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PARAGUAY REPORT ON DEFORESTATION

2000-2024

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CGIAR POLICY INNOVATIONS

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INTRODUCTION – PARAGUAY NATIVE FOREST

Native forest Paraguay definition

The definition of "forest" varies between countries, and while the differences may be marked by small subtleties, this can imply important divergences in what is understood by deforestation and/or forest degradation.

A first approximation to the definition of forests in Paraguay arises from Art. 5 of Law 2524/04, on "zero deforestation" in the Eastern Region.[1] There, "native forest" is defined as any native or autochthonous ecosystem, whether or not intervened, regenerated by natural succession or other forestry techniques, which occupies a minimum area of two hectares, characterized by the presence of mature trees of different ages, species and varied size, with one or more canopies that cover more than 50% (fifty percent) of that area and where there are more than sixty trees per hectare of fifteen or more centimeters in diameter measured at breast height.

However, to monitor its forest cover and land use change, the National Forestry Institute (INFONA for its anachronism in Spanish), define native or natural forest as the natural ecosystem with biological diversity, intervened or not, regenerated and/or restored by natural succession or forestry techniques of enrichment with native species, that produces goods, provides environmental and social services, whose minimum area is 1 hectare (1 ha), with a tree height equal to or greater than three meters (3 m) in the Western Region and equal to or greater than five meters (5 m) in the Eastern Region and that reaches a minimum canopy cover in its natural state of at least ten percent (10%) of the referenced area in the Western Region and thirty percent (30%) in the Eastern Region (INFONA, 2023). This definition is reflected in Decree 175/18, which regulates the Forestry Law 422/73.

Understanding the subtle differences in the formal definition of forests is very relevant to achieve a more complete understanding of what each of the existing monitoring platforms reflects and that can explain the divergences that are evident, in each case, regarding the area of forests, deforestation and/or forest degradation.

An exercise carried out by INFONA in its first National Report on Forest Cover and Land Use Change 2017-2020 (INFONA, 2022) exposes the divergence in the results of forest monitoring by different platforms in the period 2010-2020.

[1] See https://nube.infona.gov.py/index.php/s/tofX5Pr6ZJMSe3q?_gl=1*77taaw*_ga*MTgxMjMxNjAwNS4xNzMwOTAzMDcy*_ga_ZFFD2K46GW*MTczNjg1ODkwMy4xMy4xLjE3MzY4NTkxMjQuMC4wLjA.#pdfviewer

Table 1. Global estimates of forest cover and deforestation in Paraguay

Source	Satellital Product	Year	Spatial resolution	Forest Cover	Deforestation rate (2010-2020) (ha)
INFONA	Landsat	2020	30 m	15,951,543.7	218,537.1
GlobeLand[1]	Landsat	2020	30 m	14,394,729.0	385,848.7
Forest/No Forest JAXA[2]	ALOS-SAR	2017	25 m	9,723,001.0	660,626.4
Forest/No Forest Tan-DEM-X[3]	TerraSAR-X	2019	56 m	15,395,906.0	-
Copernicus[4]	Sentinel-2	2019	100 m	6,996,503.0	-
ESRI[5]	Sentinel-2	2020	10 m	18,448,781.0	-
ESA[6]	Sentinel 1-2	2020	10 m	16,473,894.0	185,403.8
GFC Hansen >=10%[7]	Landsat	2020	31 m	20,608,452.0	405,100.3
GFC Hansen >=20%[7]	Landsat	2020	31 m	19,638,366.0	-
GFC Hansen >=30%[7]	Landsat	2020	31 m	18,131,076.0	
Global Land Cover ESA[8]	MERIS-ENVISAT	2009	309 m	22,526,354.0	
FRA[9]	Landsat	2020	30 m	16,102,263.0	279,334.8
MapBiomas[10]	Landsat	2022	30 m	21,305,262.0	246,607.7

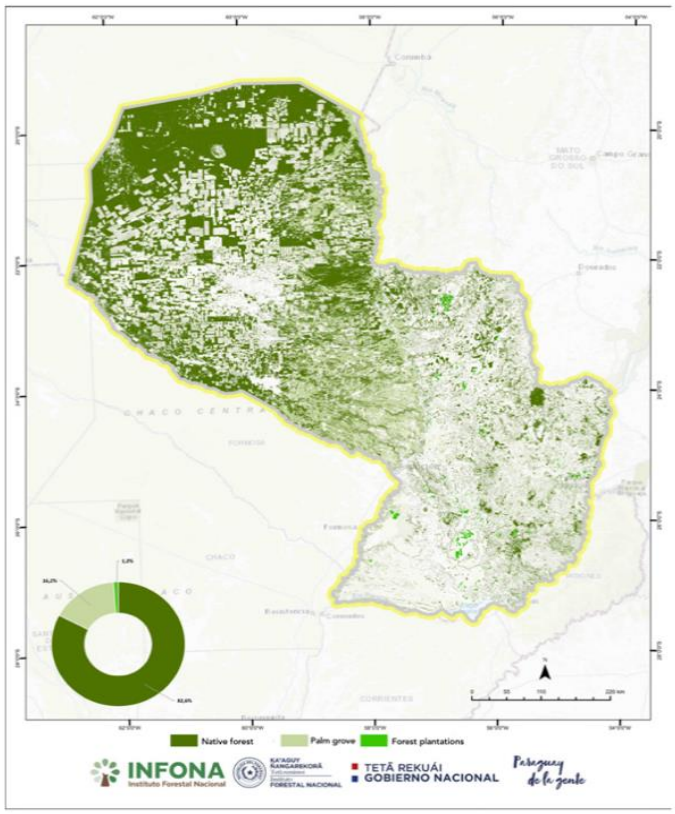
Notes: 1. http://www.globallandcover.com/home_en.html., 2. https://www.sciencedirect.com/science/article/abs/pii/S0034425714001527?via%3Dihub, 3. https://geoservice.dlr.de/web/dataguide/fnf50/, 4. https://land.copernicus.eu/global/content/algorithm-lcc-100m-v30-global 5. https://livingatlas.arcgis.com/landcover/, 6. https://worldcover2020.esa.int/viewer, 7. https://www.science.org/doi/10.1126/science.1244693 8. http://due.esrin.esa.int/page_globcover.php, 9. https://fra-data.fao.org/PRY/fra2020/home/ 10. https://paraguay.mapbiomas.org/. Source: Authors based on INFONA (2022) and MapBiomas.

In any case, it should be noted that the values of forest cover area and deforestation rates observed in **Table 1** not only reflect the impact of the use of different forest definitions but also show variations in the years analyzed. Additionally, these variations could be affected by parameters such as spatial resolution, satellite type, minimum mapping unit, scale, among others.

The state of Paraguayan forest

According to the latest National Report on Forest Cover and Land Use Change (INFONA, 2023), Paraguay had 17,727,756.6 hectares of forest cover in 2022. That represents 44.3% of Paraguayan territory, which is distributed in 14,6 million of has of native forests that represent 36.6% of the national surface. Palm groves, with 2,8 million of has represents other 7.2%. Forest plantations, with 204,6 thousand of ha, cover 0.5% of the national territory.

Figure 1. Paraguay Forest Distribution Map 2022



Source: INFONA, 2023.

Most of the surface is in the Western Region (commonly known as Chacho Paraguayo) there was 14,679,366.4 ha of forest cover, corresponding to 82.8% of the national total in 2022. On the other hand, in the Eastern Region there was 3,048,390.2 ha of forest cover, corresponding to 17.2% of the national total.

Table 2. Native Forest in Paraguay by region. Year 2022

Categories	Eastern Region		Western Region	
	Area (ha)	%	Area (ha)	%
Native forest	2,693,190.1	18.4	11,958,196.5	81.6
Palm savannas	152,211.2	5.3	2,719,527.1	94.7
Forest plantations	202,988.9	99.2	1,642.8	0.8
Total	**3,048,390.2**	**100**	**14,679,366.4**	**100**

Source: Authors based on INFONA, 2023.

The National Report on Forest Cover and Land Use Change (INFONA, 2023) also reports the surface by strata, which are defined considering biophysical variables such as climate, temperature, and land type, among others.

In 2022, the stratum called Chaco Dry Forest (BSCh) represents 56.3% of the country's forest cover, and 65% of the total native forest. The Subhumid Flooded Forest of the Paraguay River (BSHIRP) and the Humid Forest of the Eastern Region (BHRO) represent 29.6% and 13.2% of total forest cover, respectively. The Cerrado Subhumid Forest (BSHC) represents less than 1% of the forest cover.

Table 3. Forest cover by strata. Year 2022.

Forest Stratum	Area (ha)				
	Native Forest	Palm Savanna	Forest Plantation	Total	%
Chaco Dry Forest (BSCh)	9,525,393.6	447,903.0	729.3	9,974,025.8	56.3
Subhumid Flooded Forest of the Paraguay River (BSHIRP)	2,800,255.8	2,432,130.0	27,735.8	5,251,121.6	29.6
Eastern Region Rainforest (BHRO)	2,163,716.3	699.6	175,020.3	2,339,436.2	13.2
Cerrado Sub-humid Forest (BSCH)	162,020.9	5.8	1,146.4	163,173.1	0.9
Total	**14,651,386.6**	**2,871,738.3**	**204,631.7**	**17,727,756.6**	**100.0**

Source: Authors based on INFONA, 2023.

This information by stratum is also disaggregated by region and at the department level. The results of the monitoring carried out by INFONA and its composition by strata are used in the official reports that Paraguay presents, both nationally and internationally.

REGULATORY FRAMEWORK / REVIEW OF DEFORESTATION-RELATED REGULATIONS

Evaluation of National Regulations

Paraguay's forestry legal framework is regulated by various laws, decrees and provisions that seek to promote the sustainable management of the country's forest resources.

In 1973 Paraguay approved the Forestry Law No. 422/73, establishing the general provisions for the protection, conservation, management, and sustainable use of forest resources in Paraguay. Decree No. 175/2018 modifies Article 42 of the Law, establishes that all rural properties of more than twenty hectares in forested areas must maintain 25% of their area in natural forests, and if they do not have this minimum percentage, the owner must reforest an area equivalent to 5% of the property's surface area, or will reforest until completing twenty-five percent (25%) of the Natural Forest or acquire Environmental Services Certificates until completing said percentage (5% or 25% as the case may be) through the regime established in Law No. 3.001/2006 "On Valuation and Compensation of Environmental Services" and its regulations.

In parallel, Law 4.241/10 of "Reestablishment of Water courses Protection Forests within the national territory" stipulates that protective forests must be permanently conserved in their natural state, and that those properties that have not conserved them must be reestablished with native species.

Although this legislation applies to both regions of Paraguay, there are some regulatory differences between them.

The Eastern Region, where most of the country's economic activities, including agriculture and forestry, take place, occupies 40% of the national territory and is home to 97% of the population. Law 2.524/04 prohibits the transformation or conversion of areas with forest cover into areas for agricultural use or human settlements in the Eastern Region.

By 2018, as Law 2.524/04 neared expiration, it was replaced by Law 6.256/18 to uphold the prohibition on the transformation and conversion of native forest-covered areas in Eastern Paraguay. This new law extended the ban on issuing permits for forest conversion for an additional two years, starting in December 2018. In 2020, Law 6.676/20 Zero Deforestation was enacted, establishing a more extended prohibition period of ten years and authorizing INFONA to regulate the National Forest Monitoring System.

For its part, the Western or Chaco Region, consisting of a vast sedimentary plain of alluvial origin, represents 60% of the territory but contains only 3% of the population. In this Region, the regulatory framework is based on the Forestry Law 422/73, the Decree 175/2018 and Law 294/93 (Environmental Impact Assessment, EIA) that also require production units in the Chaco to conserve 25% of the land as a legal reserve for forestry use.

As a result of these legal framework, Paraguayan rural landowners in the Chaco Region who wish to legally deforest are required to prepare a Land-Use Plan that leaves 25% of the forest as a reserve, includes 100-meter buffer strips between pastures, and establishes forested strips along rivers. Since 1993, the Ministry of the Environment has required an environmental impact study for deforestation projects of more than 500 hectares. Initially, these land-use plans constituted a heterogeneous database in both paper and digital formats. Currently, a digitization process is underway, though the database is expected to be accessible only to the Administration.

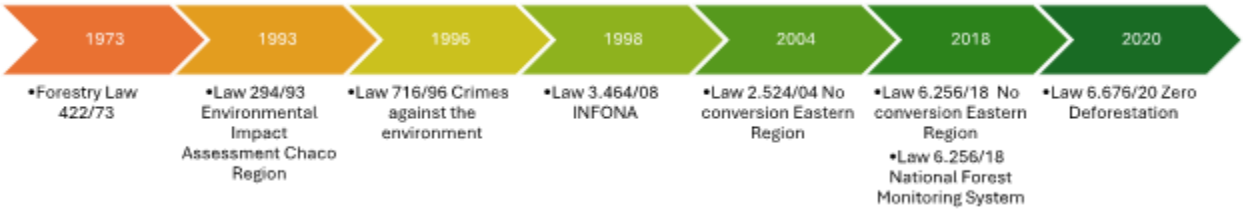
In addition, in both regions of the country, sustainable forest harvesting is permitted through Forest Harvesting Plans, which allow for the selective extraction of a certain volume of timber without involving land-use conversion.

Paraguay's regulatory framework also provides for other measures to prevent illegal deforestation. Through Law 716/96 crimes against the environment are punished. The law establishes administrative and criminal measures for those who proceed with the exploitation of forests declared special or protective. More recently, with the publication of Decree 7.774/2022, and the INFONA Resolution No. 777/2022 a “table of penalties and assessment methods for violations of forestry legislation” and an administrative inquiry for violations of forestry Legislation were established (INFONA, 2023).

Similarly, in 2010 Paraguay also approved Law No. 4.014/2010 on “Fire Prevention and Control”, which establishes standards to prevent and control rural, forest, vegetation and interface fires; and which prohibits the uncontrolled burning of grasslands, forests, bushes, fallow lands, natural fields, sawdust or any other cereal, legume or type of flammable organic material that could generate any of the fires defined in this Law.

Likewise, to respond immediately to early warning reports of deforestation, through Decree No. 1.746/2024, the Government of Paraguay has developed the Joint Intervention Protocol to intervene immediately in cases of change in land use. In addition to INFONA, the Ministry of Environment and Sustainable Development (MADES), the National Anti-Drug Secretariat (SENAD) and the Public Prosecutor's Office, the Ministry of the Interior, and any other institution that requires it, are involved.

Figure 2. Paraguay - Regulatory Framework



Source: Authors.

Natural Protected areas

The National System of Protected Areas of Paraguay (SINASIP) was created through Law No. 352/94 with the objective of establishing the regulations and managing the Protected Wild Areas. In 2000, Law 1561 created the Secretariat of the Environment (SEAM), with the mandate of responsibility for the management and administration of SINASIP and the conservation of biological diversity in the country.

The last National Report on Protected Wild Areas (SINASIP, 2007), indicated that the protected wild areas comprising SINASIP had a protected area of 6,066,207 ha, which represented 14.9% at the national level (MADES-UNDP, 2018).

Institutional framework overseeing forests and land use in Paraguay

Paraguay's forest management system operates within a complex institutional framework that integrates multiple government agencies across sectors like forestry, agriculture, energy, and environmental conservation. The primary institutions, the **National Forestry Institute (INFONA)** and the **Ministry of Environment and Sustainable Development (MADES)**, share responsibilities for forest policy, regulation, and enforcement. While INFONA focuses on maximizing economic benefits through forestry value chains, MADES is tasked with broader environmental policies, including biodiversity conservation and ecosystem services regulation. Coordination between these institutions is critical but challenged by overlapping mandates, particularly in forest monitoring and land use authorization.

Beyond INFONA and MADES, several other entities play pivotal roles in forest management. The **Ministry of Agriculture and Livestock (MAG)** oversee agroforestry, requiring forest buffer zones and windbreaks around farms, while the **Vice Ministry of Mining and Energy** regulates biomass energy use. Institutions like the **National Institute of Rural Development and Land (INDERT)** and the **Technical Secretariat for Planning (STP)** contribute to territorial planning and sustainable land use. Meanwhile, research and innovation in forestry are supported by organizations such as the **Institute for Agrarian Technology (IPTA)** and the **National Scientific and Technological Counsel (CONACYT)**.

Effective forest management requires coordination among multiple stakeholders. INFONA and MADES have complementary roles but need a unified strategy to balance conservation and economic development. Other ministries, such as MAG, also contribute to forest management by integrating agroforestry practices into agricultural policies. However, local governments, tasked with preserving the environment and creating forest reserves, often lack the capacity and resources to manage natural resources effectively. Limited coordination between municipal and central governments further restricts their ability to enforce environmental laws.

Forest information system

The highest institution responsible for forests in the country is INFONA, which has as its general objective the administration, promotion and sustainable development of the forest resources. Among its functions, it is also responsible for carrying out monitoring and the forest inventory.

The National Forest Monitoring System (SNMF) was created in 2018 by Law 6.256/18 and reinforced by Law 3246/2020. The SNMF aims to provide official information on the state of forest cover Paraguay, " [...] on a periodic, measurable, verifiable and comparable basis with other geographic information systems, as well as to provide parameters and information that allow dimensioning the magnitude of the stored carbon content of the national forest mass and the qualitative and quantitative classification of forest species that integrate the forest mass." (INFONA, 2023).

Since 2011 INFONA has implemented continuous improvements related to the national forest monitoring based on remote sensing and geographic information systems, obtaining more detailed and accurate information on forest cover and land use changes. Previously, the lack of official cartographic information was filled by external sources, such as non-governmental organizations, scientific publications or global databases, which were often not up to date or did not cover the entire national territory.

This monitoring system has enabled the regular production of national reports on forested areas using satellite mapping and a series of annual maps since 2017, which accurately determine forest cover and usage. A public consultation tool is available online through the "Portal Bosques y Usos de la Tierra/visor Bosques".[2]

More recently, to analyze the evolution of forest cover, the methodology of the Satellite Monitoring System was followed to construct two maps for the periods 2020-2021 and 2021-2022. This methodology is composed of six steps: (1) creation of cloud-free mosaics and supervised classification; (2) segmentation of multitemporal images; (3) calculation of zonal statistics using the majority criterion; (4) reclassification of map categories; (5) debugging of results through photointerpretation; and (6) Thematic Accuracy Evaluation (EET) (INFONA, 2023).

For the generation of those mosaics, Landsat 8 and 9 satellite images of the SR (Surface Reflectance) collections at Tier 1 and Tier 2 levels, as well as TOA (Top of Atmosphere Calibrated Reflectance). The satellite image mosaics were generated by regions of the country, considering date parameters and percentage of clouds (INFONA, 2023).

Additionally, Paraguay has a **Forestry Investment Portal** (*Portal de Inversión Forestal)*[3] that covers 204,631 hectares of plantations, 464 forestry industries, and 73 INFOMA establishments. It is a key platform for monitoring changes in forest cover, territorial planning, and environmental conservation. It provides interactive maps of land cover and use, deforestation, protected areas, and reforestation. The platform includes tools for measuring areas, querying data, generating reports, and downloading information for detailed analysis.

[2] See https://paraguayforestal.infona.gov.py/portal/apps/sites/?_gl=1*1lv43bg*_ga*NTE4Nzk1Ni4xNzI2ODU3OTk4*_ga_ZFFD2K46GW*MTcyNzQ0ODQ2OS4zLjEuMTcyNzQ0ODUwMy4wLjAuMA..#/portaldebosquesyusosdelatierra

[3] https://visor.infona.gov.py/portal/apps/sites/#/paraguay-forestal

Early Deforestation Alerts System in Paraguay

Recently, INFONA has been incorporating new monitoring capabilities to prevent deforestation and strengthen compliance with the existing legal framework.

The Deforestation early warnings systems use satellite images provided by the University of Maryland's Global Land Analysis and Discovery Laboratory (GLAD) to detect forest cover disturbances, providing near real-time alerts to take early action against illegal activities. These alerts are an important input for the SNMF.

While the tool is developed on a global scale, Paraguay adapted the methodology to prioritize the alerts using national parameters and data from official sources, and to obtain a tool for monitoring and control of native forests. This early report is generated and sent weekly to the INFONA´s regional offices to their verifications and interventions in the field.

KEY INTERNATIONAL AGREEMENTS

Paraguay has demonstrated its commitment to conservation and sustainability through its participation in several international agreements, treaties, and initiatives. These agreements aim to address global environmental challenges such as deforestation, biodiversity loss, climate change, and sustainable development.

1. **United Nations Framework Convention on Climate Change (UNFCCC)**

Paraguay is a party to the UNFCCC (accession on 24 February 1994 - ratification was carried out by Law 251/93), the Kyoto Protocol (1998 – Law 1.447), the Paris Agreement (4 November 2016 – Law. 5.681/16) and has committed to reducing greenhouse gas emissions and addressing climate change impacts[4]. Through its Nationally Determined Contributions (NDCs) under the Paris Agreement (1st NDC presented Oct 2016 – Updated 2021), Paraguay has a Mitigation Strategy and, since 2017, a National Climate Change Mitigation Plan, developed through a participatory process. This plan identifies, among other initiatives, the following action programs for forests: the sustainable use of Chaco Forests and the functional restoration of forest landscapes[5]. In 2024 Paraguay submitted its National Communication - NC4 - National Inventory Report (NIR).

At COP26 in Glasgow (2021), 145 world leaders representing 91% of the global forest estate committed to "halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation". Paraguay is part of this commitment.

2. **Convention on Biological Diversity (CBD)**

Paraguay is a signatory to the CBD, committing to the conservation of biological diversity, the sustainable use of its components, and the equitable sharing of benefits arising from genetic resources[6]. Paraguay is a Party to the CBD, having ratified it on 25 May 1994, and to the Cartagena Protocol on Biosafety, ratified on 8 June 2004. However, Paraguay is not a Party to the Nagoya Protocol on Access and Benefit-sharing nor to the Nagoya–Kuala Lumpur Supplementary Protocol on Liability and Redress. Paraguay

[4] https://unfccc.int/es/node/273897
[5] http://dncc.mades.gov.py/politicas-publicas-de-cambio-climatico
[6] https://www.cbd.int/countries?country=py

has developed National Biodiversity Strategies and Action Plans (NBSAPs) to guide its efforts in protecting ecosystems and species[7].

3. **United Nations Convention to Combat Desertification (UNCCD)**

Recognizing the risks of land degradation and desertification, Paraguay has been a participant in the UNCCD since ratifying the agreement on 15 January 1997[8]. The country has implemented programs to promote sustainable land management and rehabilitate degraded lands, particularly in areas affected by agricultural expansion and deforestation.

One of the main strategies is the National Strategy for Land Degradation Neutrality (ENNDT), which aims to balance soil degradation and restoration rates to maintain or improve its quality and extent over time. This strategy was validated by the Interinstitutional Working Group on Combating Desertification and Drought, comprising 31 institutions that coordinate efforts to advance the country's international commitments[9].

Additionally, the Paraguay +Verde project, led by the MADES and the United Nations Environment Programme (UNEP), in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and other entities, contributes to the development of the ENNDT. This project implements pilot projects and activities aimed at preventing and reversing soil degradation, desertification, and drought[10].

Another initiative is the Interinstitutional Working Group on Combating Soil Degradation and Desertification, which conducts technical field workshops to validate soil degradation maps and strengthen capacities in sustainable land management. These activities include soil sampling and the characterization of degradation processes, with the objective of implementing practices for land and soil restoration[11].

4. **Montreal Process[12]**

The Montréal Process Working Group (MPWG) was launched in 1994 and immediately set about the task of developing a set of criteria and indicators for Sustainable Management to cover the temperate and boreal forests within its member countries. Paraguay is not a member of the so-called Montreal Process.

5. **CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)**

Paraguay is a member of CITES, which regulates international trade in endangered species to prevent their exploitation[13]. Paraguay became a Party to the agreement through ratification on 15 November 1976, with the agreement entering into force on 13 February 1977. The country has measures in place to protect its unique wildlife and ensure sustainable trade practices.

Paraguay's Red List Index of species survival is 0.95 (on a scale where 0 is worst and 1 is best), reflecting a relatively steady state of biodiversity, even as ecosystems face continued pressures.

6. **Ramsar Convention on Wetlands**

[7] https://www.cbd.int/doc/world/py/py-nbsap-v2-es.pdf
[8] https://www.unccd.int/our-work-impact/country-profiles/paraguay
[9] https://www.arp.org.py/index.php?Itemid=116&catid=16&id=4076%3Apresentaran-la-estrategia-nacional-de-combate-a-la-degradacion-de-la-tierra&option=com_content&view=article&utm
[10] https://www.fao.org/paraguay/noticias/detail-events/en/c/1726258/
[11] https://infona.gov.py/avanzando-en-la-lucha-contra-la-desertificacion-jornada-tecnica-apunta-a-validar-mapa-de-degradacion-del-suelo/
[12] https://montreal-process.org/
[13] https://cites.org/eng/parties/country-profiles/py

Paraguay has been a Party to the Ramsar Convention since 7 October 1995 and has designated six wetlands of international importance, covering a total area of 785,970 hectares[14]. These wetlands are critical for biodiversity, water resources, and climate regulation, and the country is committed to their sustainable management.

7. **United Nations 2030 Agenda for Sustainable Development**

Paraguay has made significant strides in adopting the Sustainable Development Goals (SDGs), prioritizing environmental conservation, sustainable agriculture, clean energy, and climate action. Among these, SDG 15, "Life on Land," is particularly relevant to its efforts in forest preservation and biodiversity conservation.

In the 2024 SDG Index, Paraguay ranks 91st out of 167 countries with an overall score of 75.8, exceeding the regional average for Latin America and the Caribbean[15]. This progress reflects a growing commitment to sustainable development, though challenges remain.

Currently, 36.3% of terrestrial sites and 38.8% of freshwater sites, wich are important to biodiversity are under protection. While these figures show progress, they remain below optimal targets. A persistent issue is permanent deforestation, averaging 1.2% over the past three years, highlighting the urgent need for stronger forest conservation measures. On the positive side, Paraguay's Red List Index of species survival stands at 0.95, indicating relatively stable biodiversity despite ongoing pressures on ecosystems. Furthermore, the country has a relatively low rate of imported deforestation—6.4 m² per capita—helping to reduce its environmental footprint.

Nevertheless, critical challenges persist. Expanding protected areas, curbing deforestation, and implementing robust conservation policies are essential to achieving Paraguay’s SDG targets. Enhanced sustainable land management practices will play a pivotal role in safeguarding the nation’s biodiversity and ensuring long-term environmental resilience.

8. **Bonn Challenge**[16]

The Bonn Challenge is a global goal to bring 150 million hectares of degraded and deforested landscapes into restoration by 2020 and 350 million hectares by 2030. The goal for 2020 was established in Bonn in 2011, where the challenge was launched, and was subsequently endorsed and expanded for 2030 by the New York Declaration on Forests of the 2014 United Nations Climate Summit.

At the moment, there are 61 countries involved by 64 pledges made, where 29 countries are from America, but Paraguay has no commitment with it.

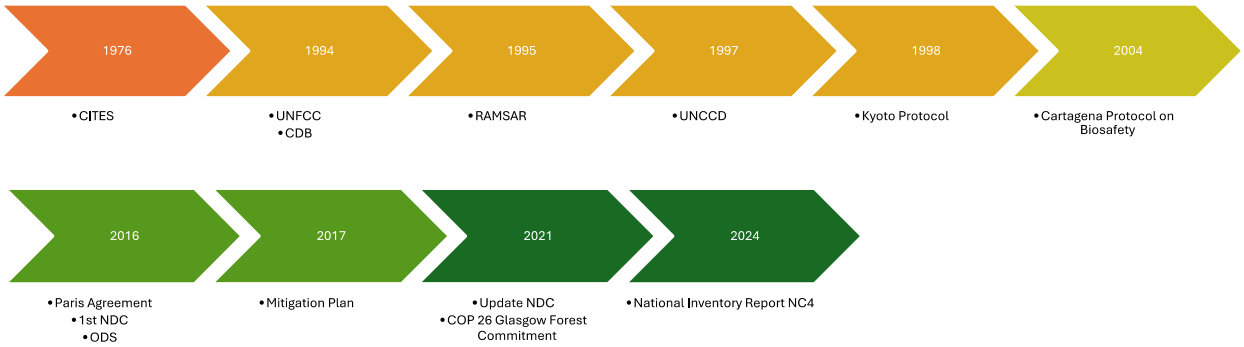
9. New York Declaration on Forest (NYDF)[17]

The New York Declaration is supported by 38 national governments (the European Union, the United States, Central America and African Countries), 20 subnational governments of more than 50 of the largest companies worldwide and over 50 influential organizations of civil society and indigenous populations. The goal of the NYDF is to reduce to half the annual loss of natural forests by 2020 and endeavor to reach zero deforestation by 2030. The declaration also makes a call for the recovery of an area of forest and cultivated land larger than India, in terms of geographic area. Reaching these goals would

[14] https://www.ramsar.org/es/country-profile/paraguay
[15] https://dashboards.sdgindex.org/profiles/paraguay
[16] https://www.bonnchallenge.org/
[17] https://forestdeclaration.org/

entail reducing carbon emissions by between 4,500 and 8,800 million tons a year, which is equivalent to eliminating the current emissions of the United States. The 2024 Assessment concluded that the world is 45% off track from halting deforestation by 2030. To date, Paraguay has not endorsed the NYDF.

Figure 3. Paraguay International Commitments Deforestation related



Source: Authors

THE DEFORESTATION EVOLUTION IN PARAGUAY (2000-2023)

National Deforestation Report

Prior to the creation of the National Forest Monitoring System, official information on deforestation was spread across various government areas. This monitoring made it possible to produce, on a regular basis, reports on forest areas through satellite mapping and a series of annual maps starting in 2017, which determined the forest cover and the change in land use with spatial precision. The public consultation tool is available online in the Forest and Land Use Portal/Forest-Uses Viewer.[18]

Table 4. Changes in the use of native forest in Paraguay by monitoring periods

Period	Area (ha)	%
2000-2005*	1,277,106.1	19.2%
2005-2011	2,261,975.0	34.0%
2011-2013	682,188.5	10.3%
2013-2015	710,900.1	10.7%
2015-2017	548,883.4	8.3%
2017-2018	354,221.2	5.3%
2018-2019	184,209.0	2.8%
2019-2020	218,537.1	3.3%
2020-2021	187,191.9	2.8%
2021-2022	225,236.2	3.4%
Total	**6,650,448.5**	**100**

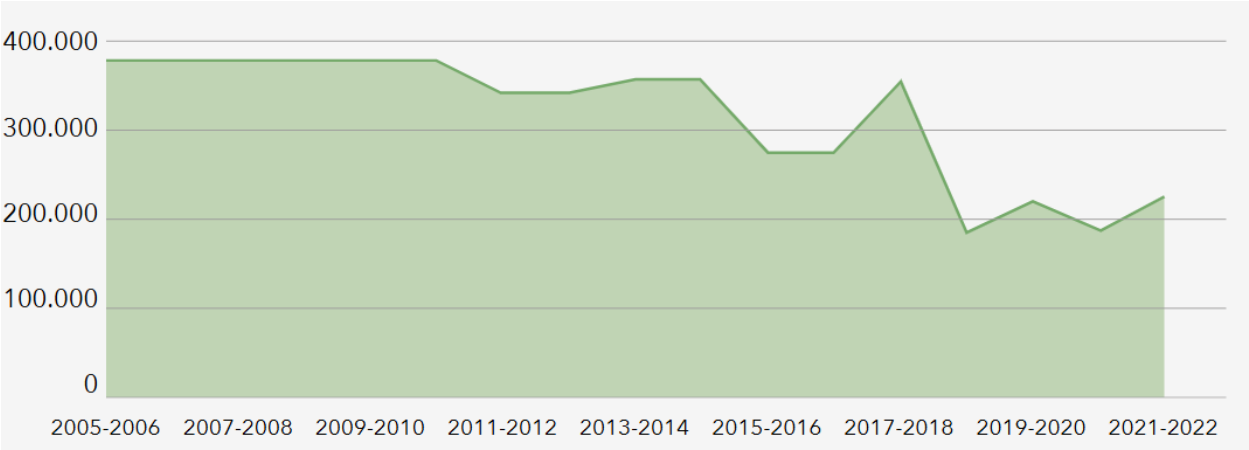
Notes: *Official data from FAO-FRA. Source: Authors based on INFONA, 2023.

[18] See https://infona.gov.py/portal-de-bosques-y-usos-de-la-tierra-nueva-plataforma-del-infona-para-la-gestion-forestal-sostenible/

The National Report on Forest Cover and Land Use Change (INFONA, 2023) presents an analysis of land use change for the period 2005-2020 based on the consolidation of different official maps generated within the framework of the Terrestrial Monitoring Satellite System and the National Forest Monitoring System.

Table 4 shows that, since the implementation of the Zero Deforestation Law for the Eastern Region, in 2004, a loss of forest cover of 5,373,558.7 hectares was recorded, of which 88.2% occurred in the Western region and only 11.8% in the Eastern region. The highest percentage of land use change occurred in the 2005-2011 period. The deforestation annual rate between 2000 and 2005 was 255,421.2 hectares and then increased to 316,091.7 hectares per year in the period 2005-2022. From 2013-2015, the annual rate of deforestation continues to show a downward trend and, although it is one third of that recorded a decade ago, it remains high. Graphically, official deforestation monitoring presents the evolution in Figure 4.

Figure 4. Changes in the use of native forest land in Paraguay by monitoring periods



Source: INFONA, 2023.

According to the analysis of the deforestation by forest strata in 2022, the stratum called Chaco Dry Forest (BSCh) represents almost 77% of the changes in the use of native forest at the national level.

Table 5. Changes in the use of native forest in Paraguay by forest stratum

Forest Stratum	Land Use Change (ha)			
	2020-2021	2021-2022	Total	%
Chaco Dry Forest (BSCh)	19,385.3	25,765.9	45,151.2	11
Subhumid Flooded Forest of the Paraguay River (BSHIRP)	900.1	1,287.5	2,187.6	0.5
Eastern Region Rainforest (BHRO)	20,333.4	28,897.1	49,230.4	11.9
Cerrado Sub-humid Forest (BSCH)	146,572.8	169,285.7	315,858.5	76.6
Total	**187,191.6**	**225,236.2**	**412,427.7**	**100.0**

Source: Authors based on INFONA, 2023.

At the national level, it is observed that the same departments that have the largest volume of native forests are the ones that registered the largest area of forest use change. They are Canindeyú, San Pedro and Concepción in the Eastern Region, Mariscal Estigarribia and Bahía Negra in the Chaco.

FAO – FRA[1920] 2020 Reporting Tables - Paraguay

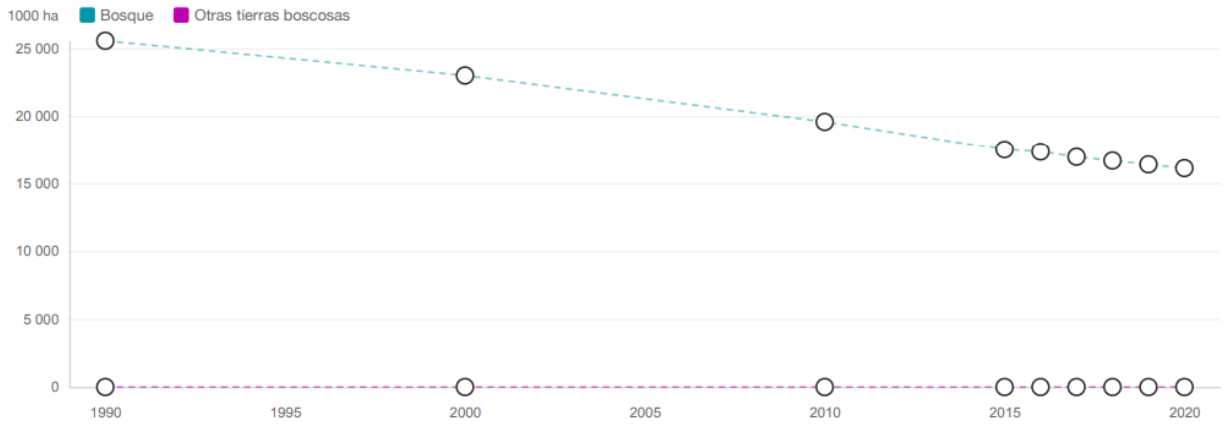
Forest: Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.

Deforestation: The conversion of forest to other land use independently whether human-induced or not.

Primary forest: Naturally regenerated forest of native tree species, where there are no clearly visible indications of human activities, and the ecological processes are not significantly disturbed.

Considering the data reported by national authorities in the FAO-FRA (FAO, 2021), the total forest area (planted and native forest) in Paraguay fell to 16,102,263.95 ha in 2020, having started from just over 25.5 million in 1990.

Figure 5. Extent of forest and other wooded land in Paraguay



Source: FAO-FRA, 2020.

Table 6. Total forest area in Paraguay. Period 1990-2020

FRA 2020 categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	25,545.9	22,991.7	19,570.2	17,498.9	17,333.1	16,940.2	16,660.9	16,381.6	16,102.3
Other wooded land	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other land	14,184.1	16,738.4	20,159.8	22,231.1	22,396.9	22,789.7	23,069.1	23,348.4	23,627.7
Total land area	**39,730.0**	**39,730.0**	**39,730.0**	**39,730.0**	**39,730.0**	**39,730.0**	**39,730.0**	**39,730.0**	**39,730.0**

(a) Minimum area of 1 ha, with tree heights equal to or greater than 3 m in the Western Region and equal to or greater than 5 m in the Eastern Region and reaching a minimum canopy coverage in its natural state of 10% in the Western Region and 30% for the Eastern Region. Native palms and bamboos that reach the parameters indicated are also included. Natural tree protection strips equal to or greater than 60 m wide and equal to or greater than 1 ha are included as forests. Urban areas, pastures, plantations with predominantly agricultural purposes, agroforestry systems and silvopastoral systems, whose main purpose is agriculture and livestock, are excluded from this definition. Source: Authors based on FAO-FRA, 2020.

[19] FAO has been monitoring the world's forests at 5-to-10-year intervals since 1946. The Global Forest Resources Assessments (FRA) are now produced every five years in an attempt to provide a consistent approach to describing the world's forests and how they are changing. The Assessment is based on two primary sources of data: Country Reports prepared by National Correspondents and remote sensing that is conducted by FAO together with national focal points and regional partners.
[20] See https://openknowledge.fao.org/server/api/core/bitstreams/0ed2d9ae-b386-4029-bb23-64a2ee73a409/content

According to FAO-FRA (2020), the annual deforestation rate increases between 1990 and 2015, starting from an annual deforestation rate of 255.42 thousand ha/year to 414.25 thousand ha/year. In the period 2015-2020 it fell to 279.34 thousand ha/year. Both categories of deforestation, illegal and legal (with land use plans approved), are included in the analysis throughout the period.

In the same period, planted forests increased from 10.2 thousand ha to 155.8 thousand ha. Since 2010, they have been growing by around 11.4 thousand ha/year. However, the area of planted forest does not exceed 1% of the total forest area.

Table 7. Paraguay Forest Area - Naturally regenerating forest + Planted Forest 1980-2020

FRA 2020 categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Natural regenerated forest	25,535.6	22,961.1	19,519.4	17,400.1	17,223.1	16,818.9	16,528.1	16,237.4	15,946.6
Planted forest	10.2	30.5	50.8	98.5	109.7	121.4	132.8	144.2	155.6
Total forest area	25,545.9	22,991.7	19,570.2	17,498.9	17,333.1	16,940.2	16,660.9	16,381.6	16,102.3

Source: Authors based on FAO-FRA, 2020

Global Forest Watch[21][22]

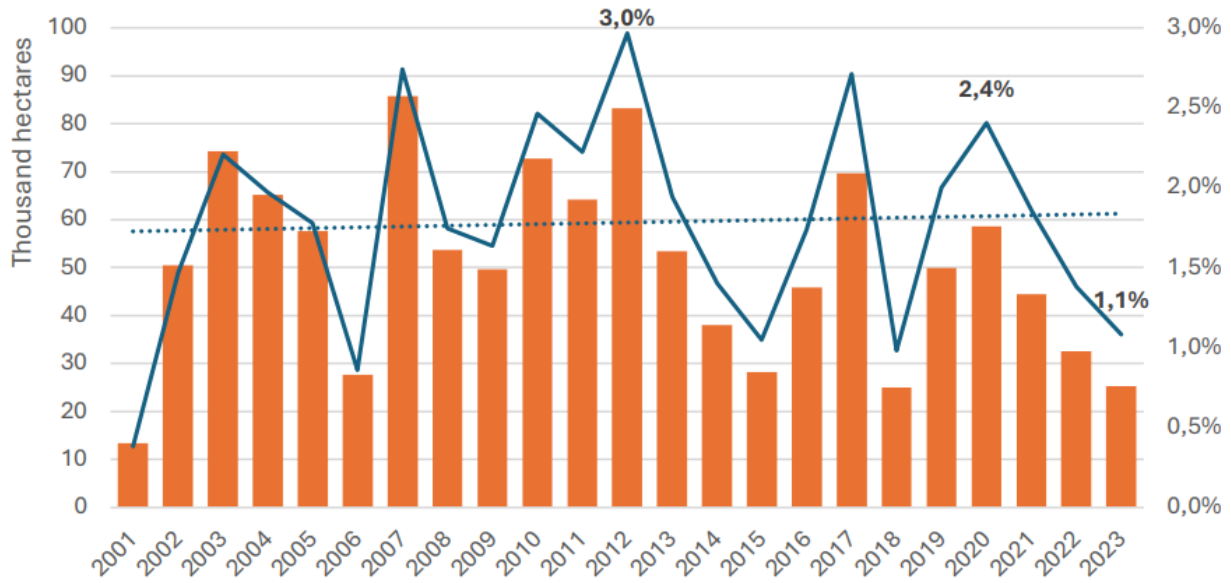
Primary Forest: Primary forests are those that have not been cleared or degraded by human activity in recent history and thus do not include recently reforested areas.
Tree cover: All vegetation greater than 5 meters in height and may take the form of natural forests or plantations across a range of canopy densities. Unless otherwise specified, the GFR uses greater than 30 percent tree canopy density for calculations.
Tree cover loss: The removal or mortality of tree cover, which can be due to a variety of factors, including mechanical harvesting, fire, disease, or storm damage. As such, loss does not equate to deforestation.
Forest gain: aims to monitor the total land area that has transitioned from an unforested to a forested state in a given period of time. The indicator currently measures tree cover gain as a best-available proxy for forest gain. Tree cover gain includes natural regeneration and gain from restoration interventions, as well as gain from planted forests and tree crops, which are not typically considered forests.
Forest Extent Indicator: the indicator aims to monitor the total area of forest worldwide, including unmanaged natural forests and managed natural forests.
Deforestation: permanent conversion of forested land to other land uses, deforestation can only be identified at the moment trees are removed if it is known how the land will be used afterward.

[21] See https://research.wri.org/gfr
[22] The **Global Forest Review** (GFR) provides an independent assessment of the state of the world's forests based on the best available geospatial data and analysis. A key distinguishing element of the GFR is its focus on insights derived from analysis of geospatial data and maps. In 2014, breakthroughs in global forest monitoring using satellite data, computer algorithms, and cloud computing resulted in the first global map of forest change at 30-meter resolution, depicting tree cover loss annually since 2001 and tree cover gain cumulatively over the same time period. Analysis of these data, combined with hundreds of other spatial data sets, allows for granular, timely, and consistent monitoring of global forest trends over time and space. The Global Forest Change data set, with its annual updates on tree cover loss and gain, provides a critical input to the report.

Primary forests are critical for biodiversity and carbon storage. According to Global Forest Watch (GFW), Paraguay lost 6.69 million hectares of tree cover between 2001 and 2023, representing a loss of 29% of total tree cover.[23] In the same period, there was an increase of 642 thousand hectares of tree cover.[24]

Figure 6 shows the Annual Primary Forest loss in Paraguay since 2001, and the proportion over total tree cover extent remaining. The GFW data shows accelerating primary forest loss rates after 2000; however, the rate is quite fluctuating, averaging around 1.7% of tree-covered areas. After 2020, a reduction in primary forest loss can be observed in Paraguay, where the rate decreased from 2.4% in 2020 to 1.1% in 2023.

Figure 6. Primary forest loss in Paraguay, in hectares and % tree cover extent. Period 2001-2023



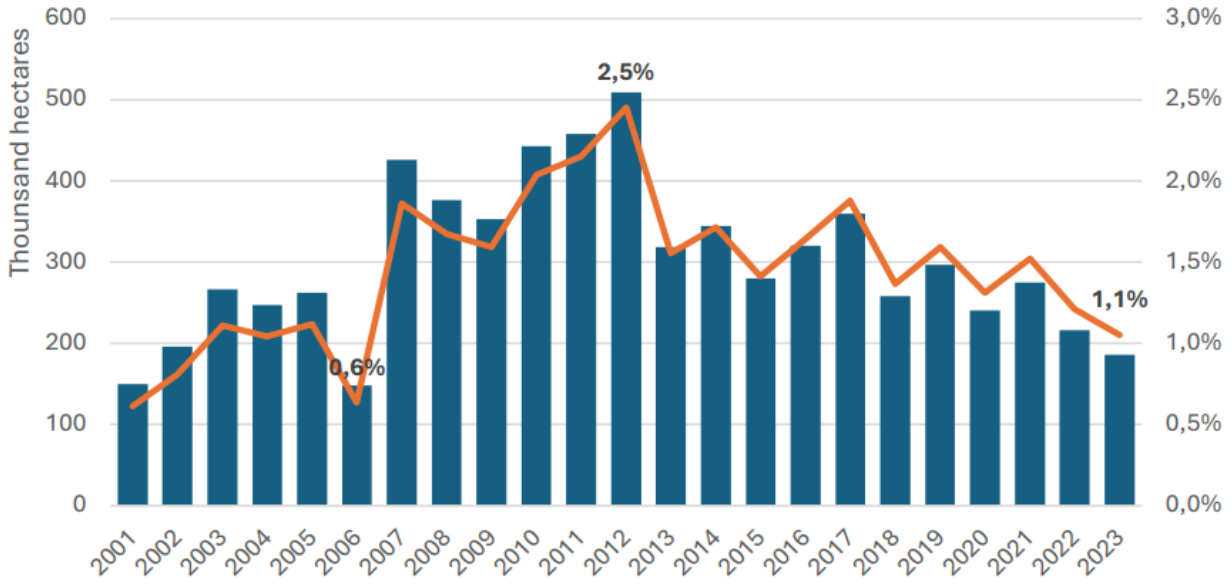
Source: GFW

The pattern of tree cover loss evolution in Paraguay is different from that of primary forest loss. The loss rates are lower, and the decline in tree cover loss began earlier, specifically in 2013, after having steadily increased since 2001, except in 2006 (Figure 7). On the other hand, between 2000 and 2020, Paraguay gained 650,000 hectares of tree cover, equivalent to 1.6% of its total extent.

[23] The methods on which these data are based have changed over time. Comparisons between periods may not be completely accurate, specially before or after 2011, or before and after 2015, when there were model changes. See https://www.globalforestwatch.org/blog/data/tree-cover-loss-satellite-data-trend-analysis/

[24] "Tree cover" is defined as woody vegetation with a height of 5 metres and above that may take the form of natural woodland, forests or tree plantations with varying canopy densities. Tree cover gain does not directly equate to restoration, afforestation or reforestation.

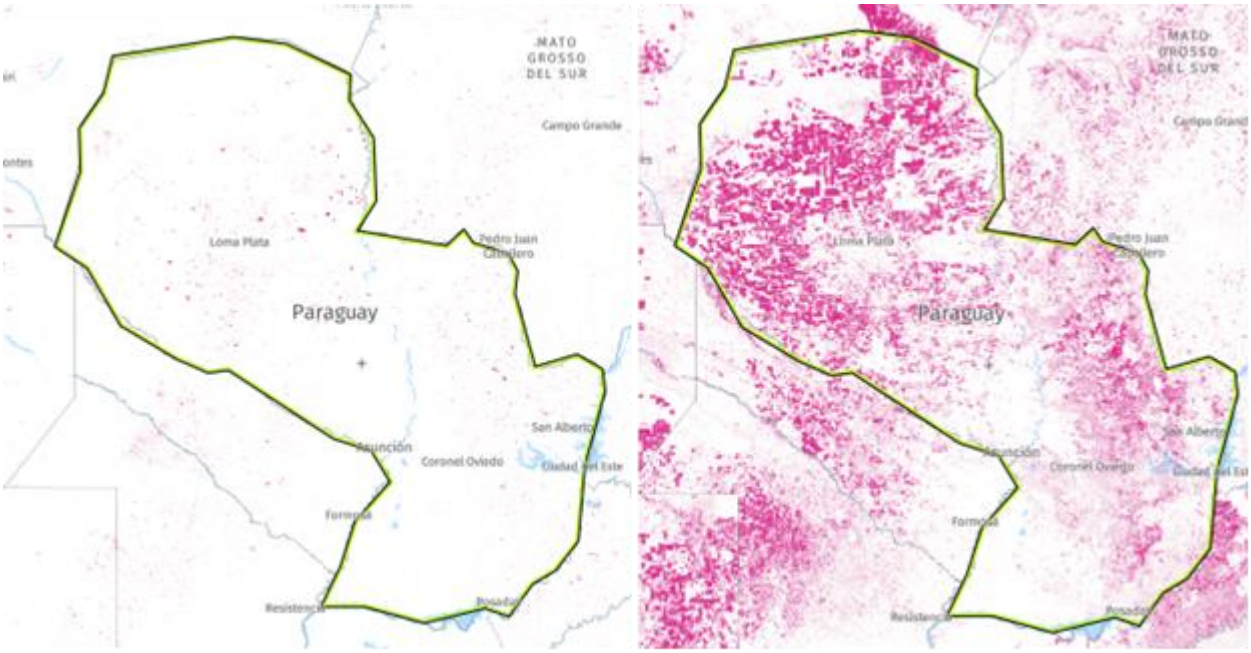
Figure 7. Tree cover loss, in hectares and % of total extent



Source: GFW

The **Figure 8** compares cumulative tree cover loss across Paraguay over two periods: 2000- 2001 and 2000-2023. Significant tree cover loss is observed in both regions. Particularly, the Chaco Region shows increasing tree cover loss over time throughout the period, which is likely associated with the expansion of cattle ranching. The visual patterns emphasize the spatial shift and acceleration of tree cover loss.

Figure 8. Cumulated Tree cover loss in Paraguay, 2000-2001 vs 2000-2023.



Source: GFW

The top 3 regions were responsible for 77.5% of all tree cover loss between 2001 and 2023. Boquerón had the most tree cover loss at 2.77 million of ha (Mha), followed by Alto Paraguay, with 1.83 Mha and Presidente Hayes with 795 Mha, all of them, in the Chaco Region.

MapBiomas[25]

Woody Natural Vegetation: Understood as cover dominated by trees and/or shrubs, not distinguishing between them and encompassing them in the woody category. In turn, it is divided into three categories: i) Closed Natural Woodlands includes only natural or semi-natural vegetation cover with a woody layer of more than 65% of canopy cover; ii) Open Natural Woodlands includes only natural or semi-natural vegetation cover with a woody layer between 65% and 15% of canopy cover; and iii) Flooded Natural Woodlands understood as natural vegetation cover consisting of trees, shrubs and palm savannahs or a transition between these is significantly influenced by water and/or depend on flooding.

Herbaceous Natural Vegetation: It is divided in i) Flooded grasslands for natural herbaceous vegetation is significantly influenced by water and/or dependent of flooding; and ii) Grassland for natural herbaceous plants with cover over 65% or more. In this category the presence of woody is allowed, but they must be at a cover less than 20%.

Agricultural areas: It identifies three main categories: i) pasture; ii) agriculture; and iii) forest plantation.

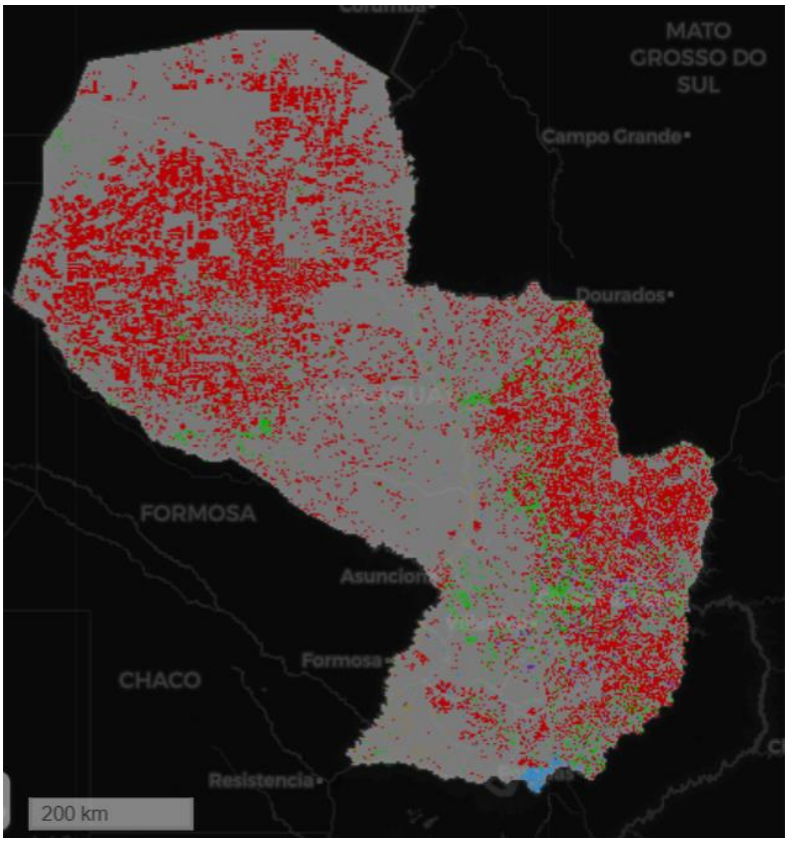
Non vegetated area: areas with artificial cover (e.g. buildings, roads, quarries). It aslo includes areas with no vegetation cover and no artificial cover.

MapBiomas Paraguay was established in 2023 as part of the collaborative effort in Paraguay among teams involved in the MapBiomas Chaco and MapBiomas Atlantic Forest Trinational initiatives. As a result of this synergy, the first annual collection of land cover and land use maps for the national territory, spanning from 1985 to 2022, was achieved. In Paraguay, Guyra Paraguay and WWF Paraguay collaborate to generate the national product.

According to MapBiomas, Paraguay still has over 21 million hectares of woody vegetation, although it has lost 8.2 million hectares since 1985, which represents a total cover loss of 27%. Today, 60% of the current forest area is in the Western Region.

[25] See https://argentina.mapbiomas.org/

Figure 9. Paraguay Tree Cover Change. Period 1985-2022.



Transitions from forest cover or non-forest natural areas to agricultural or non-vegetated areas., Transitions from agricultural classes or areas without vegetation to forest cover or non-forest natural areas. Source. MapBiomas.

Boquerón, Alto Paraguay and Presidente Hayes account for 68% of the loss of woody vegetation surface during the period. However, Canindeyú and Alto Paraná were the ones that lost the greatest surface area in relative terms (61.7% and 59.8% respectively). On the other hand, districts such as Ñeembucú, Misiones, Cordillera, Paraguarí and the Central Department increased their woody surface area between periods.

Table 8. Natural woody natural vegetation by department. Period 1985-2022

Department	Thousands of has			
	1985	2022	Total loss	Relative loos
BOQUERÓN	8.293.250,1	5.227.666,8	-3.065.583,3	-37,0%
ALTO PARAGUAY	7.740.774,1	6.066.485,1	-1.674.289,0	-21,6%
PRESIDENTE HAYES	6.617.027,1	5.760.861,1	-856.166,0	-12,9%
CANINDEYÚ	1.099.771,7	420.670,4	-679.101,2	-61,7%
ALTO PARANÁ	777.407,9	312.855,2	-464.552,7	-59,8%
SAN PEDRO	998.204,7	563.998,9	-434.205,8	-43,5%
AMAMBAY	617.482,5	359.404,7	-258.077,8	-41,8%
ITAPÚA	617.474,7	364.446,9	-253.027,8	-41,0%
CONCEPCIÓN	1.011.409,7	802.715,3	-208.694,3	-20,6%
CAAGUAZÚ	527.955,9	320.300,6	-207.655,3	-39,3%
CAAZAPÁ	419.668,1	302.543,9	-117.124,1	-27,9%
GUAIRÁ	133.374,4	107.529,3	-25.845,1	-19,4%
ASUNCIÓN	1.108,4	998,8	-109,7	-9,9%

Department	Thousands of has			
	1985	2022	Total loss	Relative loos
CENTRAL	38.082,0	39.204,0	1.122,1	2,9%
PARAGUARÍ	136.103,9	186.524,0	50.420,1	37,0%
MISIONES	48.857,6	108.874,1	60.016,6	122,8%
CORDILLERA	93.202,4	158.601,5	65.399,1	70,2%
ÑEEMBUCÚ	76.488,3	201.580,8	125.092,5	163,5%
TOTAL	29.247.643,2	21.305.261,3	-7.942.381,8	-27,2%

Source: Authors based on MapBiomas, 2025.

UNDERLYING DRIVERS OF DEFORESTATION

There are several reasons for deforestation in Paraguay. According to official and international reports, among the main causes of deforestation in the Eastern Region are the areas used for agriculture, especially corporate agriculture. In the Western Region, the expansion of livestock activities is the main reason for deforestation (GFW, 2024; INFONA, 2023; MADES/UNDP, 2019). The growth of agricultural activity has been exponential in recent years, positioning itself as one of the largest global suppliers of soybeans and beef.

The expansion of the agricultural frontier meant new areas for cultivation or livestock use on large agricultural properties. The most intense expansion, especially livestock activity, occurred in the Chaco Region. In the Eastern Region, the increase in the surface area of large farms would have occurred through new areas, and the incorporation of territories that initially corresponded to small and medium-sized farms (MADES/UNDP, 2019).

In fact, more than 50% of land use change in the Eastern Region is explained by loss of forest areas on a scale of up to 5 ha. The main activities affecting the land use changes in this region are legal agricultural use, illegal crops, and infrastructure (**Table 9**).

Table 9. Changes in the use of native forest in Paraguay. Period 2021-2022

Categories	Convertion of Native Forest to				
	AI	UA	CUI	Total	%
Changes < 2 ha	623.2	4,702.8	1,216.6	6,542.6	22.6%
Between 2 and 5 ha	756.8	6,041.5	1,925.6	8,723.9	30.1%
> 5 to 20 ha	368.5	5,370.1	1,839.8	7,578.4	26.1%
> 20 to 50 ha	0.0	2,473.9	391.9	2,865.8	9.9%
> 50 to 100 ha	0.0	1,110.5	0.0	1,110.5	3.8%
> 100 to 250 ha	0.0	535.2	0.0	535.2	1.8%
> 250 to 500 ha	0.0	251.5	0.0	251.5	0.9%
> 500 ha	0.0	1,374.6	0.0	1,374.6	4.7%
Total	**1,748.5**	**21,860.1**	**5,373.8**	**28,982.5**	**100.0**

AI: human settlements and infraestructure. UA: Agricultural Use. CUI: Ilicit use crops. Source: Authors based on INFONA, 2023.

As shown in Table 9, 75% of the loss of native forest in the Eastern Region during the 2021-2022 period was explained by agricultural activity. Illegal crops accounted for 18.5% of the loss of native forest and human settlements and infrastructure, with the remaining 7.9%.

What is relevant is that 76.7% deforestation in the Chaco Region was legal. As mentioned before, the national legal framework allows the use change of native forests in this region through Land-Use Plans granted by INFONA. Livestock activity would be the main cause of illegal deforestation in the region.

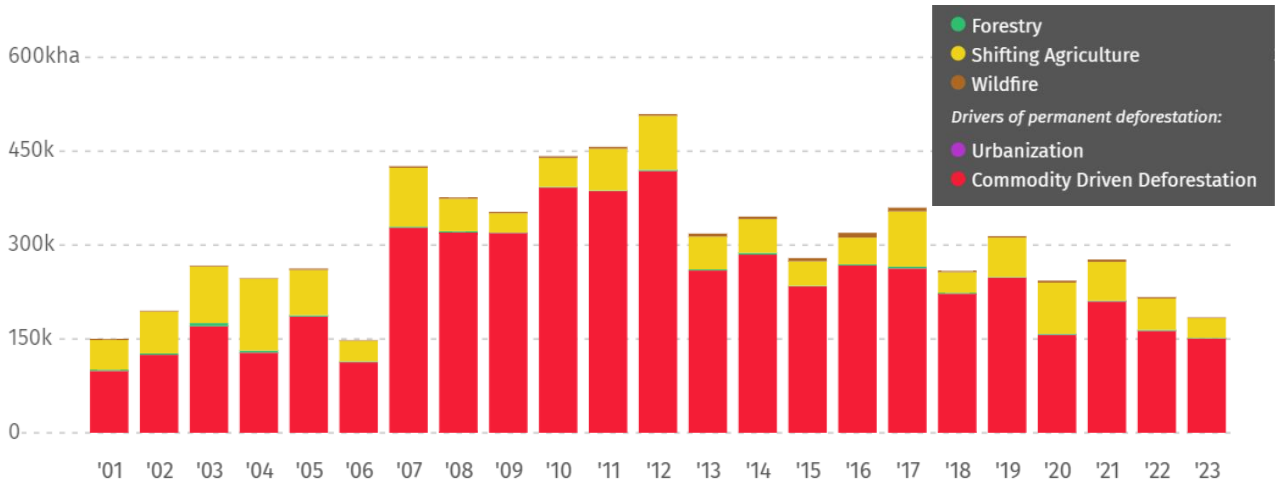
Another cause of deforestation is clearing land for illegal crops. With 5.3 thousand hectares in the period 2021-2022, these crops account for 2.3% of national deforestation (INFONA, 2023). Although at the national level it seems to have little relevance, illegal crops account for 24.3% of the loss of forests in the Eastern Region in the same period. The expansion of illegal crops has also occurred in protected areas, with 25.7% of the area planted with these crops in the period 2020-2021 being in legal nature reserves (INFONA, 2023).

Paraguay's energy matrix is also relevant in explaining the causes of deforestation and forest degradation. To date, it is estimated that 46% of energy consumption is still based on the use of firewood and charcoal. The production of charcoal is of great economic importance, being the main export product of the wood value chain in the country. Nearly 90% of annual wood production is used for the use of firewood and charcoal, with productions estimated at 15 million m3 and 2.5 million m3, respectively (MADES/UNDP, 2019).

In this sense, commercial exploitation of the forest, mostly, did not consider land use measures and the species with the highest timber value were exploited selectively, without applying sustainability criteria. With the increase in demand for wood, this situation has worsened and increased the pressure on productive forests, leading to the extraction of small diameter logs (less than 40 cm DBH) (MADES/UNDP, 2019).

Also, for GFW commodity-driven deforestation is the main cause of forest cover lost in Paraguay.

Figure 10. Paraguay Annual Tree Cover Loss by Driver. Period 2001-2023

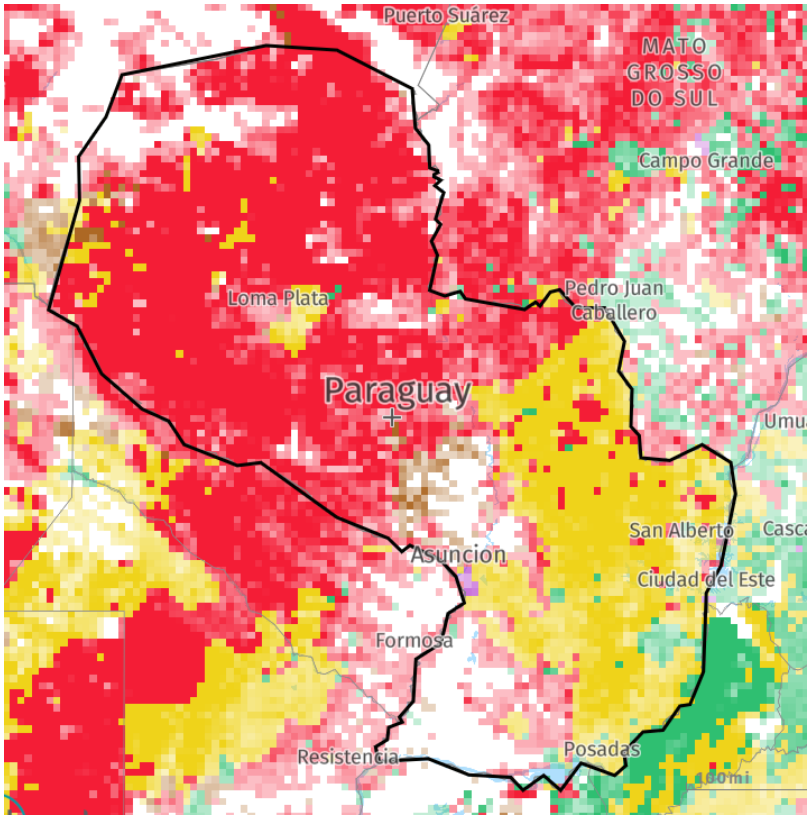


Source: GWF.

According to GFW, three dominant factors explain deforestation in Paraguay in the period 2001-2023. First, commodity-driven deforestation, which is primarily concentrated in the western region of Paraguay, in the Chaco Region. In this area, soy plantations and cattle ranching have expanded significantly. Second, shifting agriculture is another major driver of tree cover loss, concentrated in the eastern region of Paraguay, which has stricter regulations regarding deforestation. Finally, forestry, whose main activities

include selective logging and forest management, also occurs predominantly in the eastern region. However, commodity-driven deforestation remains the most significant factor, highlighting the impact of large-scale agricultural production on Paraguay's forests.

Figure 11. Cumulative Tree Cover Loss by Driver. Period 2001-2023

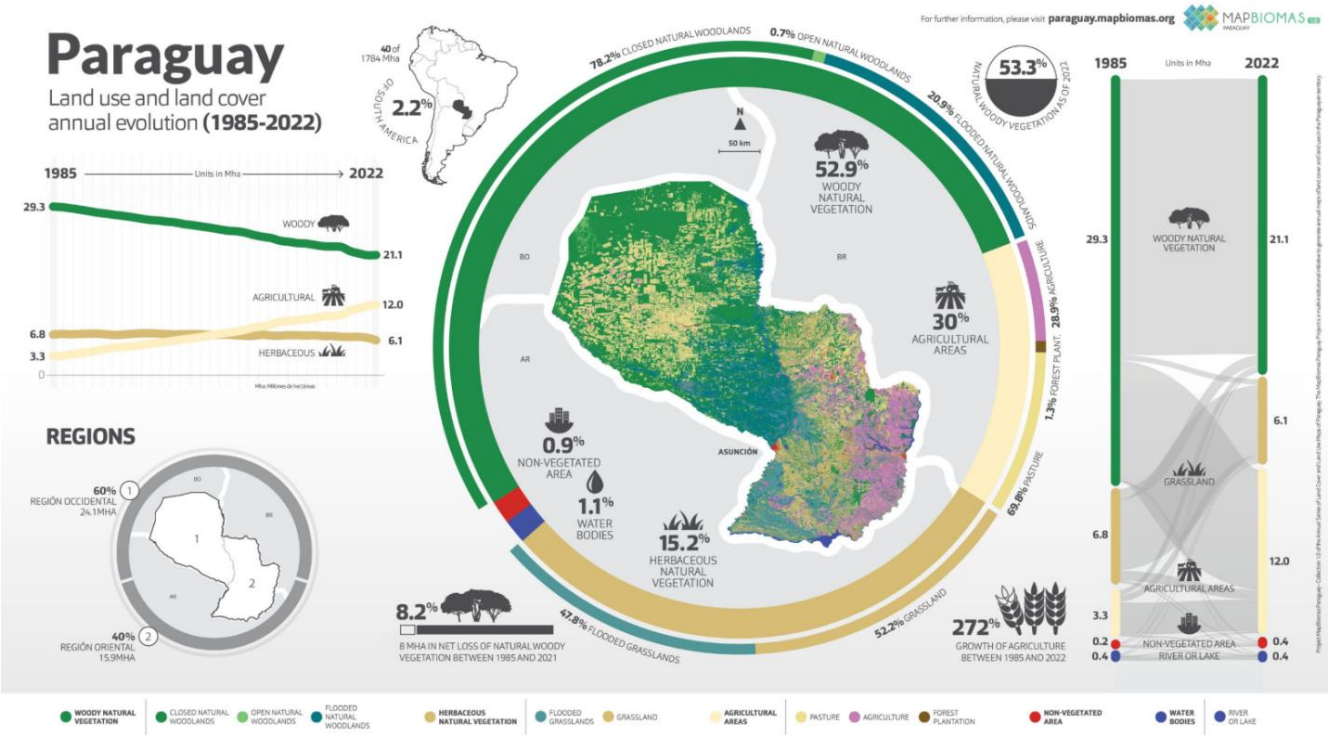


Notes: with >30% canopy density. Source: GFW.

According to MapBiomas, between 1985 and 2022, the agricultural area grew by 272%, expanding from 3.3 million to more than 12 million hectares. Of this increase, 94% came at the expense of natural woody vegetation, while the remaining share resulted from the conversion of natural grasslands..[26]

[26] See MapBiomas. Available in https://paraguay.mapbiomas.org/wp-content/uploads/sites/11/2024/05/MBI-Infograficos-paraguay-1.0-ES-scaled.jpg. Retrieved on february 15th, 2025.

Figure 12. Land use and cover annual evolution. Period 1985-2023



Source: MapBiomas.

Finally, although it is estimated that to a lesser extent, illegal occupation of private lands has also been a cause to explain deforestation and forest degradation. Although Agrarian Reform and access to land have been critical aspects of public policy, which have favored access to land through the payment of prior compensation, in practice, it has been more common for this to be done through “invasions”, which degraded the forest surface to practice small-scale productive activities (MADES/UNDP, 2019).

Trend analysis of forest legislation and deforestation

As discussed in previous sections, Paraguay’s legislation on native forest protection and monitoring dates back over 50 years and has significantly expanded in the past decade. However, despite the improvement in legislation, incentives and enforcement mechanisms, they have not been sufficient to guarantee greater forest conservation.

In this sense, MADES/UNDP (2019) proposes an analysis exercise on the effectiveness of the main forestry and environmental regulatory instruments to prevent deforestation.

Table 10. Effectiveness in the implementation of environmental and forestry regulations

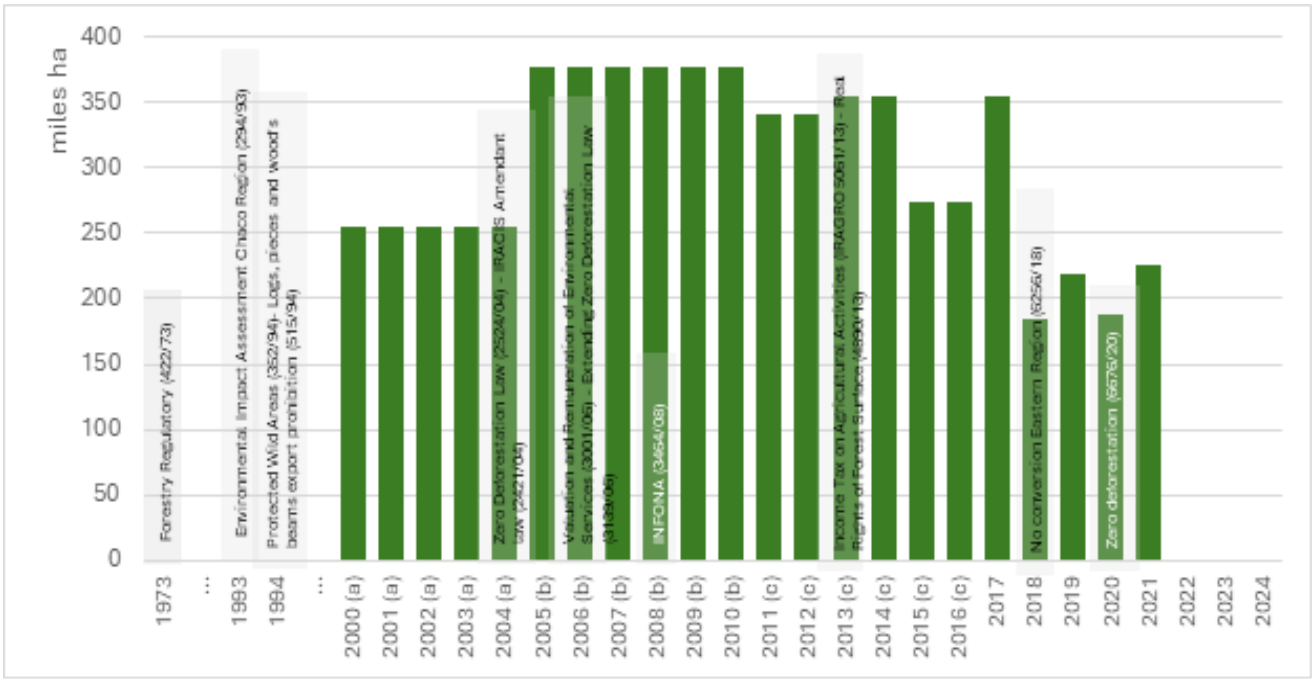
Regulatory instrument	Impact on causes			
	AG	LI	BI	HS
Law No. 2532/2005. “Establishing the border security zone of the Republic of Paraguay”	x	-	-	x
Law No. 422/73 “Forestry” Regulatory Decree 18.831/86	x	x	-	-
Law No. 125/91 and its amendment Law 2421/04 (IRACIS)	x	x	-	-

Law No. 117/92 on Investments (Art. 2)	x	x	-	-
Law No. 3239/07 “On the Water Resources of Paraguay”	x	-	x	x
Law No. 816/96, extended by Law 1095, which adopts measures to protect the country's renewable natural resources	x	x	x	x
Law No. 60/90 on the Promotion of Investment Regulated by Decree 22,031/03	x	x	-	-
Law No. 5061/13 amending Law 125/91 “Income Tax on Agricultural Activities” (IRAGRO)	x	x	x	-
Paraguayan Penal Code Art. 197	x	x	x	x
Law No. 352/94 on Protected Wild Areas	v	v	v	v
Law No. 536/95 on the Promotion of Afforestation and Reforestation	v	v	v	v
Law 4890/2013 on Real Rights of Forest Surface	v	v	v	v
Zero Deforestation Law No. 2524/04 Prohibiting in the Eastern Region the activities of transformation and conversion of surfaces with forest cover	v	v	v	v
Law No. 4014/2010 on Fire Prevention and Control	x	x	x	x
Law No. 4241/2010 on the Restoration of Watershed Protection Forests in the National Territory	v	v	v	v
Law No. 294/93 on Environmental Impact Assessment	v	v	v	v
National Reforestation Plan	v	v	v	v
Law No. 1863/02 Agrarian Statute	v	v	v	v
Law No. 854/63 establishing the Agrarian Statute	x	x	x	x
Law No. 125/91 on Tax Reform and Law 3703/09 that modifies Article 8 of Law 125 in relation to the deduction of reforestation expenses for income tax	x	x	x	-
Law No. 536/95 on the Promotion of Reforestation, with Decree 9425/95 that regulates it	v	v	v	v
Law No. 3139/06 extending the validity of Articles 2 and 3 of Law 2524/04 Law 3663/08 amending Law 2524/04 Articles 2 and 3	v	v	v	v
Law No. 4890/13 on Real Property Rights to Forest Surface known as “forest flight”	v	v	v	v
Law No. 716/95 punishes crimes against the environment. This regulation establishes that ecological crimes are not punishable by imprisonment.	v	v	v	v
Law No. 294/93 on Environmental Impact Assessment	v	v	v	v
Law No. 3001/06 on the Valuation and Remuneration of Environmental Services and its Regulatory Decree 20147/07	v	v	v	v
Law No. 352/94 on Protected Wild Areas, which establishes the general rules to regulate the management and administration of the National System of Protected Wild Areas	v	v	v	v
Law No. 515/94 prohibiting the export and trafficking of logs, pieces and beams of wood	v	v	v	v
Law No. 904/81 “Statute of Indigenous Communities” and its amendment Law 919/96	v	v	v	v

AG= Agriculture LI=Livestock BI=Biomass HS=Human Settlements, X= Poor implementation encourages deforestation, V= Efficient implementation favors forest conservation. Source: Authors based on MADES/PNUD, 2019.

Figure 13 shows the impact of the main forest regulation legislation and its impact on deforestation. Despite the pioneering implementation of the Zero Deforestation Law in the Eastern Region in 2004, the annual area of native forest loss accelerated in subsequent years. This deforestation is rooted in the expansion of the agricultural frontier toward the Chaco, and although this is largely legal, it remains a challenge for Paraguay's environmental forest policy. In recent years, a slowdown in deforested hectares has been observed.

Figure 13. National Forest regulation and Paraguay´s Deforestation Area



Source: Authors.

CONCLUSIONS

Paraguay faces critical challenges in the conservation of its native forests. Although it has developed a comprehensive and long-standing legal framework—dating back over 50 years and significantly expanded in the last decade—available data show that control and enforcement mechanisms remain insufficient to curb deforestation effectively.

Paraguay has ratified major international environmental agreements, including the Paris Agreement, the Convention on Biological Diversity, and the Convention to Combat Desertification. These commitments have informed the development of national strategies such as the National Strategy for Land Degradation Neutrality (ENNDT) and the National Climate Change Mitigation Plan. However, their impact has been limited given the scale of structural and economic pressures.

Between 2000 and 2023, Paraguay lost more than 6.6 million hectares of native forest, with 88% of this loss occurring in the Western Region (Chaco). The main driver has been the expansion of agriculture and livestock, particularly cattle ranching in the Chaco and intensive farming in the Eastern Region. While the deforestation rate has slowed in recent years, it remains at concerning levels, especially considering that a significant portion of land-use change continues to occur legally under Land-Use Plans approved by INFONA.

The country has developed modern tools for forest monitoring, including the National Forest Monitoring System (SNMF) and early warning systems using satellite imagery. However, limited access to data and weak inter-institutional coordination still hinder effective forest governance. Stronger collaboration between INFONA, MADES, and subnational governments is critical to implementing a more coherent and impactful policy framework.

Significant challenges remain, including mounting pressure on fragile ecosystems, the expansion of illegal crop cultivation, ongoing deforestation within protected areas, and heavy reliance on biomass—particularly firewood and charcoal—for energy. Moreover, the lack of adequate economic incentives for forest conservation continues to undermine sustainable land-use efforts. Additionally, regulatory asymmetries between the Eastern and Western regions create uneven enforcement environments and complicate the implementation of cohesive national policies.

In this context, Paraguay stands at a crossroads. Deforestation is not only an environmental threat but also a missed opportunity to pursue a green growth model built on the sustainable use of its natural resources. Reversing this trend will require stricter enforcement of existing regulations, enhanced monitoring capabilities, stronger environmental institutions, and the expansion of economic and financial incentives for the preservation and restoration of native forests. A holistic approach—combining regulation, transparency, territorial development, and public participation—will be essential to achieving these goals.

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