospatial data may set the stage for sourcing criteria and monitoring protocols to allow Paraguay to expand and secure its export market destinations. A wide variety of improvements across government agencies and meatpackers would be required, but there is potential to raise standards. Initiatives including the World Wildlife Fund's (WWF) Moore Foundation-funded work with the sector, as well as the United Nations Development Programme's Green Commodities program in Paraguay, seek constructive alignment among groups that are frequently at odds, including ranchers, meatpackers, NGOs, and others. Their broad thematic focus (rather than solely on, for example, deforestation) provides potential leverage points for environmental criteria to be linked with production practices and market-oriented branding exercises.

Pressure for the Private Sector to Self-Regulate

Among the many Paraguayan government agencies tasked with the management of land tenure, environmental compliance, forest stewardship, and indigenous rights and land claims, there are a great deal of mixed incentives and collectively, a limited capacity to effectively and efficiently collaborate. This results in great difficulties both in policy and operational alignment, as well as in executing the technical tasks associated with such alignment. For example, effective data management and workflows among

[157] http://www.arp.org.py/index.php?option=com_content&view=article&id=1623&Itemid=133

agencies that would facilitate transparency and document validation is impeded by both limited resources and political motives.

Within this context, the private sector makes use of the relatively low levels of regulatory pressure and enforcement to more easily acquire land, defend against competing claims, convert forest for agriculture, and keep costs low. The cattle industry has not found this lenient regulatory environment to be entirely productive, however. The occurrence of foot and mouth disease in the Paraguayan cattle herd[158] and the resulting restrictions on exports[159] are an interesting example. The lack of a strong vaccination protocol and measures to enforce it (e.g. review of documentation at road checkpoints) was seen as a failure of government capacity. As a result, the cattle industry responded via the rancher's industry organization ARP, which has subsequently entered into a public-private partnership with the National Service for Animal Health and Quality (*Servicio Nacional de Calidad y Salud Animal,* SENACSA) to implement a more effective protocol.[160] Today, the system of vaccine distribution, storage freezers, emergency generators, and more stringent documentation is claimed (by ranchers, at least) to more effectively and widely distribute vaccines across Paraguay than the equivalent system for human health.

This proactive response of the private sector to a real or expected negative impact on exports and revenue suggests a potential avenue for risk reduction in other realms, namely the potential barriers of export market access that deforestation and violation of indigenous land rights may portend. Efforts by the private sector alone, or through pressure on the government may encourage greater efficiency and implementation of government policy, and even small improvements in data transparency can be helpful to a company seeking to reduce its risk.

The finance sector provides another example of where increased transparency can reduce risk in areas beyond environmental due diligence alone. It has not generally been the practice of Paraguayan banks considering loans to agricultural projects to require location data in a digital, geographic format, though this is becoming more common. Doing so clarifies project suitability, environmental risk, the accuracy of client-provided data, and other benefits, and the long-term trend may well mean that mitigation of environmental risk and financial risk are mutually reinforcing towards increased data requirements and transparency.

As in the Brazilian example noted above, the monitoring system in the Amazon required data that only the government produces, and calls from the private sector compelled the government to improve its processes. In Paraguay, the Cartes administration has publicly urged greater transparency and information availability, and this policy is often cited amidst conversations explaining why certain datasets (environmental licensing, indigenous lands, forest monitoring, etc.) were not quite as easily available as they might be. It remains to be seen if the carrot of market access for agribusiness and the risk-related due diligence required to maintain that access will be sufficient to encourage further data availability on the government's part. At the moment, there are significant data resources that could clarify social and environmental compliance (and the lack thereof), but these data are not readily made public, and their potential use for supply chain actors is therefore limited.

Data Management and Transparency by the Beef Sector and the Government of Paraguay

A key element of an effective monitoring system involves data availability: ranch locations, accurate and legally sanctioned land use change data from INFONA, comprehensive indigenous community locations

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158 http://www.paho.org/par/index.php?option=com_content&view=article&id=560:emergencia-sanitaria-animal-fiebre-aftosa-&Itemid=258

159 http://www.5dias.com.py/6193-paraguay-suspende-exportacion-de-carne-tras-deteccion-de-fiebre-aftosa

160 http://www.senacsa.gov.py/index.php/pecuaria/sanidad-animal/control-y-erradicacion/fiebre-aftosa

and land claims (including those disputed or in process with the government or international legal system), environmental license data from SEAM, and property level data from the national cadaster.

Geospatial data on ranch locations is being collected to a limited degree, though not necessarily for the purposes of environmental compliance with the public-private partnership between ARP and SENACSA. While still an ongoing process, the partnership has gathered coordinates of ranch corrals for every cattle producer in Alto Paraguay.

Where already mandated to be public by law, the data within each of the ministry information management systems should be published online in digital format. The capacity to access and share data in standardized formats among agencies should be enabled as well. In nearly all of these cases, the existing data may be incomplete or inaccurate. Nevertheless, the online availability of these data in standard digital formats would clarify the problems.

A meatpacker attempting to properly monitor its sourcing and screen for potential indigenous land conflicts currently faces great difficulties in doing so given the state of data availability and accuracy. A few high profile cases may be easier to take into consideration (e.g. Yaguareté Porã)[161] but a systemic review requires (at the very least) knowing the location of the producer, joining census and claim data from INDI, and claim data from multiple NGOs to gain a full picture of the location and claims of indigenous people relative to the cattle's origin. Given the Paraguayan government's reluctance to recognize indigenous land claims, such a dataset and analysis tool might be more effective if managed by a national NGO, provided that the data remains open and accessible to all users (including interested private sector actors).

A unified political effort spanning national and departmental authorities that brings together land use data, land claims, and associated data to cartographically "unify" Paraguay's mapping systems also holds potential. A relevant example is Indonesia's "One Map" initiative,[162] a political effort to bring about a unified and transparent map of land use and land control. A potential candidate location to pilot such an effort is the department of Boquerón, a major cattle producing area. While the Mennonite colonies have developed their own well-ordered cadaster, there is interest in unifying the multiple levels of maps (municipal, departmental, and national). Such efforts would facilitate private sector efforts to boost transparency and enforce social and environmental criteria. Readily available and accurately mapped indigenous land data and deforestation data would greatly reduce the costs and difficulty in any future monitoring regime.

161 http://www.survivalinternational.org/about/yaguarete

162 http://www.opengovpartnership.org/sites/default/files/case-study_Indonesia_One-Map-Policy.pdf

8.0 CONCLUSION

Cattle ranching is expanding in the Paraguayan Chaco, the traditional land of indigenous peoples. Beef production, especially by large cattle operations, has contributed to the degradation and loss of forests and associated ecosystem services. This report provides an assessment of the deforestation and land rights risks to meatpackers sourcing cattle from the Paraguayan Chaco, and identifies some possible approaches to addressing these risks.

Based on WRI calculations, the Paraguayan Chaco lost an average of 245,746 ha of forest/year between 2001 and 2014, for a total loss of 3,440,441 ha in this 14-year period. This translates into an annual average deforestation rate of 1.4 percent, resulting in a 14 percent decline of forest area in the Chaco. Public Protected Areas experienced the lowest annual average of rate of average deforestation rate of 0.3 percent/year from 2001-2014 and indigenous lands had an average deforestation rate of 0.6 percent/year. Private lands had the highest average deforestation rate at 1.5 percent/year.

The last decade has seen an enormous shift in the generally accepted standard of agricultural commodity sourcing standards. While shifts towards higher standards of social and environmental criteria have been agreed upon and implemented in a piecemeal fashion across different commodities and geographies, there is nonetheless a clear direction towards greater scrutiny, and the perception that poor performance of supply chain actors implies a greater brand reputational risk and decreased market access.

The global beef and leather industries, however, are arguably the least progressive among the major drivers of tropical deforestation, with neither a globally recognized certification or standard-setting body, and little uptake of basic sourcing criteria or global, time-bound commitments by major multinational players. Three potential avenues for improvement are provided, including: 1) leveraging of existing cattle sector initiatives and best practices; 2) pressure for the private sector to self-regulate; and 3) data management and transparency by the beef sector and the government of Paraguay.

ANNEX A: LIST OF PRINCIPAL CONTACTS

Interviewed in Paraguay:

- Inés Luna Maira, Rainforest Foundation-Norway (RF-N)
- Julia Cabello Alonso, Tierra Viva (TV)
- Santiago Bobadilla, Tierra Viva (TV)
- Maximiliano Mendieta Miranda, Tierra Viva (TV)
- Yan Speranza, Fundación Moisés Bertoni (FMB)
- Raquel Fratta, Fundación Moisés Bertoni (FMB)
- Mirta Pereira, Federación por la Autodeterminación de los Pueblos Indígenas (FAPI)
- Antonina Gonzalez, Federación por la Autodeterminación de los Pueblos Indígenas (FAPI)
- Fernando Cossich, Director, USAID Paraguay Mission
- Jerry Marcus, USAID Paraguay Mission
- Shirley Zavala, Economic Growth and Environment Specialist, USAID Paraguay Mission
- Guillermo Terol, Consultant, World Wildlife Fund (WWF) and World Resources Institute (WRI)
- María del Carmen Fleytas, Country Director, Wildlife Conservation Society (WCS)
- Angel Brusquetti Rolón, Wildlife Conservation Society (WCS)
- Ezequiel Santagada, Executive Director, Instituto de Derecho y Economía Ambiental (IDEA)
- Taciano Custodio, Minerva Foods
- Aldo Zaldívar, Director, Instituto Paraguayo del Indigena (INDI)
- Carlos Franco, GIS Experts, Instituto Paraguayo del Indígena (INDI)
- Jorge Mendoza, lawyer, Instituto Paraguayo del Indígena (INDI)
- Paula Durruty, International relations at National Forest Institute (INFONA)
- Natalia Guerrero International relations at National Forest Institute (INFONA)
- Jorge Ramirez International relations at National Forest Institute (INFONA)
- Jose Serafini International relations at National Forest Institute (INFONA)
- Head Forester, International relations at National Forest Institute (INFONA)

- Cristina Morales, Country Director, World Wildlife Fund (WWF)
- Calixto Saguier, Advisor, World Wildlife Fund (WWF)
- Jorge Vera, General Coordinator, Gente, Ambiente y Territorio (GAT)
- Raul Rivarola, Cattle Rancher, Toro Pampa
- Carlos Giesbrecht, Coordinator General, Pro Comunidades Indígenas (PCI)
- Santina Cicero, Pro Comunidades Indígenas (PCI)
- Nayna Jhaveri, Tetra Tech (TT)
- Matt Sommerville, Tetra Tech (TT)
- Caleb Stevens, USAID Washington, DC
- Nelson Caballero, Secretaría del Ambiente (SEAM)
- Karem Elizeche, Secretaría del Ambiente (SEAM)
- Rudolf Hildebrandt, Filadelfia Government official

Interviewed by Skype or Telephone:

- Santiago Garcia, Open Government Partnership (OGP), Paraguay
- Peter Sawatzky, Independent Researcher, Vancouver, Canada
- Fionuala Cregan, Oxfam Novib, Netherlands
- Joel Correia, PhD student at the University of Colorado

ANNEX B: PARAGUAY TREE COVER LOSS STATISTICS, 2001- 2014

Summary Table

Territory	Total Area of Territory (ha)	Forested area in 2014 (No forest loss) (ha)	Percentage of forest intact after 2014	Average annual forest loss 2001-2014 (ha)	Percentage average annual forest loss 2001-2014	Sum of forest loss 2001-2014 (ha)	Total forest area in 2000 (ha)	Percentage forest loss 2001-2014	Percentage total area forested in 2000	Percentage total area forested in 2014	Percentage total area with forest loss 2000-2014
Indigenas Prodechaco	1,035,351	736,107	91%	5,079	0.6%	71,113	807,220	9%	78%	71%	-7%
Protected Areas	1,565,659	1,415,814	95%	4,979	0.3%	69,704	1,485,518	5%	95%	90%	-4.5%
Private Chaco (excluding Indigenas Prodechaco and Protected Areas)	21,554,883	12,355,612	79%	235,687	1.5%	3,299,624	15,655,235	21%	73%	57%	-15%
TOTAL - Entire Chaco	**24,155,893**	**14,507,532**	**81%**	**245,746**	**1.4%**	**3,440,441**	**17,947,973**	**19%**	**74%**	**60%**	**-14%**

Private Lands

DPTO_DESC	Total area (not including indigenas prodechaco or PAs) (ha)	Forested area in 2014 (No forest loss) (ha)	Pct of forest intact after 2014	Forest loss in 2001 (ha)	Forest loss in 2002 (ha)	Forest loss in 2003 (ha)	Forest loss in 2004 (ha)	Forest loss in 2005 (ha)	Forest loss in 2006 (ha)	Forest loss in 2007 (ha)	Forest loss in 2008 (ha)	Forest loss in 2009 (ha)	Forest loss in 2010 (ha)	Forest loss in 2011 (ha)	Forest loss in 2012 (ha)	Forest loss in 2013 (ha)	Forest loss in 2014 (ha)	Average annual forest loss 2001-2014 (ha)	Pct average annual forest loss	SUM Forest Loss 2001-2014 (ha)	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total dept area forested in 2000	Pct total dept area forested in 2014	Pct total dept area with forest loss 2000-2014
PRESIDENTE HAYES	6,887,862	3,112,900	86%	20,162	20,603	34,000	30,091	44,614	32,489	53,707	50,470	49,431	53,551	48,218	44,439	28,136	17,968	37,706	1.0%	527,878	3,640,778	14%	53%	45%	-8%
BOQUERON	8,373,633	5,075,010	76%	32,221	33,470	35,940	35,457	86,960	41,605	163,120	142,562	148,292	170,125	219,243	222,660	143,552	166,519	117,266	1.7%	1,641,725	6,716,735	24%	80%	61%	-20%
PARAGUAY	6,293,388	4,167,702	79%	35,370	53,271	85,678	43,334	40,715	29,456	86,739	110,401	108,661	147,171	102,488	135,176	82,948	68,611	80,716	1.5%	1,130,020	5,297,722	21%	84%	66%	-18%
TOTAL	**21,554,883**	**12,355,612**	**79%**	87,754	107,344	155,618	108,882	172,290	103,550	303,566	303,434	306,383	370,847	369,949	402,275	254,635	253,098	**235,687**	**1.5%**	**3,299,624**	######	**21%**	**73%**	**57%**	**-15%**
			Annual forest	0.6%	0.7%	1.0%	0.7%	1.1%	0.7%	1.9%	1.9%	2.0%	2.4%	2.4%	2.6%	1.6%	1.6%	**1.5%**							
																		Average annual forest loss							

Protected Areas

Protected area	Total Area of Protected Area (ha)	Forested area in 2014 (No forest loss) (ha)	Pct of forest intact after	Forest loss in 2001 (ha)	Forest loss in 2002 (ha)	Forest loss in 2003 (ha)	Forest loss in 2004 (ha)	Forest loss in 2005 (ha)	Forest loss in 2006 (ha)	Forest loss in 2007 (ha)	Forest loss in 2008 (ha)	Forest loss in 2009 (ha)	Forest loss in 2010 (ha)	Forest loss in 2011 (ha)	Forest loss in 2012 (ha)	Forest loss in 2013 (ha)	Forest loss in 2014 (ha)	Avg annual forest loss 2001-	Pct average annual forest loss	SUM Forest Loss 2001-2014	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total PA area forested in 2000	Pct total PA area forested in 2014	Pct total PA area with forest loss
Cabrera Timane	147,810	145,878	100%	38	22	16	17	42	5	112	15	26	7	48	69	133	5	40	0.0%	553	146,431	0%	99%	99%	-0.4%
Cerro Cabrera	85,955	84,940	100%	134	3	3	3	2	5	5	-	2	3	0	1	126	0	20	0.0%	286	85,226	0%	99%	99%	-0.3%
Defensores del Chaco	723,165	704,773	99%	551	97	212	1,109	478	384	2,063	603	1,064	1,199	531	1,144	66	274	698	0.1%	9,774	714,547	1%	99%	97%	-1.4%
Río Negro	315,682	251,698	91%	40	1,329	2,480	47	1,159	32	447	3,117	2,261	5,958	3,070	3,596	587	370	1,749	0.6%	24,493	276,190	9%	87%	80%	-7.8%
Tenteinte Agripino Enciso	41,412	40,121	100%	2	114	7	0	13	0	20	10	4	1	2	2	4	0	13	0.0%	179	40,299	0%	97%	97%	-0.4%
Tinfunqué	251,635	188,405	85%	714	538	202	178	1,608	686	2,942	4,270	2,901	9,204	5,135	2,627	1,298	2,117	2,459	1.1%	34,420	222,825	15%	89%	75%	-13.7%
	1,565,659	**1,415,814**	**95%**	**1,477**	**2,102**	**2,921**	**1,354**	**3,301**	**1,111**	**5,588**	**8,015**	**6,257**	**16,372**	**8,786**	**7,440**	**2,213**	**2,767**	**4,979**	**0.3%**	**69,704**	**1,485,518**	**5%**	**95%**	**90%**	**-4.5%**
			Annual forest loss	0.1%	0.1%	0.2%	0.1%	0.2%	0.1%	0.4%	0.5%	0.4%	1.1%	0.6%	0.5%	0.1%	0.2%	**0.3%**							
																		Avg annual forest							

Indigenous Lands

	Total Area of IP Territory (ha)	Forested area in 2014 (No forest	Pct of forest intact after 2014	Forest loss in 2001 (ha)	Forest loss in 2002 (ha)	Forest loss in 2003 (ha)	Forest loss in 2004 (ha)	Forest loss in 2005 (ha)	Forest loss in 2006 (ha)	Forest loss in 2007 (ha)	Forest loss in 2008 (ha)	Forest loss in 2009 (ha)	Forest loss in 2010 (ha)	Forest loss in 2011 (ha)	Forest loss in 2012 (ha)	Forest loss in 2013 (ha)	Forest loss in 2014 (ha)	Average annual forest loss 2001-2014 (ha)	Pct average annual forest loss	SUM Forest Loss 2001-2014	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total IT area forested in 2000	Pct total IT area forested in 2014	Pct total IT area with forest loss 2000-
Asociacion de Grupos de Indigenas_38-1	743	500	100%	-	0	1	0	0	-	-	-	-	-	-	0	-	-	0	0.0%	2	502	0%	68%	67%	-0.3%
Buena Vista-Yamasamakxaxapen_34	24,493	19,078	100%	3	2	-	3	1	2	1	4	3	1	5	16	4	2	3	0.0%	47	19,125	0%	78%	78%	-0.2%
Cacique Sapo_54-1	901	425	83%	5	9	-	6	-	-	52	10	2	-	0	-	-	-	6	1.2%	85	510	17%	57%	47%	-9.5%
Campo Alegre_15	17,668	11,806	91%	122	94	135	127	39	6	91	55	346	24	106	68	24	1	89	0.7%	1,239	13,045	9%	74%	67%	-7.0%
Campo Largo_77	5,733	2,459	81%	87	107	134	3	86	16	26	22	64	1	32	5	0	0	42	1.4%	582	3,041	19%	53%	43%	-10.1%
Campo Loa_76-1	3,774	2,914	99%	3	1	2	-	0	-	-	5	1	0	0	10	2	0	2	0.1%	25	2,939	1%	78%	77%	-0.7%
Campo Loro, Ebetogue (exR. Amushka)_8	10,526	6,899	85%	18	68	69	1	107	100	238	73	80	183	55	181	19	61	90	1.1%	1,253	8,152	15%	77%	66%	-11.9%
Campos y Ampu (Ex-L.Puente)_7-1	7,501	5,922	83%	6	1	1	1	6	-	42	4	35	238	171	14	-	681	86	1.2%	1,200	7,122	17%	95%	79%	-16.0%
Canaan_89-1	23,134	22,599	98%	3	5	5	1	35	1	6	6	3	16	8	338	13	71	37	0.2%	511	23,110	2%	100%	98%	-2.2%
Casanillo - Conomactololac_18-1	15,842	11,843	97%	7	26	20	2	10	17	46	12	4	6	24	48	61	74	26	0.2%	357	12,200	3%	77%	75%	-2.3%
Casuarina_16	8,155	5,392	92%	46	14	94	51	10	1	28	37	5	6	27	121	5	2	32	0.5%	446	5,839	8%	72%	66%	-5.5%
Cayin o Clim (Colonia Neuland)_122-2	1,102	35	68%	1	1	2	-	2	0	1	5	0	4	0	0	-	-	1	2.3%	16	51	32%	5%	3%	-1.5%
Cayin o Clim (Ex-Lorenzo Presentado_6	11,459	7,669	70%	59	-	-	-	7	253	310	130	-	856	1,061	532	18	5	231	2.1%	3,230	10,899	30%	95%	67%	-28.2%
Chovoreka_80-1	20,007	19,639	98%	0	2	-	2	1	2	222	3	20	0	0	11	36	-	21	0.1%	299	19,938	2%	100%	98%	-1.5%
Colonia Armonia_36	3,678	1,748	89%	151	0	68	0	0	-	-	2	-	1	1	1	-	-	16	0.8%	224	1,972	11%	54%	48%	-6.1%
Colonia La Esperanza_40-1	7,365	5,632	98%	0	1	0	1	11	2	3	22	10	10	13	15	-	-	6	0.1%	87	5,719	2%	78%	76%	-1.2%
Colonia La Esperanza_40-2	4,002	1,926	96%	1	0	2	1	3	-	9	2	12	5	14	20	-	-	5	0.3%	70	1,996	4%	50%	48%	-1.7%
Colonia Marite_9-1	11,327	3,805	98%	1	5	28	1	3	-	3	33	0	18	2	0	0	-	7	0.2%	95	3,900	2%	34%	34%	-0.8%
Comunidad Nivacle Unida_56	9,604	5,940	88%	119	89	126	14	40	8	154	98	21	10	94	9	0	0	56	0.8%	784	6,723	12%	70%	62%	-8.2%

	Total Area of IP Territory (ha)	Forested area in 2014 (No forest	Pct of forest intact after 2014	Forest loss in 2001 (ha)	Forest loss in 2002 (ha)	Forest loss in 2003 (ha)	Forest loss in 2004 (ha)	Forest loss in 2005 (ha)	Forest loss in 2006 (ha)	Forest loss in 2007 (ha)	Forest loss in 2008 (ha)	Forest loss in 2009 (ha)	Forest loss in 2010 (ha)	Forest loss in 2011 (ha)	Forest loss in 2012 (ha)	Forest loss in 2013 (ha)	Forest loss in 2014 (ha)	Average annual forest loss 2001-2014 (ha)	Pct average annual forest loss	SUM Forest Loss 2001-2014	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total IT area forested in 2000	Pct total IT area forested in 2014	Pct total IT area with forest loss 2000-
Cora i (Ex Eaton & Cia)_70-1	14,973	10,246	96%	5	25	39	35	89	3	75	47	6	13	18	46	5	0	29	0.3%	408	10,654	4%	71%	68%	-2.7%
Cucaani_26-2	249	193	100%	-	-	-	0	-	-	-	-	1	-	-	-	0	-	0	0.0%	1	193	0%	78%	77%	-0.4%
Diez Leguas (12 de julio y Palo Blanco)_39-1	5,436	4,482	91%	22	17	38	4	6	15	86	51	27	26	124	21	2	1	31	0.6%	439	4,921	9%	91%	82%	-8.1%
Ebetogue_85-1	907	43	33%	-	35	1	43	2	-	-	1	5	-	-	-	-	-	6	4.8%	87	130	67%	14%	5%	-9.6%
El Estribo_41	10,377	7,094	98%	26	11	3	1	3	9	41	12	4	2	6	15	17	0	11	0.1%	151	7,245	2%	70%	68%	-1.5%
Estancia Pedernal-Naranjaty_55-1	903	402	100%	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	0.0%	0	402	0%	45%	45%	0.0%
Familias Unidas_67-1	3,798	3,624	99%	0	5	2	-	0	-	2	7	8	-	12	0	-	-	3	0.1%	35	3,659	1%	96%	95%	-0.9%
Filadelfia - Laguna Pora (Colonia Fernheim)_121-1	915	8	92%	0	-	-	-	-	-	-	-	0	-	-	0	-	-	0	0.6%	1	9	8%	1%	1%	-0.1%
Fischat San Leonardo (Mision Escalante)_23-1	5,063	4,569	99%	1	-	0	-	-	-	-	14	-	5	1	8	4	2	2	0.1%	34	4,603	1%	91%	90%	-0.7%
Fischat San Leonardo (Mision Escalante)_23-2	4,573	3,405	99%	1	0	1	0	3	-	0	13	0	5	1	26	0	0	4	0.1%	51	3,455	1%	76%	74%	-1.1%
Fuerte Olimpo - Mision Sta. Teresita_63-1	104	51	100%	-	-	-	-	0	-	-	-	-	-	-	-	-	-	0	0.0%	0	51	0%	49%	49%	-0.1%
Guarani-Nandeva (Ex-López)_3-2	8,097	4,389	100%	0	1	5	0	8	0	-	4	0	1	0	-	-	-	2	0.0%	21	4,410	0%	54%	54%	-0.3%
Guarani-Nandeva (Ex-W.Heckeler)_3-1	27,834	20,597	77%	0	3	1	7	571	320	153	53	988	737	765	607	91	2,029	452	1.7%	6,326	26,923	23%	97%	74%	-22.7%
Guidai shai_26-3	129	80	99%	-	0	0	-	-	0	-	-	0	-	-	-	-	-	0	0.1%	1	81	1%	63%	62%	-0.9%
Isla Alta_26-1	18,723	16,881	98%	3	1	170	5	1	1	23	3	7	2	73	4	1	0	21	0.1%	293	17,173	2%	92%	90%	-1.6%
Jesudi_4-1	4,707	4,539	99%	5	1	1	-	1	-	1	11	2	1	0	9	0	0	2	0.1%	33	4,571	1%	97%	96%	-0.7%
Josojiyish/Jacavash_94-1	1,835	1,213	72%	-	11	8	3	60	1	12	106	133	20	6	107	-	0	33	2.0%	466	1,679	28%	91%	66%	-25.4%
Josojiyish/Jacavash_94-2	495	370	91%	-	1	-	-	-	-	0	31	0	-	5	-	-	-	3	0.6%	37	407	9%	82%	75%	-7.5%

	Total Area of IP Territorg (ha)	Forested area in 2014 (No forest	Pct of forest intact after 2014	Forest loss in 2001 (ha)	Forest loss in 2002 (ha)	Forest loss in 2003 (ha)	Forest loss in 2004 (ha)	Forest loss in 2005 (ha)	Forest loss in 2006 (ha)	Forest loss in 2007 (ha)	Forest loss in 2008 (ha)	Forest loss in 2009 (ha)	Forest loss in 2010 (ha)	Forest loss in 2011 (ha)	Forest loss in 2012 (ha)	Forest loss in 2013 (ha)	Forest loss in 2014 (ha)	Average annual forest loss 2001-2014 (ha)	Pct average annual forest loss	SUM Forest Loss 2001-2014	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total IT area forested in 2000	Pct total IT area forested in 2014	Pct total IT area with forest loss 2000-
Karcha Balhut/Wothuta_59-1	9,834	8,767	98%	10	5	27	1	11	39	5	12	3	23	24	20	-	0	13	0.1%	179	8,946	2%	91%	89%	-1.8%
Kayaweatog Kelasma (Ea. Los Lapacho)_72-1	9,999	6,098	91%	117	179	43	94	4	5	3	11	9	9	79	17	1	0	41	0.6%	572	6,670	9%	67%	61%	-5.7%
La Abundancia (Ex-Norman de Costa)_5-2	3,967	3,759	96%	0	7	7	-	-	7	48	47	4	0	31	0	-	-	11	0.3%	152	3,911	4%	99%	95%	-3.8%
La Abundancia_5-1	907	154	89%	8	-	0	-	-	0	3	6	-	-	2	-	-	-	1	0.8%	20	174	11%	19%	17%	-2.2%
La Esperanza (Ex - P.Ortiz)_71-1	7,507	5,062	93%	4	-	8	20	42	18	43	112	13	1	8	113	0	1	27	0.5%	382	5,445	7%	73%	67%	-5.1%
La Esperanza (Ex - P.Ortiz)_71-2	3,712	2,394	97%	1	-	0	1	11	3	2	7	6	2	4	29	0	3	5	0.2%	70	2,464	3%	66%	64%	-1.9%
La Esperanza_61-1	1,816	734	81%	1	-	14	43	7	1	26	2	14	12	40	6	-	3	12	1.3%	167	902	19%	50%	40%	-9.2%
La Patria_30-1	22,972	18,920	99%	7	14	11	18	16	1	9	24	8	8	2	37	5	1	11	0.1%	160	19,080	1%	83%	82%	-0.7%
Laguna Negra_11	14,916	12,181	98%	14	5	2	6	9	23	5	2	86	52	10	74	5	4	21	0.2%	296	12,478	2%	84%	82%	-2.0%
Lamenxay (Lag. Pato, Sta. Juanita)(ex. J. Abente)_73	914	611	90%	-	0	5	1	4	3	1	16	0	0	0	37	-	-	5	0.7%	68	679	10%	74%	67%	-7.4%
Lhavoj ocfi Pablo Stahl - San Jose_24-1	9,092	6,141	92%	0	-	0	-	1	-	1	0	1	1	0	43	440	18	36	0.5%	505	6,646	8%	73%	68%	-5.6%
Lhavoj ocfi Pablo Stahl - San Jose_24-2	12,034	11,146	97%	2	3	8	1	16	1	8	6	92	18	24	23	18	76	21	0.2%	297	11,443	3%	95%	93%	-2.5%
Loma_58-1	10,000	6,635	76%	2	13	1	8	1	2	296	384	227	38	17	641	215	250	150	1.7%	2,095	8,729	24%	87%	66%	-20.9%
Makthlawaiya (Ex-Mision Central)_31-1	3,950	2,156	99%	0	2	2	-	0	-	1	4	0	0	-	2	1	8	1	0.1%	20	2,175	1%	55%	55%	-0.5%
Manjuy - Nivacle (Ex - Francisco Fleitas)_96	918	837	92%	4	-	-	-	-	-	3	-	-	-	-	0	-	68	5	0.6%	75	911	8%	99%	91%	-8.2%
Mision P. P. Pena_20-1	5,259	4,296	97%	2	5	5	3	19	10	14	20	10	13	8	20	17	4	11	0.2%	149	4,445	3%	85%	82%	-2.8%
Mision P. P. Pena_21-1	6,558	5,343	99%	4	4	1	3	2	2	10	12	7	4	2	6	0	-	4	0.1%	58	5,400	1%	82%	81%	-0.9%

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Mision P. P. Pena_22-1	17,624	14,384	99%	7	1	0	4	7	4	17	25	7	10	34	4	5	0	9	0.1%	126	14,510	1%	82%	82%	-0.7%
Mision P. P. Pena_27-1	1,272	1,106	100%	-	1	0	-	1	0	1	0	-	0	2	-	-	-	0	0.0%	5	1,111	0%	87%	87%	-0.4%
Mision Sta. Rosa_87	14,332	13,229	98%	22	77	76	1	1	-	10	-	5	3	1	0	9	0	15	0.1%	205	13,435	2%	94%	92%	-1.4%
Mistolar_69-1	904	512	100%	-	-	-	0	0	-	-	0	0	-	-	1	-	-	0	0.0%	2	513	0%	57%	57%	-0.2%
Ngalec Qom - San Jose_33	7,301	4,676	97%	2	1	1	0	2	3	6	5	8	2	14	14	83	2	10	0.2%	143	4,818	3%	66%	64%	-2.0%
Nich a Toyish_12	9,954	7,547	96%	52	2	8	1	4	12	17	59	107	1	13	31	0	0	22	0.3%	309	7,856	4%	79%	76%	-3.1%
Nivacle - Otros_37-1	904	133	100%	-	-	-	-	-	-	-	-	-	-	-	0	-	0	0	0.0%	1	133	0%	15%	15%	-0.1%
Novoctas_42-1	1,651	1,408	95%	0	0	0	0	-	-	0	0	-	64	1	3	3	-	5	0.3%	72	1,480	5%	90%	85%	-4.4%
Novoctas_42-2	1,860	1,668	96%	51	-	-	0	0	7	0	0	-	-	2	0	2	0	5	0.3%	63	1,731	4%	93%	90%	-3.4%
Novoctas_42-3	1,860	1,544	98%	0	-	4	1	1	5	2	4	-	3	3	6	1	-	2	0.1%	31	1,575	2%	85%	83%	-1.7%
Novoctas_42-4	5,620	4,881	98%	6	0	3	0	1	2	27	9	11	4	20	17	8	-	8	0.2%	108	4,989	2%	89%	87%	-1.9%
Nueva Promesa_81	7,360	4,738	98%	0	7	0	15	50	6	1	6	0	2	2	4	0	-	7	0.1%	92	4,831	2%	66%	64%	-1.3%
Nueva Vida_62-1	1,116	644	95%	3	2	0	-	7	-	1	2	2	0	0	4	3	10	2	0.4%	33	677	5%	61%	58%	-3.0%
Nu-Guazu(ex-Pykasu)(ex-Guy Durand)_1-1	50,140	26,687	96%	180	140	239	7	126	5	15	125	8	10	132	2	1	-	71	0.3%	990	27,678	4%	55%	53%	-2.0%
Onichta - Puerto Esperanza_44-1	1,544	924	100%	0	-	2	-	-	-	-	1	-	-	0	0	-	-	0	0.0%	3	927	0%	60%	60%	-0.2%
Onichta - Puerto Esperanza_44-2	19,437	12,226	91%	15	6	134	3	72	6	244	10	137	357	21	169	0	0	84	0.6%	1,175	13,400	9%	69%	63%	-6.0%
Padre Livio Farina (Pueblito - P. Casado)_84-	585	222	98%	-	0	0	0	-	1	1	-	1	0	1	0	-	0	0	0.1%	4	226	2%	39%	38%	-0.6%
Paz del Chaco_82	10,714	6,025	92%	14	106	24	17	25	0	123	7	18	136	33	15	7	0	38	0.6%	526	6,552	8%	61%	56%	-4.9%
Pesempoo - Ea. Paratodo (Colonia Menno)_120-1	916	77	91%	0	1	0	-	-	-	4	-	2	-	-	1	0	-	1	0.7%	8	85	9%	9%	8%	-0.9%
Pitiantuta/Puerto Ma. Elena (Ex-J.R	1,872	1,030	100%	1	1	1	1	0	0	1	0	0	0	0	0	-	-	0	0.0%	5	1,035	0%	55%	55%	-0.3%

	Total Area of IP Territory (ha)	Forested area in 2014 (No forest	Pct of forest intact after 2014	Forest loss in 2001 (ha)	Forest loss in 2002 (ha)	Forest loss in 2003 (ha)	Forest loss in 2004 (ha)	Forest loss in 2005 (ha)	Forest loss in 2006 (ha)	Forest loss in 2007 (ha)	Forest loss in 2008 (ha)	Forest loss in 2009 (ha)	Forest loss in 2010 (ha)	Forest loss in 2011 (ha)	Forest loss in 2012 (ha)	Forest loss in 2013 (ha)	Forest loss in 2014 (ha)	Average annual forest loss 2001-2014 (ha)	Pct average annual forest loss	SUM Forest Loss 2001-2014	TOTAL Forest Area in 2000 (ha)	Pct forest loss 2001-2014	Pct total IT area forested in 2000	Pct total IT area forested in 2014	Pct total IT area with forest loss 2000-
Pitiantuta/Puerto Ma. Elena_45-2	1,997	1,708	99%	0	-	3	0	-	1	3	1	4	3	0	3	0	-	1	0.1%	19	1,727	1%	86%	86%	-1.0%
Pozo Amarillo_60-1	8,152	2,829	85%	57	77	80	58	19	16	54	40	5	43	16	45	1	0	36	1.1%	510	3,339	15%	41%	35%	-6.3%
Puerto Caballo_48-1	2,497	2,462	100%	-	-	2	-	-	-	0	0	0	2	-	0	-	1	0	0.0%	7	2,469	0%	99%	99%	-0.3%
Puerto Caballo_48-2	5,927	5,813	100%	-	-	-	-	-	0	0	1	0	0	-	1	0	0	0	0.0%	3	5,816	0%	98%	98%	-0.1%
Puerto Diana_49-1	2,210	1,872	96%	0	6	7	-	2	0	1	1	0	60	4	1	-	-	6	0.3%	83	1,955	4%	88%	85%	-3.7%
Pycasu_65	43,035	17,166	95%	214	62	163	63	60	30	21	207	5	63	11	14	-	-	65	0.4%	914	18,080	5%	42%	40%	-2.1%
Qenkuket_29	472	253	100%	0	-	-	-	-	0	-	0	-	-	-	-	-	-	0	0.0%	1	253	0%	54%	54%	-0.1%
Qominayajnaqta (Rio Verde y S.F. de Asis)_43-1	1,059	129	100%	-	-	-	-	0	-	-	-	-	-	-	-	0	-	0	0.0%	0	130	0%	12%	12%	0.0%
Quenjaclay_28-1	903	566	99%	-	0	-	0	2	-	0	3	-	1	-	0	-	-	0	0.1%	6	572	1%	63%	63%	-0.7%
Reserva Indigena_17-1	3,248	2,528	99%	2	0	5	-	1	-	1	2	5	4	3	7	1	-	2	0.1%	30	2,558	1%	79%	78%	-0.9%
Reserva Indigena_79-1	36,241	32,488	91%	17	53	56	8	341	649	997	19	92	3	624	200	139	80	234	0.7%	3,279	35,767	9%	99%	90%	-9.0%
Riacho Mosquito_51-1	31,500	29,591	100%	5	0	31	3	6	5	7	2	5	5	9	8	4	30	9	0.0%	120	29,711	0%	94%	94%	-0.4%
San Carlos_83-1	3,670	2,617	98%	1	3	1	1	1	8	12	2	8	7	1	2	2	0	4	0.1%	49	2,666	2%	73%	71%	-1.3%
Sandhorst (Colonia Neuland)_122-1	1,157	23	66%	2	0	0	-	-	-	0	2	-	7	-	0	-	-	1	2.4%	12	34	34%	3%	2%	-1.0%
Santa Maria_57-1	6,217	5,520	98%	0	0	2	0	0	0	44	18	0	1	17	3	3	3	7	0.1%	93	5,613	2%	90%	89%	-1.5%
Santa Rosa Manjuy (Ex-Guido Martinez C.)_19	910	179	20%	1	-	-	-	-	-	5	-	143	-	294	279	0	-	52	5.7%	721	900	80%	99%	20%	-79.3%
Santa Teresa_57-3	6,317	5,714	93%	3	2	1	9	1	4	30	2	1	1	4	86	172	86	29	0.5%	400	6,114	7%	97%	90%	-6.3%
Santa Teresita_10	7,369	6,562	100%	0	0	0	0	5	-	3	-	0	-	0	0	1	0	1	0.0%	11	6,572	0%	89%	89%	-0.1%
Santo Domingo y San Martin_2-1	4,414	3,833	92%	1	12	55	11	62	0	61	35	6	35	2	29	39	-	25	0.6%	348	4,181	8%	95%	87%	-7.9%
Santo Domingo_57-2	6,790	6,363	99%	1	1	13	0	1	2	7	3	-	2	3	18	2	-	4	0.1%	52	6,415	1%	94%	94%	-0.8%
Siete Horizontes - Yanekyaha_35	10,127	6,387	97%	2	5	27	6	8	6	46	12	65	9	3	11	2	12	15	0.2%	214	6,601	3%	65%	63%	-2.1%

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Sombrero Piri (Ex-La Herencia)_32-1	10,347	7,519	92%	4	21	18	113	18	5	96	52	62	87	54	150	2	1	49	0.6%	681	8,200	8%	79%	73%	-6.6%
Totobiegosode - EbetoguГ‡Ü (Miguel L.	905	116	18%	49	237	12	155	-	0	1	3	41	18	-	1	2	8	38	5.9%	526	642	82%	71%	13%	-58.1%
Totobiegosode (Ex - E. Nieto)_50-1	9,310	8,963	98%	0	0	0	-	0	89	70	-	-	1	1	1	0	1	12	0.1%	164	9,127	2%	98%	96%	-1.8%
Totobiegosode (Ex - J.E. Gorostiaga_53-1	29,595	23,579	97%	6	90	79	2	7	3	72	17	72	8	29	261	1	0	46	0.2%	646	24,225	3%	82%	80%	-2.2%
Totobiegosode_64-1	26,190	13,588	98%	20	6	60	1	39	23	38	29	7	21	35	35	1	0	22	0.2%	315	13,902	2%	53%	52%	-1.2%
Totobiegosode_66-1	29,778	13,826	94%	10	6	1	29	497	3	8	28	15	17	95	115	42	4	62	0.4%	870	14,697	6%	49%	46%	-2.9%
Totobiegosode_74-1	80,263	56,807	79%	36	29	237	170	1,011	186	4,044	3,039	50	2,982	2,190	597	106	62	1,053	1.5%	14,739	71,546	21%	89%	71%	-18.4%
Tte. Montania_47-1	6,380	5,652	92%	93	132	83	-	11	-	43	5	9	8	4	83	2	-	34	0.6%	473	6,125	8%	96%	89%	-7.4%
Urbano (Filadelfia)_127-1	996	45	95%	-	0	-	0	0	-	-	-	-	-	1	1	0	-	0	0.4%	3	48	5%	5%	5%	-0.3%
Urbano (Filadelfia)_128-1	996	39	86%	0	1	1	-	-	-	0	3	-	0	0	1	-	-	0	1.0%	6	45	14%	5%	4%	-0.6%
Yalve Sanga (Ex-Benito Galeano)_13-1	25,160	9,487	39%	655	648	3	745	1,176	3	2,234	2,106	4,145	1,468	40	361	974	117	1,048	4.3%	14,675	24,162	61%	96%	38%	-58.3%
Yalve Sanga_14	6,219	1,671	65%	294	113	4	76	34	14	219	71	4	10	37	21	1	1	64	2.5%	898	2,569	35%	41%	27%	-14.4%
Yby Pora SRL (GAT)_	28,833	27,806	99%	9	5	38	1	9	0	14	8	30	28	3	26	1	4	13	0.0%	176	27,982	1%	97%	96%	-0.6%
Yishinachat_25-1	1,823	1,451	96%	2	0	1	0	1	4	0	10	1	2	17	1	0	19	4	0.3%	59	1,510	4%	83%	80%	-3.2%
Yishinachat_25-2	5,659	5,130	99%	1	-	0	0	3	-	-	13	10	1	2	22	3	-	4	0.1%	55	5,184	1%	92%	91%	-1.0%
Ylyhorta - Buena Vista_46-1	1,872	1,142	100%	-	-	0	-	-	-	-	0	0	0	0	1	1	-	0	0.0%	2	1,145	0%	61%	61%	-0.1%
Yshyro Ybytoso_124-1	628	234	40%	-	8	9	0	0	0	4	10	-	8	0	316	1	0	26	4.3%	358	592	60%	94%	37%	-57.0%
Yshyro Ybytoso_124-2	8,733	7,141	83%	-	19	5	1	1	1	21	37	907	341	65	87	-	7	107	1.2%	1,493	8,634	17%	99%	82%	-17.1%
TOTAL	1,035,351	736,107	91%	2,710	2,653	2,583	2,017	4,861	1,979	10,733	7,571	8,266	8,212	6,718	6,361	2,630	3,819	5,079	0.6%	71,113	807,220	9%	78%	71%	-6.9%
		Annual forest loss		0.3%	0.3%	0.3%	0.2%	0.6%	0.2%	1.3%	0.9%	1.0%	1.0%	0.8%	0.8%	0.3%	0.5%	**0.6%**	**Average annual forest loss (%)**						

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