

*Project  
Forestal San Pedro*

# Environmental and Social Impact Assessment

## Executive Summary

The company Forestal San Pedro was created in 2020 and aims to manage 8,000 ha of forest plantations and timber industrial development within the framework of the **San Pedro Forest Project (FSP)**. The project will cover plantations in the department of San Pedro, west of the department of Canindeyú, south of the department of Concepción and north of Caaguazú. The company is in the process of acquiring 6,270 ha of eucalyptus plantations, which were planted between 2014 and 2020, currently located within the departments of San Pedro and Canindeyú. This area consists of stands of pure and silvopastoral plantations. It is foreseen to establish another 1,730 ha to reach the target.

The Forest Management Units (FMUs) to be acquired for the FSP Project in Paraguay are timber plantations that have and will continue to have social and environmental management systems based on environmental, social and governance policies that are aligned with all the principles and criteria of Forest Stewardship Council (FSC) certification and the Environmental and Social Performance Standards of the International Finance Corporation. Being certified by the FSC demonstrates that forest plantations meet the highest social and environmental standards on the market (FSC 2020).

The operations of the FSP Project will be carried out by UNIQUE Wood Paraguay SA, a company founded in 2001 that is part of the UNIQUE Group, and whose objective is the valorization of the forest resource through the development and implementation of profitable models of forest production, which generate positive social and environmental impacts (UNIQUE Wood 2018).

Sustainable development encompasses environmental, social and economic aspects. The FSP Project requires to formalize the ownership of forest plantations within the framework of Law No. 4890/15 - REAL PROPERTY RIGHT OF FOREST AREA, where forest plantations are registered for development with the requirement of compliance with all environmental laws governing the matter. For this reason, each owner who assigns the DRSF to the FSP project must necessarily have an environmental license at least.

In addition, as Paraguay ratifies all ILO (International Labour Organization) conventions, the FSP Project only works with contractors who comply with labour laws. To ensure compliance with environmental and social aspects, monitoring plans are implemented with a system of continuous communication with contractors, subcontracted workers and surrounding communities.





## **Environmental and Social Impact Assessment Report**

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## Company Information

The company San Pedro Forestal was created in 2020 and aims to manage forest plantations and timber industrial development within the framework of the **Forestal San Pedro (FSP) Project**. The project will cover plantations mainly in the department of San Pedro, also considering to the west of the department of Canindeyú, south of the department of Concepción and north of the department of Caaguazú. The company seeks to develop plantations on land of previous agricultural use, leased to its owners.

The project aims to reach about 8,000 ha. Eucalyptus forest plantations aged between 0-6 years have been identified and the company is in the process of acquiring 6,270 ha over leased land consisting of stands of pure and silvopastoral plantations. The company plans to identify another 1,730 ha to reach the target area. In addition, it foresees the development of an industry to process such wood, initially planned as a sawmill that could be modified according to market needs.

The operations of the FSP Project are carried out by UNIQUE Wood Paraguay SA, a company founded in 2001 that is part of the UNIQUE Group, and whose objective is the valorization of the forest resource through the development and implementation of profitable models of forest production, which generate positive social and environmental impacts (UNIQUE Wood 2018).



The investor of the FSP Project is the Arbaro Fund, a private equity fund based in Luxembourg that already implements sustainable forestry projects in different countries and now in Paraguay where biophysical growth conditions are ideal. Arbaro provides significant climate change mitigation and adaptation benefits by establishing a renewable resource through FSC-certified and sustainable forest plantations. Arbaro aims globally to sequester 20 million metric tons of CO<sub>2</sub>, create 5,000 new jobs and contribute to the development of knowledge and skills in rural areas where it operates (Arbaro 2018).

Eucalyptus plantations are organized in Forest Management Units (FMUs) according to their location. The FMUs in acquisition process for the FSP Project are timber plantaciones with social and environmental management systems implemented based on environmental and social policies that are aligned with all the principles and criteria of a Forest Stewardship Council (FSC) certification. Being FSC certified demonstrates that plantations meet the highest social and environmental standards on the market (FSC 2020).

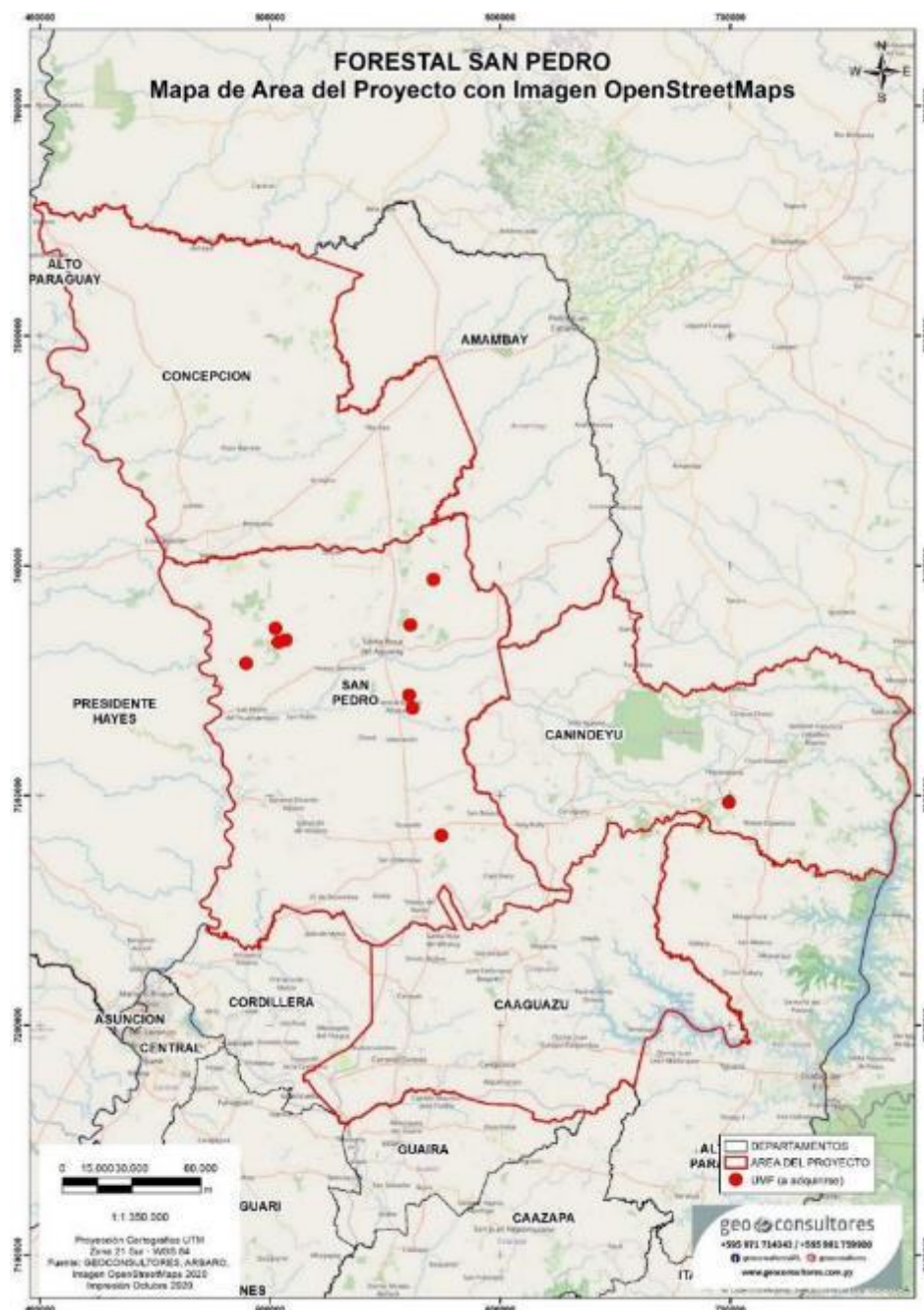
For the development of the FSP Project, historical monitoring data on plans implemented to mitigate environmental and social impacts on identified FMUs are considered relevant and necessary for continuous improvement. This report establishes mitigation plans in accordance with Arbaro's Environmental, Social and Governance Policy and Exclusion List and according to continuous improvements, considering previous experiences. Forestal San Pedro has hired GEOCONSULTORES, a company with more than nineteen years of experience as advisor and consultant in the agricultural, livestock and forestry sectors, to carry out this Environmental and Social Impact Assessment of the FSP Project.



## Project Description

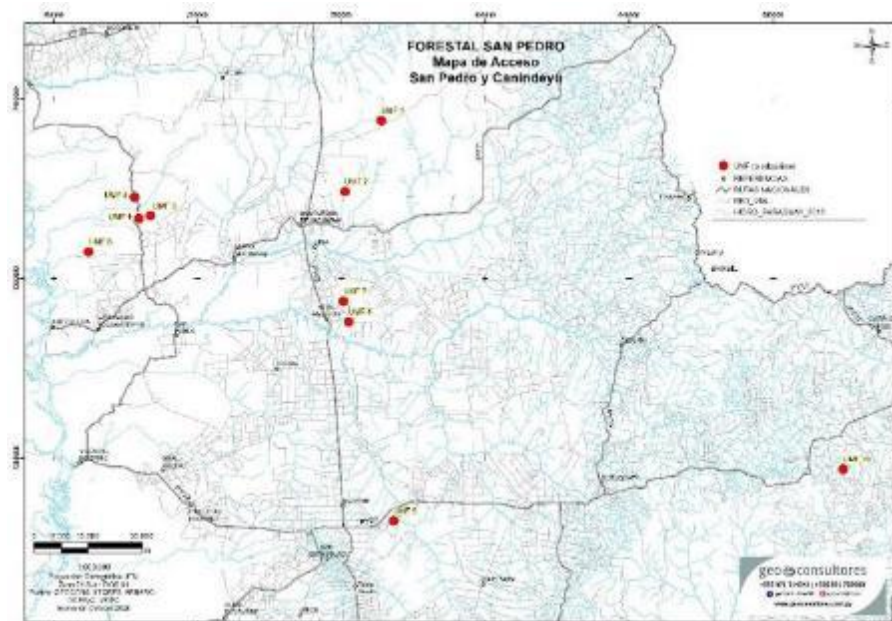
On the one hand, the FSP Project consists of the management of 6,270 ha of eucalyptus plantations planted between 2014-2020, distributed between pure and silvoastoral plantations; on the other hand, the planting and management of an additional 1,730 ha over the years 2021-2024 to establish a total of 8,000 ha, the target of the project. Once maturity has been reached, the FSP Project will include timber industrial processing initially planned to be a sawmill, but which could be expanded according to market demand.

## Location



Map 1. The Area of Influence of the Project included for this Environmental and Social Impact Study are the Departments of San Pedro, Canindeyú, Concepción and Caaguazú. The Forest Management Units identified and in process of being acquired are located in the departments of San Pedro and Canindeyú.





Map 2. Forest Management Units identified and in process of being acquired.

### Definition of FSP Project actions

The forest plantations of the FSP Project are for producing quality timber. Once a study of the characteristics and use capacity of the soil is carried out, the species and clones that will be used are defined. In addition, according to soil baselines and agreement with landowners, FMUs can be pure plantations or plantations with silvopastoral systems.

The Project activities are listed in the following:

Forest Activities	
Actions	Definition
<b>Preparation</b>	<p>Cleaning and preparation of the soil for plantation of woody species. Following topographic survey and soil studies, soil preparation is carried out in order to promote root development of the species to be planted. Includes demarcation and distribution of planting materials.</p> <p>This stage represents an action for future FMUs, with current FMUs being in more advanced stages.</p>
<b>Planting</b>	<p>Plantation of planting materials of woody species such as <i>E. grandis</i> and <i>E. urophylla</i>. Planting can be under silvopastoral system or in pure plantation system. Planting materials from outsourced suppliers are received in pots or tubettes containing the specific nutrients that protect the roots, it is recommended to keep them in a humid place, outdoors and must be watered at least 3 times a day.</p> <p>Silvopastoral system: Space of 5 x 9 x 2 meters. Thus reaching approximately 714 trees/ha.</p> <p>Pure planting system: 5 x 2 meters and 5 x 2.5 meters. Thus reaching approximately 800-1000 trees/ha.</p> <p>It also refers to blanking, a stage that replaces plants of the first plantation that did not survive with the aim of repopulating and maintaining a minimum of survival.</p> <p>This stage represents an action for future FMUs, with current FMUs being in more advanced stages.</p>

Forest Activities	
Actions	Definition
<b>Maintenance</b>	<p>Manual control and application of agrochemicals for timely control of insects, bacteria, fungi, or unwanted vegetation.</p> <p>It includes the control, maintenance of forest ground by permanent cleaning, and all activities related to fire prevention.</p> <p>Thinning: at 2, 5 and 8 years old. Selection of trees for removal as needed.</p> <p>Pruning: up to 9 meters in 3-4 interventions within the first 3 years. They aim to eliminate basal branches to increase growth rate, wood quality and ornamental quality.</p>
<b>Harvesting and Transport</b>	<p>Directional felling: control of the fall of the tree, taking care of the safety of the personnel in charge and taking care of the quality of the forest product and optimization of the extraction.</p> <p>Wood extraction.</p> <p>Transport of commercial. Includes logs registration, sectioning, loading, and potentially sawing (mobile saw).</p> <p>Includes maintenance of vehicles and machinery, including saw blade sharpening.</p>
<b>Installation and Infrastructure for Industrial Wood Development - Sawmill</b>	<p>The set of operations covered by a timber company with a focus on sawing and preservation areas, as well as the services and dependencies, includes for its activity several factors. The flow of activities such as sawing on the one hand and preservation on the other must have a directional continuity from the entry of the logs to the dispatch of the elaborated wood product. To do this, it is necessary to allocate the spaces essential for the performance of the unit activities that are part of the process and it is necessary to combine those spaces so that the whole works most effectively. Of course, the possible formulas are very varied, depending on the volume of the company, the equipment and the operations it chooses to include in its process, the physical space available, the previous existence or not of constructions, roads, railways and water.</p> <p>The necessary and sufficient spaces are provided for the storage of logs, for the area for indoor or outdoor drying castles, the drying preparation area, spaces for large truck manoeuvres and also consider future widenings of the installation.</p> <p>The arrangement of equipment in the sawmill "Line-Out"- Sawmill Design: these are the terms with which it is possible to present the multiple solutions that can be given to rationally distribute the elements of a sawmill. The multiplicity of solutions derives from the very diverse situations, which is possible or that need to be raised with the factors that come into play, volume of production, types of parts to be obtained, types of woods to be made, maximum dimensions of the logs, all this refers to the technical issues of the plant. It is essential to combine equipment and wood mobility devices, so that there are no material vacuums (or potholes), bottlenecks or jams.</p> <p>To do this, the first thing that needs to be ensured is the fluid feeding of the sawmill from the log storage yard, follow in a coordination of tasks in the units of the sawing equipment. This should be based on the permissible feed rate in each and the ability to make one or more cuts simultaneously. Sectors where bottlenecks are quite common is in saws for resawing, edgers and markers and in the sorting chain. One way to lessen this problem is to provide for a temporary storage area (or tables) before some of those machines.</p> <p>The opening of the logs and the immediate subdivision is achieved with endless saws. The next steps of the process continue with double and multiple circulars to be edged and sawn if necessary, the sides are stored to be resawn (in smaller parts) or to be chipped or collected for charcoal production. The logs are fed to the sawing machine by chains in inclined planes, at the other end the sawn parts are descending through the sorting chain or a conveyor, towards the immersion bath or towards the preparation for drying.</p>

## Forest Activities

Actions	Definition																																
	<p>According to the final product, the wood can enter the laminating machine, the pole derailing tool, the rocker drill, or the endless carpentry (Herebia 2014).</p> <p>The Pan American Committee on Technical Standards (2018) has summarized the name of the sawn parts as follows:</p> <table><tr><th><u>Piezas</u></th><th><u>Espesor</u></th><th><u>Ancho</u></th><th><u>Largo</u></th></tr><tr><td><b>Chapa</b></td><td>menos de 5 mm</td><td>variable s/uso</td><td>variable s/uso</td></tr><tr><td><b>Tablilla</b></td><td>de 5 a 10 mm</td><td>variable s/uso</td><td>variable s/uso</td></tr><tr><td><b>Tabla</b></td><td>desde + de 10mm Hasta – de 50mm</td><td>mayor de 100mm</td><td>variable s/uso</td></tr><tr><td><b>Tablón</b></td><td>desde 40mm hasta 125 mm</td><td>200mm o más</td><td>variable s/uso</td></tr><tr><td><b>Tirante</b></td><td>desde 50 a 75mm</td><td>desde 50 a 150mm</td><td>no menos de 2 m</td></tr><tr><td><b>Vigueta</b></td><td>desde 125mm hasta menos de 200mm</td><td>desde 125mm hasta menos de 200mm</td><td>no menor de 2 m</td></tr><tr><td><b>Viga</b></td><td>200mm o más</td><td>200mm o más</td><td>no menos de 2 m</td></tr></table>	<u>Piezas</u>	<u>Espesor</u>	<u>Ancho</u>	<u>Largo</u>	<b>Chapa</b>	menos de 5 mm	variable s/uso	variable s/uso	<b>Tablilla</b>	de 5 a 10 mm	variable s/uso	variable s/uso	<b>Tabla</b>	desde + de 10mm Hasta – de 50mm	mayor de 100mm	variable s/uso	<b>Tablón</b>	desde 40mm hasta 125 mm	200mm o más	variable s/uso	<b>Tirante</b>	desde 50 a 75mm	desde 50 a 150mm	no menos de 2 m	<b>Vigueta</b>	desde 125mm hasta menos de 200mm	desde 125mm hasta menos de 200mm	no menor de 2 m	<b>Viga</b>	200mm o más	200mm o más	no menos de 2 m
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## Associated Activities

Actions	Definition
<b>Livestock</b>	<p>Although this activity is not part of the FSP Project, the farms that lease the property may have an agricultural production. In addition, in silvopastoral plantations, owners use these areas for cattle grazing.</p> <p>Activity that includes the arrival of cattle at the establishment for marking, caravan placement, weighing, etc. For introduction to the silvopastoral system.</p> <p>Cattle grazing within silvopastoral plantations in order to consume grass for weight gain. The system used in paddocks is rotating and outsourced. Outsourced services include activities such as weaning, castration, partition control, rodeo, breeding, breeding-finishing, wintering. This action also includes the staff of the livestock sector to be able to carry out the activities with the support of labor.</p>
<b>Sanitation and Vaccination</b>	<p>Although this service is outsourced, it is an essential activity for livestock introduced to the silvopastoral system.</p> <p>Vaccination: Preventive treatment against diseases such as aftosa, anthrax, rabies, brucellosis, etc.</p> <p>Dewositation/Sanitation: It consists of the periodic treatment of the animal mainly against verme, tick, lice, flies, uras, etc. The sanitation of the calf's navel and worms should be considered mainly.</p> <p>It should be done throughout the herd periodically and on a plan basis.</p>
<b>Constructions: Wires, Water, Plumbing, Infrastructure</b>	<p>Manual excavation of wells for the placement of poles every 5-8 meters with 4-5 wire barbed or smooth with 3 rockers. Soil excavation for placing PVC pipes for water distribution, maintenance of existing pipes. Soil movement and surface leveling for the construction and maintenance of infrastructures and roads.</p>



### Plantation Calendar

On the one hand, the FSP Project consists of the management of 6,270 ha of eucalyptus plantations planted between 2014-2020, distributed between pure and silvoastoral plantations; on the other hand, the planting and management of an additional 1,730 ha over the years 2021-2024 to establish a total of 8,000 ha, the target of the project. It is planned to plant 400 ha per year and these new areas will correspond to a ratio of 1:1 between areas with silvopastoral and areas of pure planting. It should be emphasized that all remnants of natural forests and water protection forest areas will be protected, the areas for plantations to be acquired must meet preset requirements, among other not being planted on forested areas or areas deforested after the validity of Law No. 2524/2004 followed by 3139/2006, 3663/2008, 5045/2013, 6256/2018 and have an environmental license, or proceed to obtain one in case of not having one.

### Forest Management Units Identified

In the following, average values considering all the FMUs identified and in acquisition process, according to their objective (Silvopastoral or Pure Plantation).

#### Silvopastoral plantations

Plantation density: approximately 714 trees/ha.  
Spacing: 5 x 9 x 2 m.  
Average annual increment (MAI): 33-34 m<sup>3</sup>/ha/year.

#### Pure plantations

Plantation Density: approximately 800-1000 trees/ha.  
Spacing: 5 x 2 m and 5 x 2.5 m.  
Average annual increment (MAI): 38-40 m<sup>3</sup>/ha/year.

#### For both planting objectives:

Species: Different Eucalyptus: mostly hybrids of *E. grandis* and *E. urophylla* (*urograndis*).  
Rotation: 12 years average (range of 10-14 years).  
Thinning: 3 interventions in the 2nd, 5th and 8th year.

In the following maps are presented of the identified Forest Management Units that are being acquired, displayed with Sentinel 2A images from October 2020.



Map 3. Forest Management Units in process of acquisition - Image Sentinel 2A, October 2020.





Map 4. Forest Management Units in process of acquisition - Image Sentinel 2A, October 2020.





Map 5. Forest Management Units in process of acquisition - Image Sentinel 2A, October 2020.

## FSC Certification (Forest Stewardship Council)

The company is committed to managing the FSP Project in accordance with FSC principles and criteria and obtaining FSC certification in the early stages of implementation. Since 2014, the Forest Management Units under acquisition have been FSC Certified, a voluntary certification that guarantees timber products and derivatives from sustainable forests with responsible forest management. Certification includes all stages from obtaining, producing to distributing products.

FSC Certification promotes ten principles, each with numerous criteria describing how environmental and social management of forestry ventures should look like to achieve sustainable development and thus achieve: mitigate environmental impacts during all stages of the project; make the project beneficial to society; and make the project economically viable. FSC principles and criteria are suitable for forest plantations in Paraguay as FSC certification applies to tropical, temperate forest areas, diverse ecosystems, different cultural, political and legal systems.

### Principles

The need to purchase products from sustainable forest plantations to curb the procurement of products from native forests that do not have management plans and that only contribute to the continued degradation of forests and deforestation is recognized worldwide. The awareness of society of purchasing products from sustainable sources requires a commitment from companies to meet demands, which is why FSC requires compliance with 10 principles that are critical to defining sustainable development.

- Principle 1: Compliance with laws – comply with all laws, regulations, treaties, conventions and agreements.
- Principle 2: Workers' rights and conditions of employment – maintain or improve the social and economic well-being of workers.
- Principle 3: Indigenous Peoples' rights – identify and support the rights of indigenous peoples of ownership, use and management of land and its resources.
- Principle 4: Community relations – contributing to the maintenance or improvement of the social and economic well-being of local communities
- Principle 5: Benefits from the forest – maintain or improve the long-term economic, social and environmental benefits from the forest.
- Principle 6: Environmental values and impacts – maintain or restore ecosystem services and environmental values.
- Principle 7: Management planning – have a management plan implemented, monitored and documented.
- Principle 8: Monitoring and assessment – demonstrating progress towards meeting management objectives.
- Principle 9: High conservation values – maintain or improve high conservation values by precautionary approach.
- Principle 10: Implementation of management activities – plan and manage activities in accordance with company policies and objectives and FSC Principles and Criteria.

## Environmental and Social Procedures

In addition to the principles and criteria of FSC certification, the FSP Project adopts the Environmental and Social Performance Standards of the International Finance Corporation (IFC) to express a commitment to sustainable development in its environmental and social procedures.

The IFC has eight Performance Standards:

- Performance Standard 1: Assessment and management of environmental and social risks and impacts
- Performance Standard 2: Labor and working conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

Sustainable development encompasses environmental, social and economic aspects. Since it is foreseen to operate on leased land, the FSP Project requires to formalize the ownership of forest plantations within the framework of Law No. 4890/15 - REAL RIGHT OF FOREST AREA (DRSF), where forest plantations are registered for development with the requirement of compliance with all environmental laws governing the matter. For this reason, each landowner who assigns the DRSF to the FSP Project must necessarily have an environmental license at least.

In addition, as Paraguay ratifies all ILO Conventions, the FSP Project only works with contractors who comply with labour laws. To ensure compliance with environmental and social aspects, monitoring plans are implemented with a system of continuous communication with contractors, subcontracted workers and surrounding communities.

Below is a summary of the procedures adopted in the identified FMUs being acquired, which will be continued within the framework of the FSP Project and which serve as the basis for this study.

Environmental and Social Procedures	
Procedure	Summary
Forest Management Plan (FMP)	The FMP includes: descriptions of planned forestry operations; baseline information presented by specialists trained for biodiversity recognition that determines which ecosystems are fragile and of high conservation value; risk assessment during forestry operations and mitigation measures to be implemented with a system for monitoring such mitigation plans during all stages of the project.
Check List for New Forest Management Units	It is planned to continue expanding forest plantations in Paraguay, for this there is an overview of the activities that will be carried out before starting operations in a new FMU. Among them are: <ul style="list-style-type: none"> <li>• Valid property title.</li> <li>• There should be no major unresolved conflicts regarding land tenure.</li> <li>• FMUs should necessarily have the approval of related government institutions, such as MADES and INFONA.</li> </ul>



Environmental and Social Procedures	
Procedure	Summary
	<ul style="list-style-type: none"> <li>Land use of the new FMUs under no circumstances will be on areas covered with natural forests or areas that may have attributes of High Conservation Value.</li> <li>The land must have aptitude for quality wood forest plantations.</li> <li>A lease agreement of a minimum duration of a forest production cycle must be reached.</li> <li>Baseline studies should be carried out.</li> <li>Protection areas must be delimited.</li> <li>Identify neighboring communities.</li> <li>Analyze the forest cover of 2005 to check for changes in forest cover, since this is prohibited in the project region (Law No. 6.256/18 "Prohibiting the transformation and conversion of forest-covered areas in the Eastern Region")</li> </ul>
Participation of Interested Parties and Disclosure of Information.	<p>Stakeholder participation improves the quality of project implementation and fosters mutual trust. It refers to stakeholders as individuals or groups that are affected or may be affected by the project and those who may have an interest in the project. It includes parties likely to be affected by the project due to real impacts or potential risks to their physical environment, health, safety, cultural practices, well-being or livelihoods. Particular interest is paid to vulnerable or less favoured parties. Stakeholder participation begins at the project identification stage and continues until the project closes.</p> <p>The FMUs identified and in the process of being acquired have the approval of stakeholders and an officer who maintains open lines of communication. Future FMUs will also be assigned an officer for:</p> <ul style="list-style-type: none"> <li>identification and analysis of stakeholders:</li> <li>planning how stakeholder participation will be carried out</li> <li>disclosure of information</li> <li>stakeholder consultation</li> <li>addressing and responding to complaints</li> <li>reporting to stakeholders</li> </ul>
Grievance Mechanism	<p>The following means of communication are enabled for continuous communication with all stakeholders:</p> <ul style="list-style-type: none"> <li>Written: Complaint mailboxes are installed and maintained, one must necessarily be at the entrance of the properties for surrounding communities and another located within the FMUs for workers</li> <li>Verbal: The officer assigned to ensure the company's social responsibilities has a telephone number available to receive calls from stakeholders and can also be personally approached to talk</li> </ul> <p>All communications are recorded, and complaints and concerns are followed up.</p>
Procedures for Social Monitoring	<p>Mitigation plans and subsequent monitoring plans establish what procedures must be carried out to achieve positive social impacts. In this sense, the project's own workers, contractors and their subcontracted and, on the other hand, stakeholders are considered. The provision of local jobs seeks to integrate workers from surrounding communities with the aim of</p>

Environmental and Social Procedures	
Procedure	Summary
	<p>providing quality long-term jobs in compliance with current labour legislation and social benefits.</p> <ul style="list-style-type: none"> <li>Workers: Monitoring of employment conditions, housing facilities, health and safety training, satisfaction of subcontracted personnel, monitoring accidents to know how to act and more importantly to learn how to avoid in the future.</li> <li>Stakeholders: Meetings are held, and communication methods are provided to receive complaints directly or anonymously, community projects are developed and reports are prepared to achieve continuous improvement of the relationship between all stakeholders.</li> </ul> <p>Monitoring is constant, i.e. it is maintained in communication with workers and stakeholders. With the criterion of continuous improvement, it is possible to anticipate predictable adverse situations, providing possible solutions that are already structured.</p>
Procedures for Environmental Monitoring	<p>Mitigation plans and subsequent monitoring plans establish the procedures to be carried out to achieve positive environmental impacts considering the impacts of soil, water, flora, fauna, landscape, caused by the use of agrochemicals and fuels, waste, illegal activities and the development in close proximity of areas of high conservation value. Procedures include:</p> <ul style="list-style-type: none"> <li>Existing Forest Plantations operate only on properties with environmental license from MADES.</li> <li>All checklist items for new plantations apply to existing forest plantations.</li> <li>All plantation areas have biodiversity baseline studies and analysis of High Conservation Value (HCV) attributes, the results of the report are necessary to identify conservation areas (FSC Principle 9).</li> <li>Good practices to avoid erosion and not contribute to the drought of low natural fields important for water recharge.</li> <li>Close to the preset percentages of asexual and sexual plantings.</li> <li>Good practices to avoid dust.</li> <li>Uncontrolled hunting and logging of native wood species is strictly prohibited.</li> <li>Comprehensive management of solid waste that avoids waste through sustainable production and consumption practices: avoid generation, if it is not possible to avoid, minimization should be sought using the concept of 3R's (reduce, reuse, recycle), if this minimization is not possible, then treatment should be done, and only when treatment is not feasible, one should just think about the final arrangement.</li> </ul> <p>Law No. 3.956/09 - INTEGRAL MANAGEMENT OF SOLID RESIDUES IN THE REPUBLIC OF PARAGUAY.</p> <p>Article 33.- Prohibition. "The burning or incineration and disposal of solid waste in open pits, in watercourses, in lakes or lagoons or in places of final disposal other than landfills is prohibited. The participation of minors in any stage of management is also prohibited."</p>

Environmental and Social Procedures	
Procedure	Summary
Machinery	Good practices for the use and maintenance of machinery and training for proper use during operations by the personnel in charge.
Agrochemicals	<p>Hazardous Waste Management.</p> <ul style="list-style-type: none"> <li>• The purchase of agrochemicals will be made with companies that integrate the principle of extended responsibility in their products, who have an adequate final arrangement of empty packaging.</li> <li>• Review the stored products for storage conditions and how long they can remain stored. This prevents the generation of waste by expiry of the products.</li> <li>• The packaging of agrochemicals once empty must be rinsed three times and then perforated so that they cannot be used again. The contents of the rinse are poured into the chemical application tank.</li> <li>• Use of personal protective equipment during handling and use of agrochemicals.</li> <li>• Have written emergency responses. This manual should be available for inquiries on each agrochemical used and/or stored.</li> <li>• Have showers and washes.</li> </ul>
Personal Protective Equipment (PPE)	Procedure for the provision, use and registration of PPE. Have a list of PPEs necessary per operation and that these PPEs are in good condition.
Fire Control Plan (PCI)	Have well-trained and organized human resources to respond; physical resources and infrastructure; fire action plans; appropriate preventive measures.



## Analysis of Legal Requirements

The social and environmental responsibility of the company begins with compliance with the legislation in force in the country. The laws in force in the country ratify international agreements and conventions such as the fundamental labour conventions of the International Labour Organization (ILO), on discrimination, child labour, forced labour, freedom of association, collective bargaining, equal pay, transparent and non-discriminatory procurement procedures, and the complaints mechanism.

### The 1992 National Constitution

Article 6 - QUALITY OF LIFE. "Quality of life will be promoted by the State through plans and policies that recognize conditioning factors, such as extreme poverty and impediments to disability or age. The State will also promote research on population factors and their links to social economic development, environmental preservation and the quality of life of the inhabitants."

Article 7 - THE RIGHT TO A HEALTHY ENVIRONMENT. "Everyone has the right to live in a healthy and ecologically balanced environment. Priority objectives of social interest are the preservation, conservation, recomposition and improvement of the environment, as well as its reconciliation with integral human development. These purposes will guide relevant government legislation and policy."

Article 8 - ENVIRONMENTAL PROTECTION. "Activities likely to cause environmental disturbance will be regulated by law. It may also restrict or prohibit those that qualify as dangerous." "[The law] will regulate the trafficking of genetic resources and their technology, using national interests." "The ecological crime shall be defined and punished by law. Any damage to the environment will matter to the obligation to recompose and compensate."

Article 38 - THE RIGHT TO DEFENSE OF FUZZY INTERESTS. "Everyone has the right, individually or collectively, to claim from public authorities measures for the defence of the environment, habitat integrity, public health, national cultural acquis, the interests of the consumer and others who, by their legal nature, belong to the community and relate to quality of life and collective heritage."

Article 62 - OF INDIGENOUS PEOPLES AND ETHNIC GROUPS. "This Constitution recognizes the existence of indigenous peoples, defined as culture groups prior to the formation and organization of the Paraguayan State."

Article 64 - COMMUNITY PROPERTY. "Indigenous peoples have the right to community ownership of land, in sufficient extension and quality for the conservation and development of their peculiar forms of life. The State shall provide them with free of charge of these lands, which shall be unpackageable, indivisible, non-transferable, imprescriptible, not susceptible, not capable of guaranteeing contractual obligations or being leased." "The removal or transfer of their habitat is prohibited without their express consent."

Article 72 - QUALITY CONTROL. "The State shall ensure the quality control of foodstuffs, chemicals, pharmaceuticals and biological products at the stages of production, import and marketing. "

Article 86 - RIGHT TO WORK. "All the inhabitants of the Republic have the right to lawful, freely chosen work and to be carried out in dignified and just conditions. The law will protect work in all its forms and the rights it grants to the worker are indispensable."

Article 115 - OF THE BASES OF AGRARIAN REFORM AND RURAL DEVELOPMENT. "rationalization and regularization of land use and cultivation practices to prevent its degradation" "the defense and preservation of the environment."

Article 168 - OF THE ATTRIBUTIONS. "They shall be the responsibilities of the municipalities, in their territorial jurisdiction and in accordance with the law: 1 free management in matters of their competence, particularly those of... atmosphere..."

Article 176 - ECONOMIC POLICY AND DEVELOPMENT PROMOTION. "Economic policy will have as its objectives, fundamentally, the promotion of economic, social and cultural development. The State will promote economic development through the rational use of available resources, in order to drive an orderly and sustained growth of the economy, to create new sources of work and wealth, to increase national heritage and to ensure the well-being of the population. Development will be fostered through global programmes that coordinate and guide national economic activity."

Article 177 - OF THE CHARACTER OF DEVELOPMENT PLANS. "National development plans will be indicative for the private sector, and mandatory compliance for the public sector."

### Paraguay's National Environmental Policy (PAN)

CONCEPTUAL FRAMEWORK. "Environmental Policy is the set of objectives, principles, criteria and general guidelines for the protection of a society's environment, in order to ensure the sustainability of development for current and future generations."

Principles. "Sustainability: present generations are responsible for environmental protection and must ensure the proper use and enjoyment of natural heritage that will be legacy of future generations. Caution: where there is a danger of serious or irreversible harm, the absence of scientific information or certainty should not be used as a reason to delay effective measures. Integrality is understood as the need to concert sectoral policies and to adjust the national, departmental and municipal legal framework, making the rules that give greater protection to the environment prevail. Graduality: it is assumed as the ability to continuous adaptation and improvement. Responsibility: the cause of damage to the environment must repair the damage and restore the affected conditions. Subsidiarity: environmental management will be organized in order to achieve maximum social prominence in decision-making, efficiency in the use of resources and in obtaining results, ensuring that decision-making is as close as possible to the citizen.

GENERAL OBJECTIVE. Preserve and adapt the use of Paraguay's natural and cultural heritage to ensure the sustainability of development, equitable distribution of its benefits, environmental justice and the quality of life of the present and future population.

By order of the year of validity, the main Laws, Decrees and Resolutions related to the care of the environment that apply to this project are cited below.

### Major Environmental and Social Laws

Law No. 422/73- FORESTAL.

Article 1.- Declare in the public interest the use and rational management of the country's forests and forest lands, as well as that of renewable natural resources included in the regime of this law. The protection, conservation, improvement and increase of forest resources should also be declared in the public and compulsory interest.

Article 2.- These are fundamental objectives of this Law: (a) The protection, conservation, increase, renewal and sustainable and rational use of the country's forest resources; (b) The incorporation into the national economy of land that can maintain forest vegetation; (c) control of soil erosion; (d) the protection of watersheds and springs; (e) The promotion of afforestation, reforestation, crop protection, defence and beautification of communication, public health and tourism areas; (f) coordination with the Ministry of Public Works and Communications in the construction of communication routes for economic access to forest production areas; (g) the conservation and increase of natural resources for river and lake hunting and fishing in order to obtain maximum social benefit; (h) The study, research and dissemination of forest products; (i) cooperation with national defence.

Article 3.- Understand by forest lands for the purposes of this law, those that by their agrological conditions have an aptitude for the production of timber and other products of wood and other forest products.

Article 4.- State the following classification of forests and forest lands: (a) of production; b) protectors; c) special ones.

Article 5.- These are forests or forest lands of production, those whose main use makes it possible to obtain an annual or periodic income by orderly use thereof.

Article 6.- It is forests or forest lands that by their location fulfill purposes of interest to: a) Regularize the water regime; b) Protect soil, agricultural crops, livestock farming, roads, river banks, streams, lakes, islands, canals and reservoirs; (c) Prevent erosion and action of floods and floods and avoid the desiccant effects of winds; (d) To house and protect species of flora and fauna whose existence is declared necessary; (e) Protect public health; (f) ensure national defence.

Article 7.- Special forests are those that, for reasons of scientific, educational, historical, tourist, experimental or recreational nature, must be preserved as such.

Art. 42.- All rural properties of more than twenty hectares in forest areas shall maintain twenty-five per cent of their natural forest area. If this minimum percentage is not available, the owner must reforest an area equivalent to five per cent of the area of the property.

In addition, for the transport and marketing of timber and other forest products, the corresponding guides extended by the National Forest Service are required. Such guides shall specify: quantity, species, weight or volume, origin and destination of the transported product. (Article 26) Natural or legal persons in this activity shall be entered in the registers which are enabled for that purpose (Article 27).

Law No. 836/80- OF HEALTH CODE. "This Code regulates the functions of the State with regard to the comprehensive care of the health of the people and the rights and obligations of persons in this matter." Regulating the environment in Title II of HEALTH AND THE ENVIRONMENT. Chapter I, Environmental Sanitation – Pollution and Pollution, Chapter II, Water for Human Consumption and Recreation, Chapter III of Sewers and Industrial Rights, Chapter IV of Occupational and Work Environment Health. Article 104.- Owners or managers of rural farms are obliged to carry out works and facilities of a health nature that will be determined by regulation.

Law No. 904/81 STATUTE OF INDIGENOUS COMMUNITIES



Law No. 1183/85- Civil Code. PARAGRAFO IV, OF THE WATERS: Art. 2004.- The stormwater belongs to the owners of the inheritances where they fell, or where they entered, and may freely dispose of them, or divert them, to the detriment of the lower lands, if there is no right acquired to the contrary.

Law 123/91- ADOPTING NEW PHYTOSANITARY PROTECTION RULES

Law No. 96/92- ON SILVESTRE.

Article 1.- "For the purposes of this Law, "Wildlife shall mean individuals, their parts and products belonging to species of wildlife which, temporarily or permanently, inhabit the national territory" even if they are managed by man."

Article 4.- "The protection, management and conservation of the country's wildlife is declared of social interest and public utility, which will be regulated by this Law, as well as its incorporation into the national economy. All the inhabitants have a duty to protect the wildlife of our country."

Article 5.- Any public or private works project, such as clearing, drying or drainage of floodland, riverbed modifications, dam and reservoir constructions, wildlife introductions, which may cause transformations in the native wildlife environment, will be consulted in advance with the Implementation Authority to determine whether such a project needs an Environmental Impact study for the realization of the same , in accordance with the regulations of this Act.

Law No. 213/93- SETTING THE CODE OF WORK

Law No. 234/93- "APPROVING CONVENTION No. 169 ON INDIGENOUS AND TRIBAL PEOPLES IN INDEPENDENT COUNTRIES, ADOPTED DURING THE 76TH. INTERNATIONAL LABOUR CONFERENCE, HELD IN GENEVA ON 7 JUNE 1989".

Law No. 294/93- ENVIRONMENTAL IMPACT ASSESSMENT. "The Environmental Impact Assessment is mandatory. Environmental Impact, for legal purposes, means any modification of the environment caused by human works or activities that have, as a positive or negative consequence, direct or indirect, affect life in general, biodiversity, quality or a significant amount of natural or environmental resources and their use, well-being, health, personal safety, habits and customs, cultural heritage or legitimate livelihoods."

Law No. 496/95- AMENDING, EXTENDING AND REPEALING ARTICLES OF LAW 213/93, CODE OF WORK

Law No. 716/96- CRIMES AGAINST THE ENVIRONMENT. "This Law protects the environment and the quality of human life against those who order, execute or, because of their powers, allow or authorize activities that threaten the balance of the ecosystem, the sustainability of natural resources and the quality of human life.

Law No. 1100/97- PREVENTION OF SOUND POLLUTION. Article 5 "Workplaces prohibit the operation of machinery, engines and tools without proper precautions necessary to prevent the spread of annoying noises, sounds and vibrations over the decibels determined by Article 9."

Law No. 1561/00- CREATING THE NATIONAL ENVIRONMENT SYSTEM, THE NATIONAL COUNCIL OF THE ENVIRONMENT, THE SECRETARY OF THE ENVIRONMENT. "This law aims to create and regulate the functioning of the bodies responsible for the elaboration, standardization, coordination, implementation and control of national environmental management and policy. for the purpose of acting together, harmoniously and orderly, in the search for answers and solutions to environmental problems. Also, to avoid interinstitutional conflicts, gaps or overlaps of competition, and to respond efficiently and effectively to environmental policy objectives."

Law No. 1863/02- SETTING THE AGRICULTURAL STATUTE.

Article 4.- The productive, efficient and rational use of rural properties. Consider that a property is efficiently and rationally used when it observes sustainable economic and environmental productive use, of at least 30% (thirty percent) of its agrologically useful area, from the fifth year of validity of this law. For the purposes of this law, productive use, use of the property in agricultural activities, farmers, livestock, management and use of natural production forests, reforestation or afforestation, or mixed agricultural uses are understood.

Law No. 2524/04- PROHIBITION IN THE EASTERN REGION OF THE ACTIVITIES OF TRANSFORMATION AND CONVERSION OF AREAS WITH COVERAGE OF FORESTS.

Law No. 3139/06- EXTENDING THE VALIDITY OF ARTICLES 2ND AND 3RD AND EXTENDING LAW NO. 2524/04 "PROHIBITING IN THE EASTERN REGION OF THE ACTIVITIES OF TRANSFORMATION AND CONVERSION OF AREAS WITH COVERAGE OF FORESTS.

Law No. 3239/07- OF THE WATER RESOURCES OF PARAGUAY. "aims to regulate the sustainable and integral management of all the waters and territories that produce it, whatever its location, physical condition or its natural occurrence within the Paraguayan territory, in order to make it socially, economically and environmentally sustainable for the people who inhabit the territory of the Republic of Paraguay."

Law No. 3646/08- CREATING THE NATIONAL FOREST INSTITUTE - INFONA. Article 5.- "THE INFONA shall be the implementing body of Law No. 422/73 "FORESTAL", of Law No. 536/95 "FROM PROMOTION TO AFFORESTATION AND REFORESTATION", and the other legal rules related to the forestry sector."

Law No. 3663/08- AMENDING ARTICLES 2 AND 3 OF LAW NO. 2.524/04 "ON PROHIBITION IN THE EASTERN REGION OF PROCESSING AND CONVERSION OF AREAS WITH FOREST COVERAGE", AS AMENDED BY LAW NO. 3.139/06

Law No. 3.956/09- INTEGRAL MANAGEMENT OF SOLID RESIDUES IN THE REPUBLIC OF PARAGUAY.

Article 1.- Object. "aims at establishing and applying a legal regime to the responsible production and management of solid waste, the normative content and practical usefulness of which should lead to the reduction of solid waste, to a minimum, and to avoid situations of risk to human health and environmental quality."

Article 3.- Principles. "Principle of Co-responsibility. The waste generator or the cause of any degrading effect of the environment, current or future, is responsible, together with the relevant authorities, for the cost of preventive or corrective recomposition actions."

Article 5.- Management. "Comprehensive management of solid waste should be healthy and environmentally adequate, subject to the principles of prevention and control of negative impacts on the environment and human health."

Article 29.- Landfills. "Waste that cannot be recycled and processed through available technologies shall be used for a permanent final disposal system, through Landfills."

Article 33.- Prohibition. "The burning or incineration and disposal of solid waste in open pits, in watercourses, in lakes or lagoons or in places of final disposal other than landfills is prohibited. The participation of minors in any stage of management is also prohibited."

Law No. 3.966/2010- ORGANIC MUNICIPAL. Article 12o Functions: "(a) The preservation, conservation, recomposition and improvement of significant natural resources. b) The regulation and control of standards and patterns that guarantee the environmental quality of the municipality. (c) Monitoring compliance with national environmental standards, after agreement with the competent national

authorities (d) The establishment of a local bondage and riverbank delimitation regime, lakes and streams."

Law No. 4014/10- PREVENTION AND CONTROL OF FIRES. It aims to establish standards suitable for preventing and controlling rural, forestry, vegetation and interface fires. As of its validity, on June 17, 2010, uncontrolled burning of grasslands, forests, scrub, fallows, natural fields, sawdy or any other cereal, legumes or type of flammable organic material that could generate any of the fires defined in that Law is prohibited. On that basis, the only form of burning authorized by law is prescribed burning, which refers to the ignition technique performed under such conditions as to suggest that fire will be kept within a given area. Therefore, from its validity, municipalities throughout the country, in inescapable coordination with the "Paraguayan Fire Prevention, Monitoring and Control Network", are responsible for "issuing authorizations of Quema Prescripta", enabling them to carry out the ignitions and constitute in contralor on site the way in which the burns are carried out. In order to grant such permits, which must be given in "forms printed under predetermined forms", the following measures should be taken: 1. wind concurrency below a set speed, with a maximum air temperature and a given minimum ambient relative humidity; 2. determine the period of months in which burning shall be permitted; 3. the minimum time interval between one and the other burns; 4. Allowed start times; 5. the number of minimum persons with elements to initiate ignition to be attended; 6. vehicles; means of communication and any other necessary security element to be provided by the data subject; among others. In the event of non-compliance, penalties for fines of 100 (hundred) to 2,000 (two thousand) minimum day labor fixed for various activities not specified in the Republic are provided for those who do not submit to the requirements laid down in that Law to carry out burns.

Law No. 4241/10- ON THE RESTORATION OF PROTECTIVE FORESTS OF WATER CHANNELS WITHIN THE NATIONAL TERRITORY. Article 1.- "Declare in the national interest the restoration of protective forests of the waterways of the Eastern Region, and the conservation thereof and in the Western Region of the Republic of Paraguay, to contribute to the implementation of environmental adequacy and protection measures that are required to ensure the integrity of water resources, which constitute public domain property of the State, in accordance with Article 23(c) of Law No. 98/07 of PARAGUAY'S WATER RESOURCES."

Law No. 5045/13- AMENDING ARTICLES 2 AND 3 OF LAW NO. 2.524/04 "ON PROHIBITION IN THE EASTERN REGION OF THE ACTIVITIES OF TRANSFORMATION AND CONVERSION OF AREAS WITH COVERAGE OF FORESTS", AS AMENDED BY LAW NO. 3139/06 AND EXTENDED BY LAW NO. 3663/08.

Law No. 5211/14- AIR QUALITY. "This Law aims to protect air and atmospheric quality by preventing and controlling the emission of chemical and physical pollutants into the air, to reduce the deterioration of the environment and the health of living beings, in order to improve their quality of life and ensure the sustainability of development. The Implementation Authority shall be the Secretariat of the Environment (SEAM)."

Law No. 4890/15- REAL RIGHT OF FOREST SURFACE

Article 1.- The "Real Forest Area Law", hereinafter DRSF, is one by which the owner of the domain of a property capable of containing forest plantations or natural forests constitutes, in favour of third parties or superfitearies, a right of use or provision on forest property planted on the surface of its property or on the property found in the property in the form of a natural forest; all of which should be exercised in accordance with the environmental legislation governing the matter. The mandatory conservation area established as a legal reserve for natural forests by Article 42 of Law No. 422/73



"FORESTAL", shall not be the subject of the constitution of The Royal Forest Area Law (DRSF), and the provisions of that Law must be respected in this regard.

Article 2.-The Real Forest Area Law (DRSF) is autonomous, separate and independent of the property right on which the property on which it is constituted and limits the owner's power to use, on its own or by another, the plantations or tree masses resulting from or to be implemented in the affected property. Such properties may have no other destination than that granted by the owner in the respective contract, as long as they are affected by the Real Forest Area Law (DRSF) that would have been constituted on the property subject to the contract. For the purposes of this Law, tree plantations or masses are considered furniture, in accordance with Article 1878 of Law No. 1183/85 "CIVIL CODE".

Law No. 5804/17- ESTABLISHING THE NATIONAL SYSTEM OF PREVENTION OF OCCUPATIONAL RISKS.

Law No. 6123/18- WHICH ELEVATES THE RANK OF MINISTRY TO THE MINISTRY OF THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

Law No. 6256/18- PROHIBITING THE ACTIVITIES OF TRANSFORMATION AND CONVERSION OF AREAS WITH COVERAGE OF FORESTS IN THE EASTERN REGION. Article 2: Definitions (b) Forest: to the native or indigenous ecosystem, intervened or not, regenerated by natural succession or other forestry techniques, which occupies a minimum area of 2 (two) hectares, varied, with one or more canopies suffering more than 50% (fifty percent) of that area and where there are more than 60 (sixty) trees per hectare of 15 (fifteen) or more centimeters in diameter measured at chest height (DAP).

Law No. 6524/20- DECLARES STATE OF EMERGENCY THROUGHOUT THE TERRITORY OF THE REPUBLIC OF PARAGUAY BEFORE THE PANDEMIC DECLARED BY THE WORLD HEALTH ORGANIZATION BECAUSE OF COVID-19 OR CORONAVIRUS AND ADMINISTRATIVE, FISCAL AND FINANCIAL MEASURES ARE ESTABLISHED.

### Regulatory decrees

Decree No. 18831/86- SETTING ENVIRONMENTAL PROTECTION RULES.

Article 5o Prohibit cut-off on land with slopes greater than 15%. Soils with slopes of less than 15% and more than 5% dedicated to agricultural crops should be carried out soil conservation practices in order to avoid erosion.

Article 6o Prohibit the cut without continuity solution, on areas greater than 100 (hundred) hectares, must be left between plots, strips of forest at least 100 (hundred) meters wide.

Article 7: Plots where more cut has been made than those laid down in this Decree shall be reforestation immediately in order to achieve in the medium and long term the conditions laid down in Article 6

Article 8: Soils in areas adjacent to road margins and other public roads, with slopes or other characteristics that may affect their integrity, may not be used for agricultural or livestock purposes, or for friction, logging or other work that may involve degradation.

Art. 9th. Any owner, fork in any title, concessionaires or any other form of company or association that have or develop farms, livestock or forestry or any combination thereon, shall: a) establish and apply preventive and anti-erosion, pollution and all types of degradation caused by man. b) Avoid over-storeying that harmfully reduces or removes plant cover from soils. c) Apply practices for soil fertility maintenance. d) Apply cultural practices and technologies that do not degrade soils and that avoid any improvement in their ability to use. (e) Apply land recovery practices that were in any degraded form or intensity. f) Protect any natural springs, fountains and channels where water and artificial channels flow permanently or intermittently.

Article 11 All rural properties of more than twenty hectares in forest areas shall maintain at least twenty-five per cent of their natural forest area.

Decree 14390/92 – APPROVING THE GENERAL TECHNICAL REGULATION OF SAFETY, HYGIENE AND MEDICINE AT WORK. Article 1: Subject matter of the Regulations. 1. The purpose of this Regulation is to regulate aspects relating to the minimum mandatory technical conditions and requirements which, in the area of prevention of occupational risks and improvement of the working environment, are required to be met in any establishment or work centre in the country.

Decree No. 10579/00 - REGULATING LAW NO. 1561/2000. Article 1 regulate Law No. 1.561/00 creating the National Environment System, the National Environment Council and the Secretary of the Environment. Article 2 "The Ministry of the Environment may delegate its functions as provided for in Article 13 of Law No. 1561/00."

Decree No. 1937/09 - ESTABLISHING HEALTH MEASURES FOR THE PROPER USE OF PESTICIDES IN AGRICULTURAL PRODUCTION, WITH A VIEW TO THE PROTECTION OF HUMAN HEALTH, AS WELL AS FOOD AND THE ENVIRONMENT.

Article 1.- Provide for the application of the following measures for the proper use of pesticides in agricultural production, for the protection of life, health, water sources and the environment in general: 1. Strip of protective forest. For the purposes of protecting rivers, streams, rising, lakes, lagoons and other water and wetland courses and mirrors, a protective forest strip of at least 100 (hundred) metres should be left at each margin or round, as appropriate, a strip that can be increased by any of the following factors: width, importance or use of the watercourse, by the community. In case of not having the strip of protective forest, the owners, tenants, usufructuaries or forks, in any title, of the properties in which it is located or where water runs, they must immediately implant the strip of protective forest of at least 100 (hundred) meters with native species. 3. Protection strip for ground application. A protection strip of 100 (hundred) meters is established between the treatment area and human settlements, farms with organic crops and/ or animal breeding, educational centers, health centers and stalls, temples, squares and places of public turnout. No pesticides should be applied to the protection strip.

Decree No. 9824/12 – REGULATING LAW NO. 4241/2010 "ON THE RESTORATION OF PROTECTIVE FORESTS OF WATER CHANNELS WITHIN THE NATIONAL TERRITORY".

Decree No. 453/13 - REGULATING ENVIRONMENTAL IMPACT ASSESSMENT LAW 294/93. Chapter I, of the works and activities that require obtaining an environmental impact statement. Chapter III, Of the procedure for obtaining the environmental impact statement. Chapter IV, Of the environmental impact statement and its conditions of validity and compliance. Chapter V, Environmental Consultants and Environmental Management Plan Implementers.

Decree 954/13 – AMENDING AND EXTENDING ARTICLES 2, 3, 5, 6TH SUBPARAGRAPH E), 9TH, 10, 14 AND THE ANNEX TO DECREE NO. 453 OF 8 OCTOBER 2013 REGULATING LAW NO. 294/1993 "ON ENVIRONMENTAL IMPACT ASSESSMENT" AND AMENDING IT, LAW NO. 345/1994, AND REPEALING DECREE NO. 14.281/1996.

Article 1st subparagraph(o), numeral 2: land-use clearings or changes with natural forests of more than two hectares, for commercial purposes. Therefore, the Land Use Plan – Livestock Exploitation Project will be evaluated with an Environmental-Preliminary Impact Study.

Decree 7031/17- REGULATING ARTICLE 42 OF LAW NO. 422/1973 FORESTAL.

Decree 3246/20- REGULATING PARAGUAY'S NATIONAL FOREST MONITORING SYSTEM.

Decree 3312/20- REGULATING ARTICLE 53 OF LAW NO. 422/1973

ADMINISTRATIVE POWERS ARE GRANTED TO THE NATIONAL FORESTRY INSTITUTE (INFONA) FOR THE PURPOSE OF ESTABLISHING GUARANTEES ON SUMMARY PROCEDURES.

## Resolutions

RESOLUTION SEAM No. 200/01 BY WHICH MANAGEMENT CATEGORIES ARE ASSIGNED AND REGULATED; ZONING AND USES AND ACTIVITIES.

Article 22: These are characteristics of areas with Managed Resource Reserve category:

- (a) Possess at least 50 % of the surface area with minimal anthropic alterations, or in natural conditions;
- b) Human settlements are allowed. Production must be through environmentally compatible systems, promoting sustainable production;
- (c) Carrying out activities aimed at the maintenance of Environmental Services;
- d) The property on which the area sits may be publicly or privately owned; as well as those in the public or private municipal domain;
- (e) The administration of the area may be exercised by the en implementation authority or by third parties, under its control.

SFN INT Resolution No. 07/2002 REGULATING THE DEVELOPMENT AND PRESENTATION OF FOREST MANAGEMENT PLANS

RESOLUTION SEAM NO. 222/02 ESTABLISHING THE WATER QUALITY PADRON IN THE NATIONAL TERRITORY.

Article 1: They are classified, according to their predominant uses, in 4 classes of the National Territory.

1 Class 1- Water intended:

- (a) Household supplies after simplified treatment;
- b) The protection of aquatic communities
- c) Primary contact recreations (swimming, ski-to-water)
- d) Irrigation of vegetables that are eaten raw, fruits that grow in soils and that are grafted raw without the removal of the film.
- (e) Natural and/or intensive breeding (aquaculture) of species intended for human food.

2 Class 2- Water intended:

- a) For domestic supply after conventional treatments:
- b) For the protection of aquatic communities
- c) For primary contact recreation (water skiing, swimming)
- d) Irrigation of vegetables that are eaten raw, fruits that grow in soils and that are grafted raw without the removal of the film.
- (e) Natural and/or intensive breeding (aquaculture) of species intended for human food.

RESOLUTION SEAM NO. 225/05 LAYING DOWN THE TECHNICAL SPECIFICATIONS FOR THE CONSTRUCTION OF TUBULAR WELLS FOR GROUNDWATER COLLECTION.

SEAM RESOLUTION NO. 255/06 ESTABLISHING THE CLASSIFICATION OF THE SURFACE WATERS OF THE REPUBLIC OF PARAGUAY

Article 1: Declare Class 2, to all surface waters of the Republic of Paraguay in accordance with Article 3 of Resolution 222/02.

Article 3.- Establish that the control and control for compliance with this resolution will be coordinated with the respective municipalities.



SEAM Resolution No. 1190/08. It lays down environmental protection specifications for the handling of equipment: contaminated equipment, liquids, solids, materials and hazardous waste containing or contaminated with Polychlorinated Biphenyls (PCBs), and sets deadlines for the disposal of such equipment, liquids, solids, materials and hazardous waste containing or contaminated with PCBs, by disinteminating, reclassifying and decontamination

INFONA RESOLUTION NO. 1.544/2011 "CREATING THE REGISTRATION OF PROPERTIES WHOSE AREA OF USE IS FIFTY (50) HECTARES OF FORESTS IN THE WESTERN REGION AND ESTABLISHING THE PROCEDURE FOR THE APPROVAL OF FOREST WORK PLANS"

INFONA RESOLUTION NO. 348/2012 "AMENDING SFN INT RESOLUTION NO. 224/2001 "REGULATING THE DEVELOPMENT AND PRESENTATION OF LAND USE PLANS", DATED 7 DECEMBER 2001", AND RESOLUTION SFN NO. 07/2002 "REGULATING THE ELABORATION AND PRESENTATION OF FOREST MANAGEMENT PLANS"

INFONA RESOLUTION NO. 1138/14 ESTABLISHING THE REGISTER OF PROTECTIVE FOREST OF WATER CHANNELS UNDER LAW NO. 4241/10 ON THE RESTORATION OF PROTECTIVE FORESTS OF WATER CHANNELS WITHIN THE NATIONAL TERRITORY.

Article 4.- "Protective forests shall be permanently preserved in their natural state. Those properties that have not preserved them must be re-established with native species, to recover and conserve them."

INFONA RESOLUTION NO. 1122/19 ESTABLISHING PROCEDURE FOR THE REQUEST FOR TECHNICAL OPINION FOR THE DETERMINATION OF FORESTS UNDER LAW NO. 6256/2018 "PROHIBITING PROCESSING AND CONVERSION OF AREA WITH FOREST COVERAGE IN THE EASTERN REGION".

Article 4.- subsection

A) Procedure for requesting Technical Opinion.

Definition of forest under Law 6256/2018 in accordance with Article 2nd, Subparagraph (b) Definitions: For the purposes of this law: Forest: to the native or indigenous ecosystem, intervened or not, regenerated by natural succession or other forestry techniques, occupying a minimum area of 2 (two) hectares, characterized by the presence of mature trees of different ages, species and decayed size, with one or more canopies covering more than 50% (fifty percent) is that area and where there are more than 60 (sixty) trees per hectare of 15 (fifteen) or more centimeters in diameter measured at chest height (DAP).

RESOLUTION MADES NO. 254/19 UPDATING THE LIST OF PROTECTED SPECIES OF WILDLIFE OF THE BIRDS CLASS.

RESOLUTION MADES NO. 433/19 UPDATING THE LIST OF PROTECTED WILDLIFE SPECIES OF THE AMPHIBIA CLASS.

RESOLUTION MADES NO. 470/19 UPDATING THE LIST OF PROTECTED SPECIES OF THE NATIVE WILD FLORA OF PARAGUAY.

RESOLUTION MADES NO. 206/20 UPDATING THE LIST OF PROTECTED WILDLIFE SPECIES OF THE REPTILIA CLASS.

RESOLUTION MADES NO. 182/20 ESTABLISHING THE PLANS AND MODALITIES OF RECOMPOSITION AND COMPENSATION THAT WILL BE PART OF THE ENVIRONMENTAL MANAGEMENT PLAN (PGA) FOR ENVIRONMENTAL IMPACT ASSESSMENT PROCESSES UNDER LAW NO. 294/1993 ON ENVIRONMENTAL IMPACT ASSESSMENT.

MOPC RESOLUTION NO. 933/20 APPROVING THE REGULATION ESTABLISHING THE CERTIFICATION, CONTROL AND PROMOTION REGIMES FOR THE USE OF BIOENERGY FROM FOREST PLANTATIONS OR MANAGED NATIVE FORESTS, TO ENSURE THE SUSTAINABILITY OF THESE RENEWABLE RESOURCES WITHIN THE NATIONAL TERRITORY.

### Environmental License - the Environmental Impact Assessment process in Paraguay

The environmental license known by its technical name as the Environmental Impact Statement (DIA) of the Ministry of Environment and Sustainable Development (MADES) is required for forestry projects, established in Decree No. 453/13 of Law No. 294/93 on Environmental Impact Assessment. This standard is in turn amended by Decree No. 954/2013, which it determines in Article 1; (b) "Agricultural, livestock, forestry and farmer's holding", numeral 1: Agricultural or livestock establishments using five hundred or more hectares in the Eastern Region, or two thousand or more hectares in the Western Region, without accounting for reserve areas of natural forests or protective forests or waterway protection zones or other areas not intended directly for agricultural or livestock work. Numeral 2: reforestations or afforestations established in the form of monocultures on areas greater than one thousand hectares.

According to the nature of the project, the process for obtaining the DIA consists of the presentation of a Preliminary Environmental Impact Study (EIAp) or Effluent Disposition Study (EDE) prepared by a consultant or consulting firm duly registered with MADES detailing the areas of direct and indirect influence of the project and assessing the positive and negative environmental impacts thus proposing plans to mitigate those impacts and a monitoring plan audited during project development. Some of the documents presented include: affidavits on the veracity of the content, copies authenticated by public notaries of all legal documents, certificate of tax compliance, special power granted by the project manager in favor of the Consultant or Consulting Company or another person designated as responsible for compliance with the Proposed Management Plan and its correct implementation. Prior to their approval, Preliminary Environmental Impact Studies (EIAp) must be published in the media (radio, newspaper and MADES website), for this the consultant or consulting firm develops an Environmental Impact Report, an instrument of the process, which must be presented in the form of a written document, in a simple and understandable way for the community, with the use of visual media and other teaching techniques

Since the company Forestal San Pedro will have DRSF on forest plantations, landowners must necessarily comply with environmental legislation in force in the country, for this reason as a requirement of the FSP Project, all FMUs must have and maintain an environmental license. The FMUs identified and in process of being acquired have been subject to these Environmental Impact Assessments by MADES and are periodically undergoing Environmental Audit for the renewal of the environmental license. The status of environmental licenses for the farms where the identified FMUs are located is as follows:

FMU farm	District	Department	State	Date to submit Environmental Audit
1	Santa Rosa del Aguaray	San Pedro	Valid	25/03/2021
2	San Pedro del Ycuamandiyu	San Pedro	Valid	04/11/2021
3	Ybyrarobana	Canindeyú	Valid	14/12/2020
4	San Pedro del Ycuamandiyu	San Pedro	Valid	18/03/2022
5	San Pedro del Ycuamandiyu	San Pedro	Valid	30/03/2022
6	San Pedro del Ycuamandiyu	San Pedro	Valid	04/10/2021
7	Gral. Resquin	San Pedro	Audit filed. Pending	Submitted 01/09/2020
8				
9	Nueva Germania	San Pedro	Valid	18/03/2022
10	San Estanislao	San Pedro	Audit filed. Pending	Submitted 24/06/2020



## Baseline

The environmental and social baseline describes the elements of the project's area of influence and justifies the need to present an Environmental and Social Impact Study.

Before describing the baseline, the areas of influence are defined:

**Area of Influence of the Project:** Refers in a general manner to the Departments where the already identified FMUs are located and where new FMUs will be sought to expand the project area.

**Area of Influence of Identified FMUs:** Refers to the area that is part of the farms where the currently identified FMUs are located, as well as the surrounding communities.

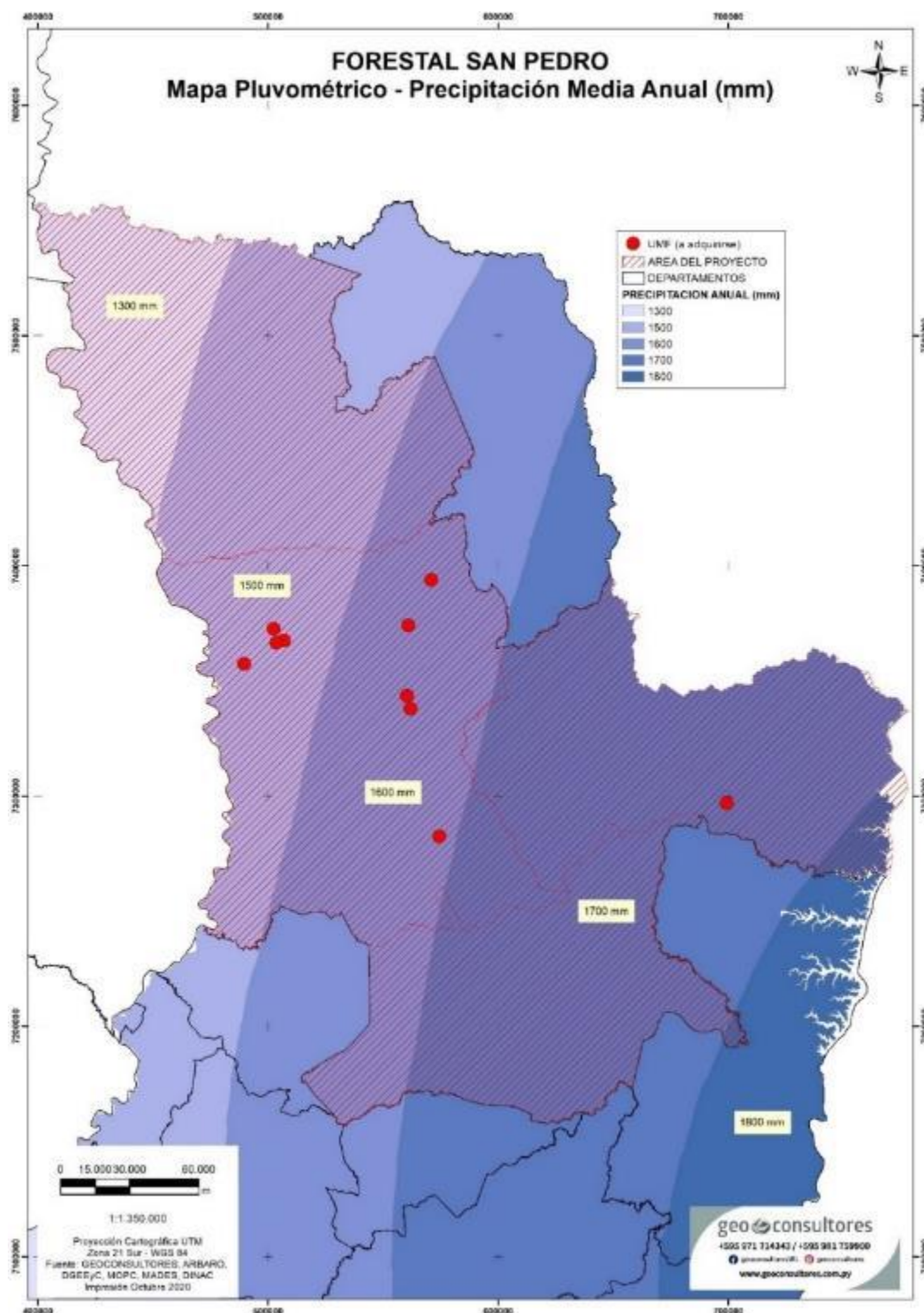
In the following the features of the project area are described. It is important to note that the information is representative of the Area of Influence of the Project, i.e. the total area where the identified FMUs are located and where future FMUs to be acquired will be located. The more specific data correspond to studies carried out in the past in the FMUs identified, for future FMUs these studies will be carried out, once they are defined.

## Climate

The climate is defined as the average state of the atmosphere with all its variations. It is a statistical description of the atmospheric state in average values and the variability of their magnitudes. For the study and determination of climate a period of 30 years is used, Paraguay has the last report of the year 2019, which is located on the page of the National Directorate of Climate Change of the Ministry of Environment and Sustainable Development (DCNN-MADES). Data from the Directorate of Meteorology and Hydrology of DINAC, Temperature, Precipitation, Frost, Excess Water, among others were also considered.

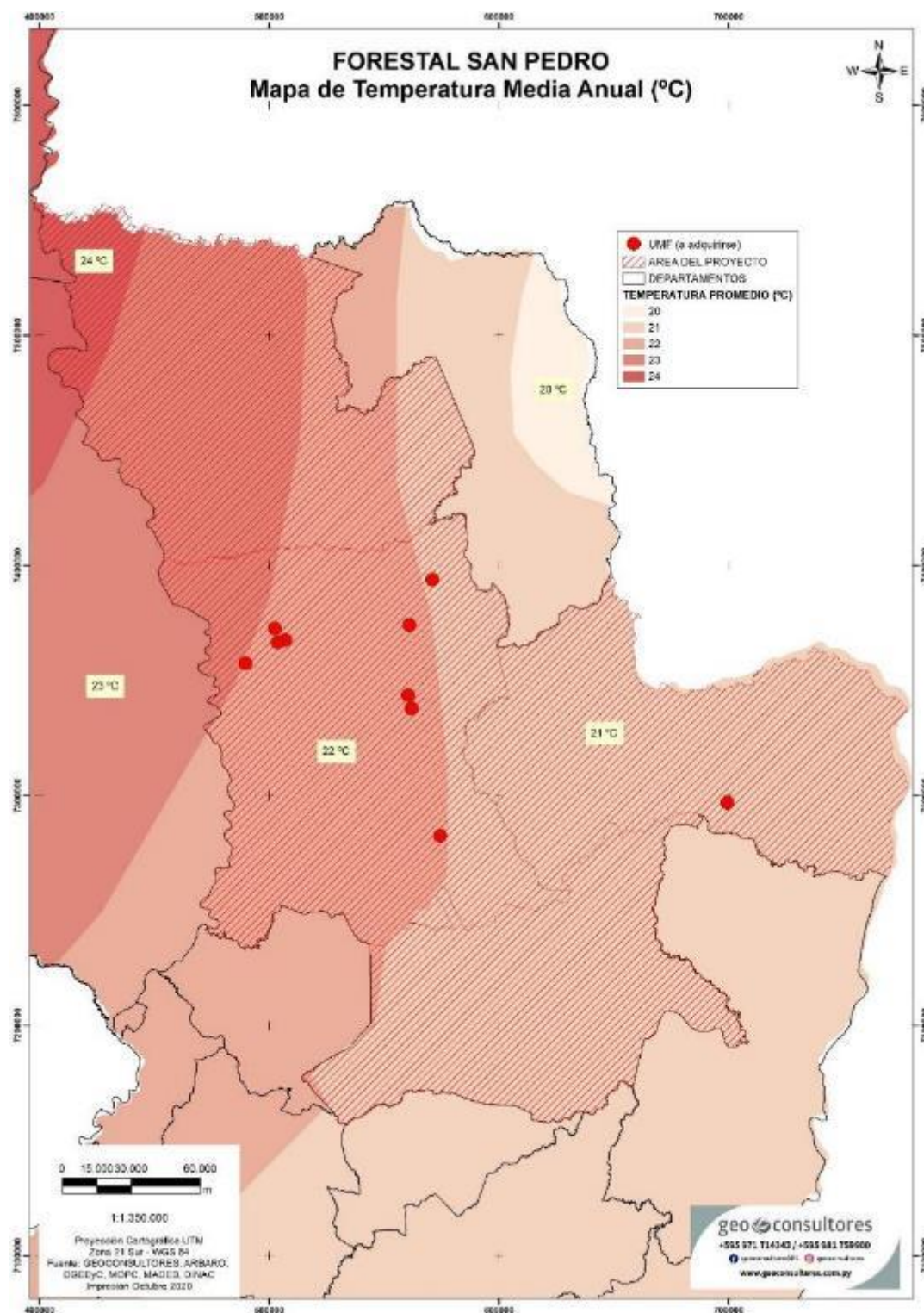
Using Geographic Information Systems, climate data from DINAC's Directorate of Meteorology and Hydrology overlap, then the data is represented on maps, where the ranges of average values are observed in the areas of influence of the project.

Average annual precipitation from 1,300 to 1,800 mm



Map 6. Rainfall Map - Average Annual Precipitation

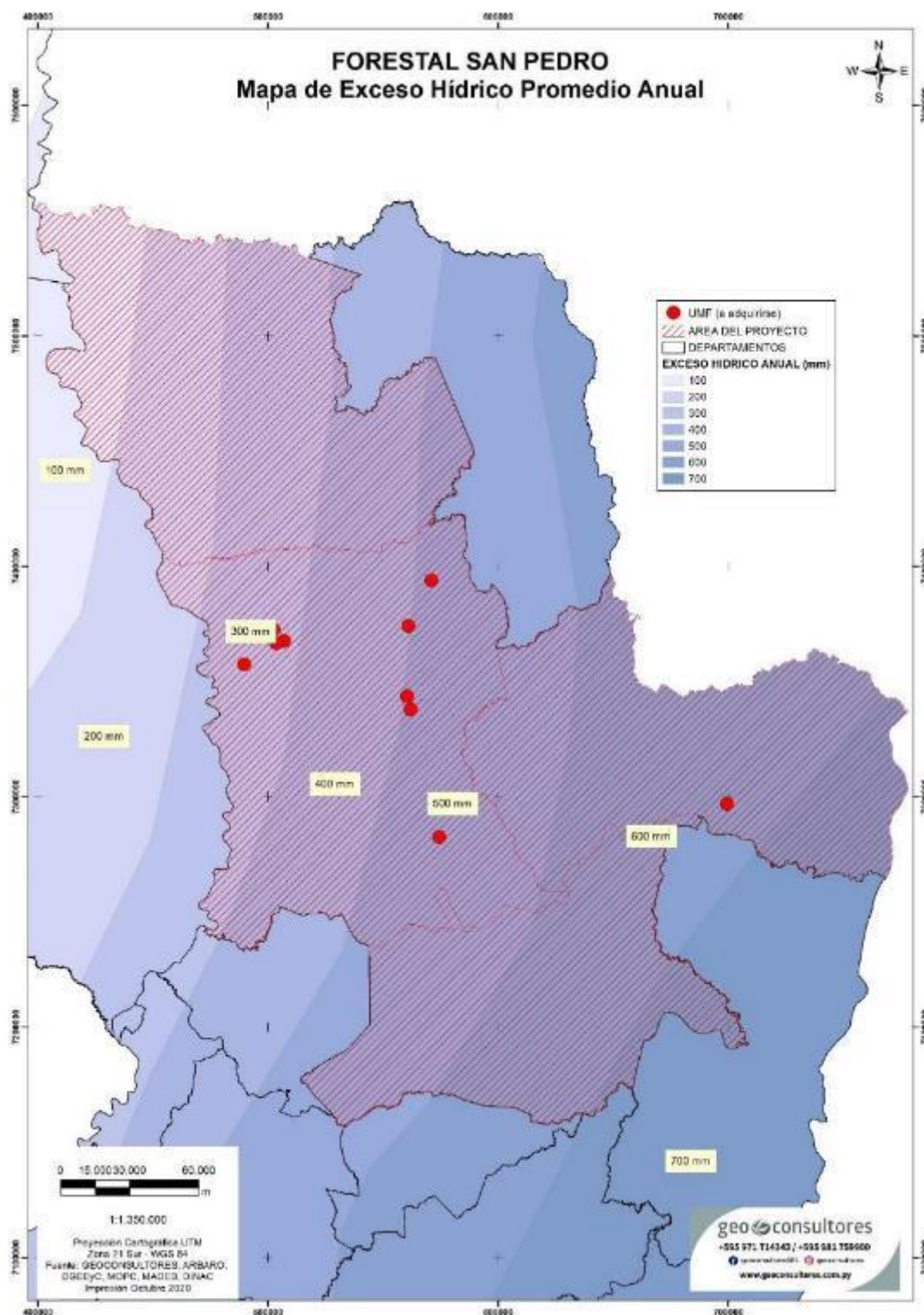
Average annual temperature of 20 to 24°C



Map 7. Average Annual Temperature Map

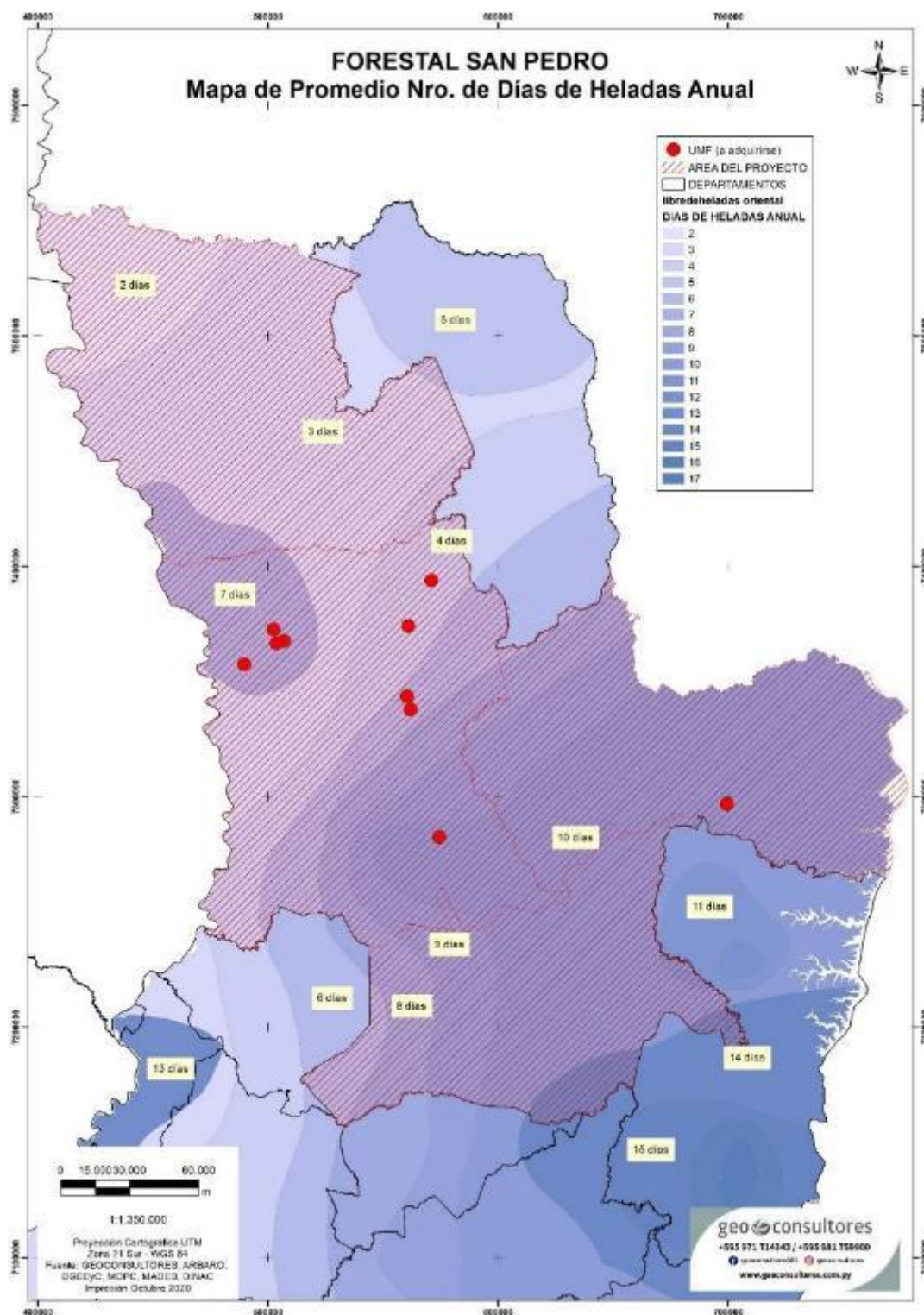


Annual water excess of 100 to 700 mm per year



Map 8. Average Annual Water Excess Map

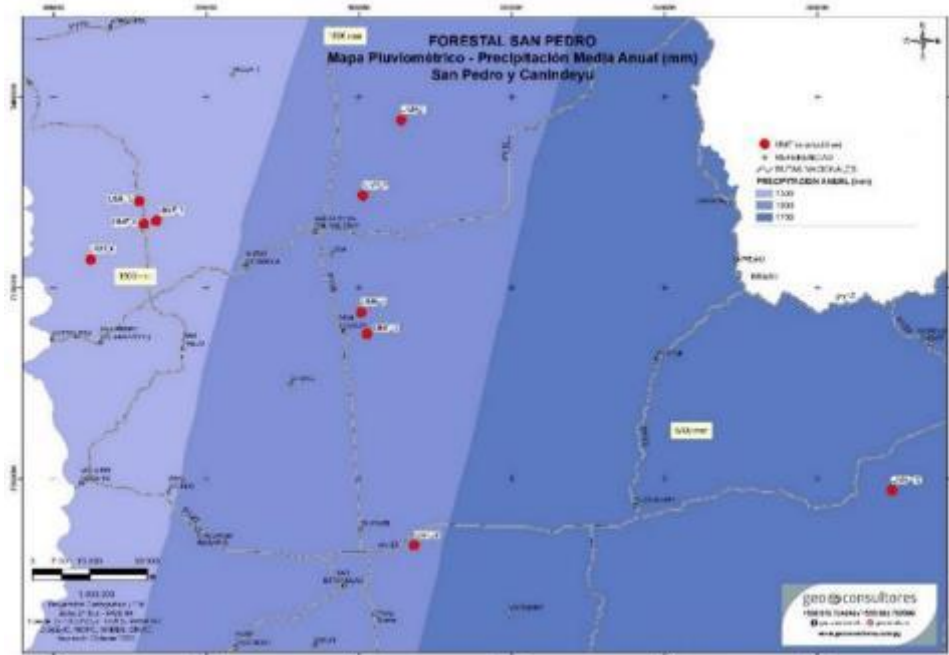
Frost frequency: 2 to 17 days a year



Map 9. Average map of number of days of annual frost

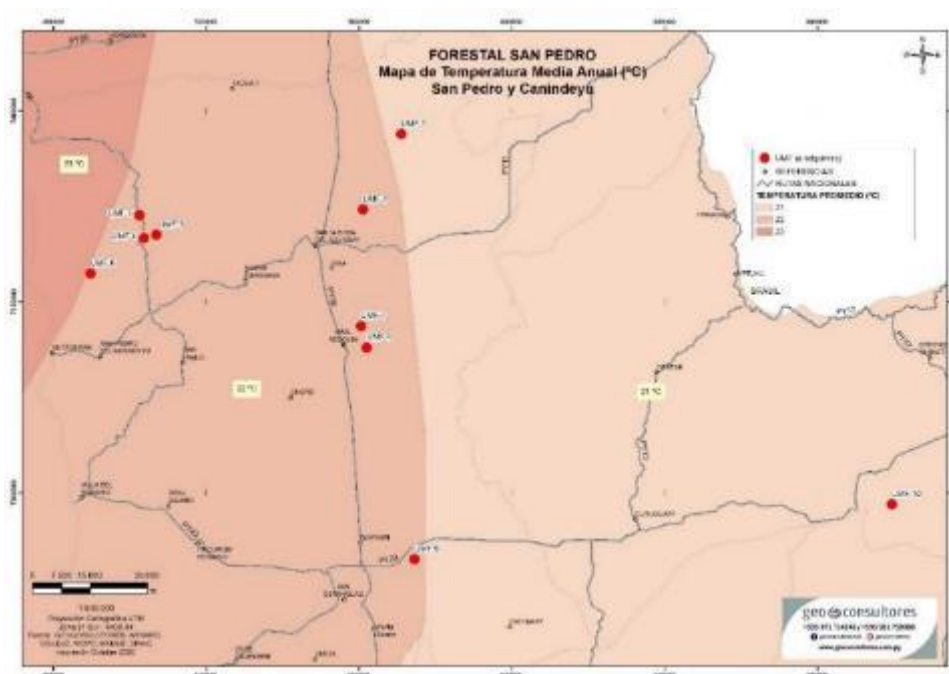
Using Geographic Information Systems, climate data from the Directorate of Meteorology and Hydrology of the DINAC overlap, representing the data on maps, where it is observed that in the areas of influence of the identified FMUs the average ranges are:

**Average annual precipitation from 1,500 to 1,700 mm**



Map 10. Rainfall Map - Average Annual Precipitation

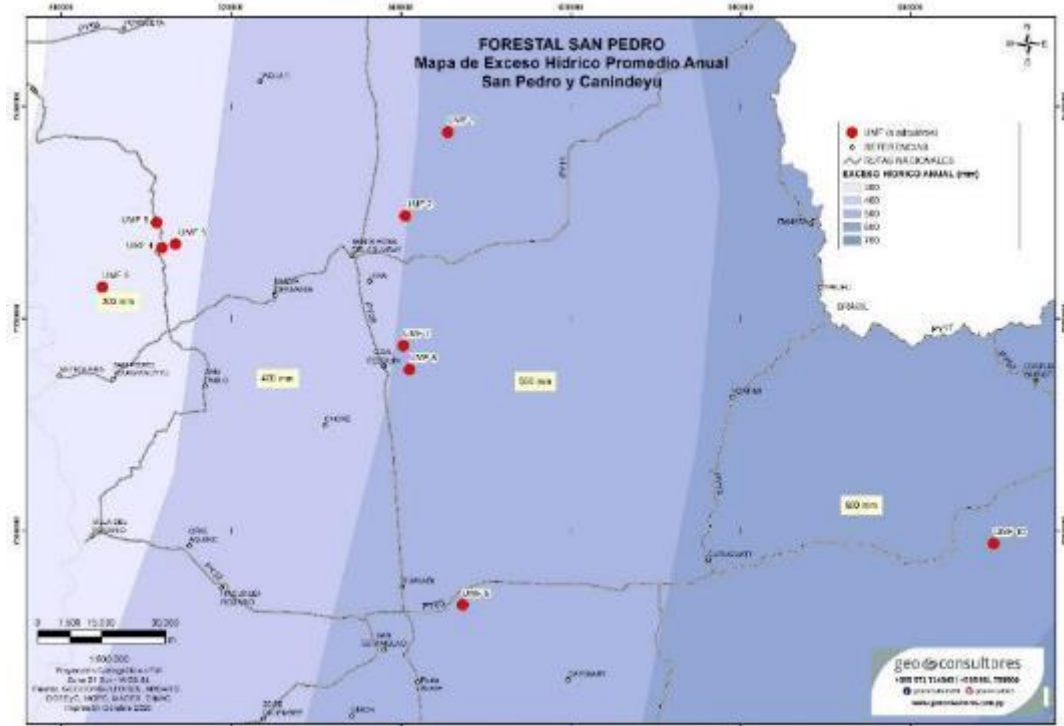
**Average annual temperature of 22 to 23oC**



Map 11. Average Annual Temperature Map

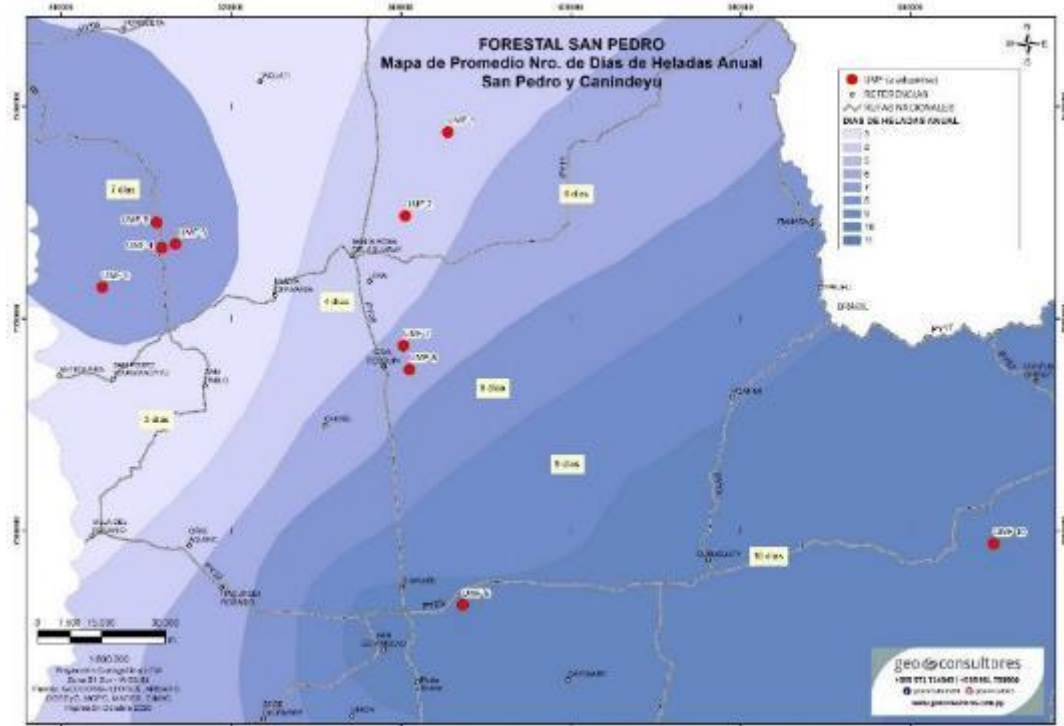


Annual water excess of 300 to 600 mm per year



Map 12. Average Annual Water Excess Map

Frost frequency: 7 to 10 days a year



Map 13. Average map of the number of frost days per year



## Hydrology

Paraguay is located entirely in the Rio de la Plata Basin and is characteristic for having a dense water network. It has an abundance of surface and groundwater.

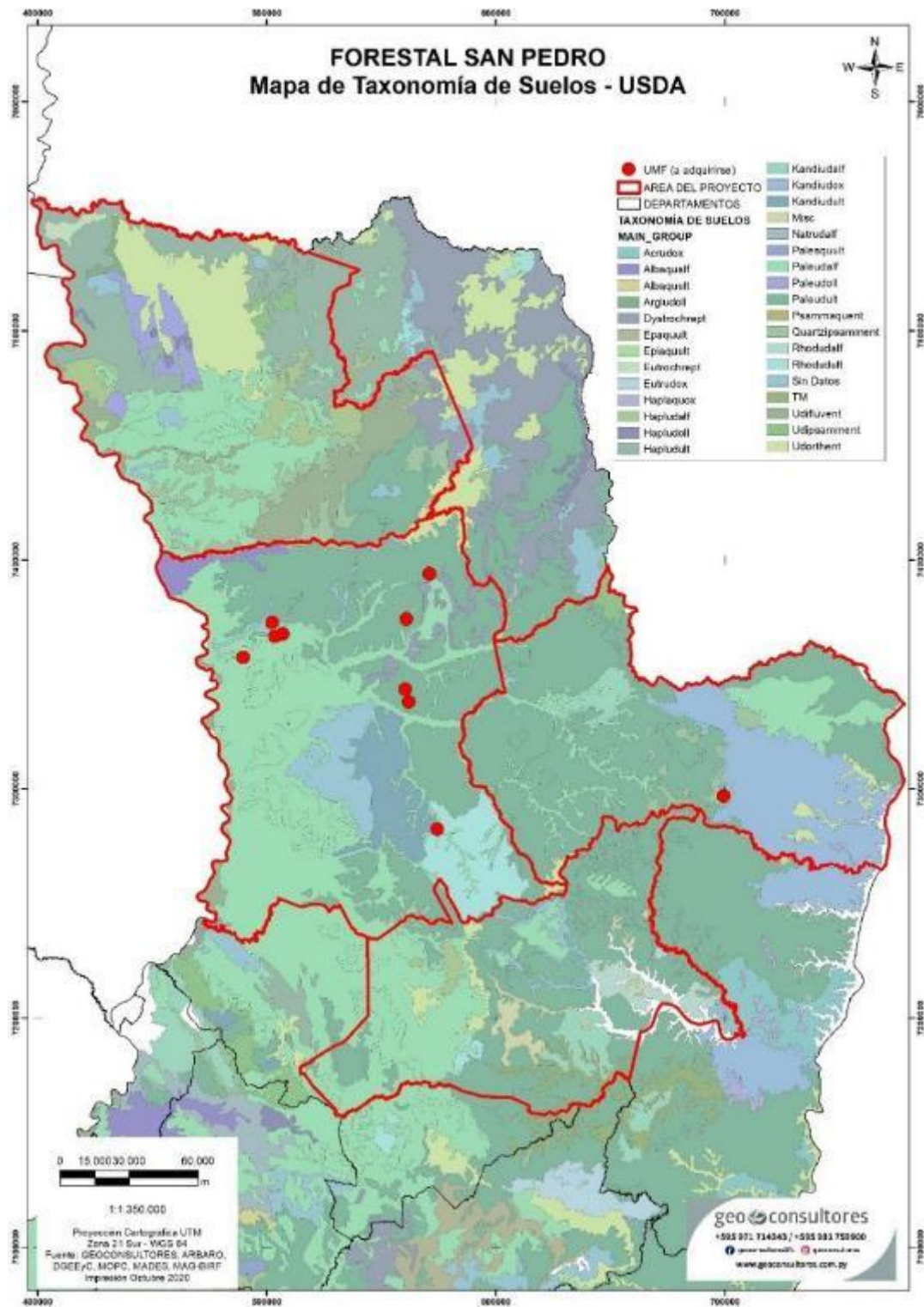
The management of water resources in the country is carried out by MADES, which has the Directorate-General for the Protection and Conservation of Water Resources – DGPCRH which is responsible for managing water resources, it has the function of Article 25 of Law No. 1561/00 to formulate, coordinate and evaluate policies for the maintenance and conservation of water resources and their basins, ensuring the renewal process, the maintenance of the basic flow rates of water flows, the rechargeability of aquifers, the care of the different uses and use of water resources, preserving the economic balance.

In the areas of influence of the project, different waterways and intermittent channels cross. According to the MADES water balance map, of the Directorate-General for the Protection and Conservation of Water Resources, the watersheds committed within the area of influence of the project are: Intercuenca Ao Tagatiya, Apa River, Ypane River, Aquidaban River, Intercuenca Ao Arroyo Cabral, Jejui River, Manduvira River, Acaray River, Monday River, Tebicuary River, , Ao Pozuelo.

Some of the most important water courses of the identified FMU areas of influence are Arroyo Aguara-ymi, Arroyo Ata, Arroyo Paloma, Arroyo Acuti, Arroyo Ybykai, Arroyo Yatebo, Arroyo Capiibary, Río Apa.

## Soils

In Paraguay there are studies prepared by mag-GTZ for the Western Region and by MAG BIRF for the Eastern Region describing the taxonomy of the country's soils, "USDA-SOIL TAXONOMY" (United States Department of Agriculture) and FAO-UNESCO. Below is a soil classification map for the Eastern Region according to USDA.



Map 14. Soil Taxonomy Map

Below are the soil types identified in the Project's area of influence.

### Classification by Department by soil source material

Depending on the source material			
Caaguazu	CANINDEYU	Concepcion	SAN PEDRO
Sandstone	Sandstone	Sandstone	Sandstone
Basalt	Basalt	Limestone	Basalt
Alluvial Sediment	Alluvial Sediment	Granite	Alluvial Sediment
		Alluvial Sediment	

### Classification by Department by Grand Group

Grand Group Ranking			
Caaguazu	CANINDEYU	Concepcion	SAN PEDRO
<b>Aquic</b>	<b>Aquic</b>	<b>Aquic</b>	<b>Aquic</b>
Paleudalf	Paleudalf	Eutrochrept	Paleudalf
<b>Arenic</b>	<b>Arenic Rhodic</b>	Paleudalf	Udifulvent
Paleudalf	Paleudult	Udifulvent	<b>Arenic</b>
<b>Arenic Rhodic</b>	<b>Grossarenic</b>	<b>Arenic Rhodic</b>	Kandiudult
Paleudult	Paleudult	Paleudult	<b>Arenic Rhodic</b>
<b>Fragiaquic</b>	<b>Lithic</b>	<b>Calcic</b>	Paleudult
Paleudult	Udorthent	Argiudoll	<b>Grossarenic</b>
<b>Grossarenic</b>	<b>Misc</b>	<b>Humic</b>	Paleudalf
Paleudalf	Misc	Hapludult	Paleudult
<b>Kandiudalfic</b>	<b>Oxyaquic</b>	<b>Lithic</b>	<b>Lithic</b>
Eutrudox	Udipsamment	Hapludoll	Udorthent
<b>Lithic</b>	<b>Rhodic</b>	Udorthent	<b>Mollic</b>
Udorthent	Kandiudalf	<b>Mollic</b>	Paleudalf
<b>Misc</b>	Kandiudox	Paleudalf	<b>Oxyaquic</b>
Misc	Paleudalf	<b>Oxyaquic</b>	Dystrochrept
<b>Oxyaquic</b>	Paleudult	Paleudalf	<b>Psammentic</b>
Hapludalf	<b>No Data</b>	<b>Rhodic</b>	Rhodudult
<b>Psammentic</b>	No Data	Paleudult	<b>Rhodic</b>
Rhodudult	<b>Typic</b>	<b>No Data</b>	Paleudult
<b>Rhodic</b>	Haplaquox	No Data	<b>Typic</b>
Acrudox	Paleudult	<b>Typic</b>	Albaqualf
Kandiudalf	Quartzipsamment	Albaqualf	Dystrochrept
Kandiudox		Dystrochrept	Paleudult
Paleudalf		Epiaquult	Quartzipsamment
Paleudult		Hapludalf	<b>Umbric</b>
<b>No Data</b>		Quartzipsamment	Dystrochrept
No Data		Rhodudult	

Grand Group Ranking			
Caaguazu	CANINDEYU	Concepcion	SAN PEDRO
Typic		Udipsamment	
Haplaquox		Umbric	
Paleudalf		Dystrochrept	
Paleudult		Vertic	
Quartzipsamment		Paleudoll	

### Classification by Department by Subgroup

Subgroup Ranking			
Caaguazu	CANINDEYU	Concepcion	SAN PEDRO
Aquic	Aquic	Aquic	Aquic
Arenic	Arenic Rhodic	Arenic Rhodic	Arenic
Arenic Rhodic	Grossarenic	Calcic	Arenic Rhodic
Fragiaquic	Lithic	Humic	Grossarenic
Grossarenic	Misc	Lithic	Lithic
Kandiudalfic	Oxyaquic	Mollic	Mollic
Lithic	Rhodic	Oxyaquic	Oxyaquic
Misc	No Data	Rhodic	Psammentic
Oxyaquic	Typic	No Data	Rhodic
Psammentic		Typic	No Data
Rhodic		Umbric	Typic
Typic		Vertic	Umbric

The following are the types of Soils identified in the FMU area of influence:

Taxonomy Soils in the Area of Influence of THE FMU	
Umbric	Dystrochrept
Rhodic	Kandiudox
Arenic	Kandiudult
Aquic	Paleudalf
Mllic	Paleudalf
Rhodic	Paleudult
Typic	Paleudult
Typic	Quartzpsamment
Psammentic	Rhodudult

Also, according to the "Study of Soil Recognition, Land Use Capacity and Proposal for Preliminary Territorial Planning of the Eastern Region of Paraguay" prepared in 1995 by the Ministry of Agriculture and Livestock (MAG) and the World Bank, the soils of the Región Oriental in Paraguay can be grouped according to their capacity for use. The study considers limitations for its use according to the risk of soil degradation under agricultural crops and taking into account the degree of responses to



management practices. According to this study, soils are classified into 4 hierarchical levels: the group, class, subclass, and unit of usability. The main groups and types of use capacity are:

GROUP A: Land with capacity for annual and perennial agricultural use, pastoral, forestry and environmental protection: constituted by Classes I, II, III and IV of capacity to use.

1 CLASS I: Lands with slight limitations of use and arable without special methods of soil conservation.

2 CLASS II: Lands with moderate limitations of use that reduces the choice of plants to be grown and/or requires simple soil conservation practices.

3 CLASS III: Lands with strong limitations of use that reduce the choice of plants to be grown and/or require special soil conservation practices.

4 CLASS IV: Lands with very severe limitations of use that reduce the choice of plants to be grown on an occasional basis and require internships

GROUP B: Land unsuitable for intensive crops, but with capacity for pastoral, forestry and environmental protection; Classes V, VI and VII of use capacity.

1 CLASS V: Lands without risk of erosion, but with other limitations of difficult removal and requiring light restrictions on the use of perennial crops.

2 CLASS VI: Inappropriate land for annual agricultural crops and moderate restrictions on perennial and/or forest plantations.

3 CLASS VII: Land with severe limitations of use and requiring strong restrictions of use, preferably forestry or native grazing.

GROUP C: Land unsuitable for annual and/or perennial crops, grazing and forestry production, but suitable for environmental, flora and fauna protection, water storage and recreation.

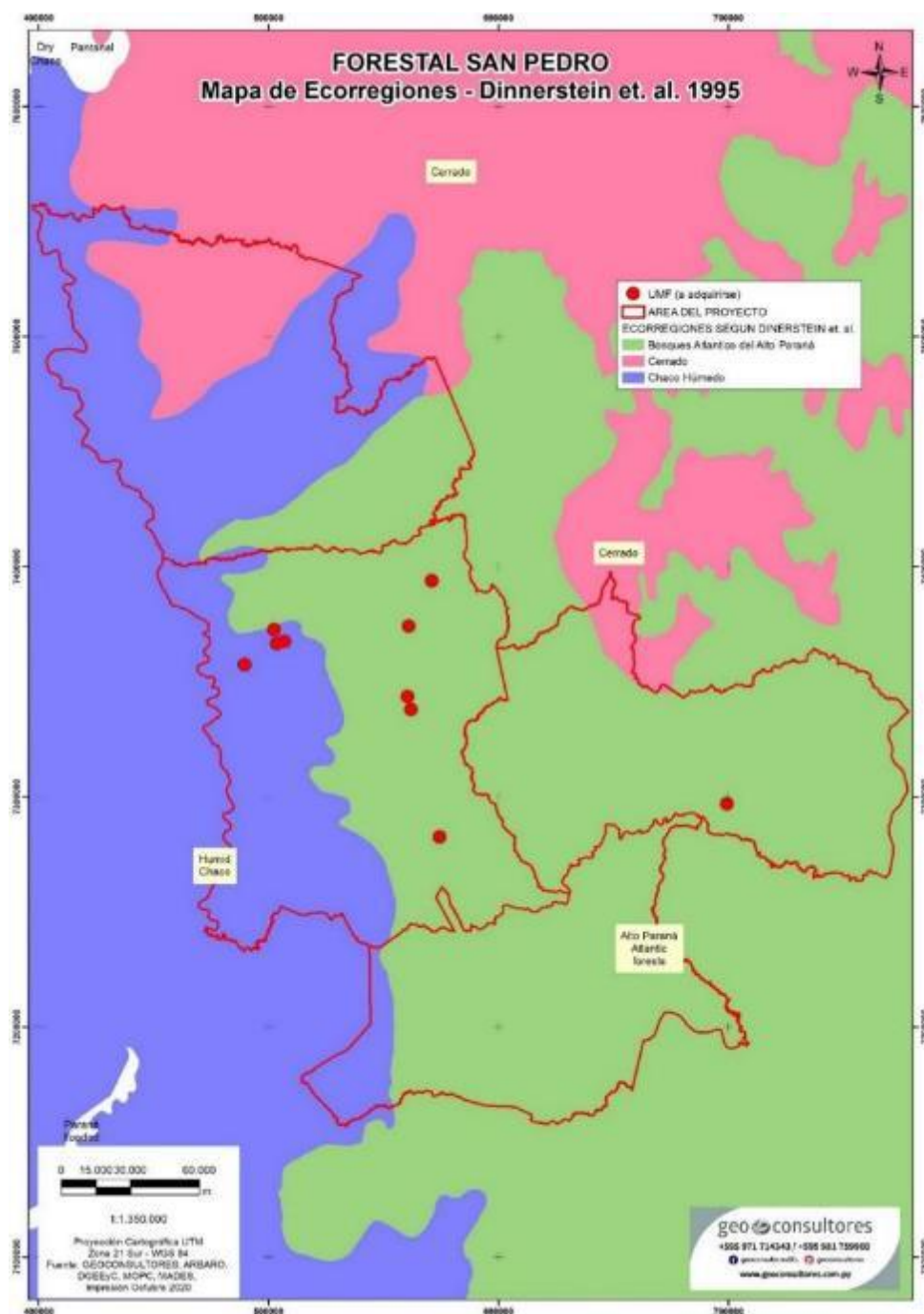
1 CLASS VIII: Land unbecoming for any use for agricultural, grazing or forestry purposes, rugged, sandy, very wet or very arid that only allows protection of the environment, preservation of flora and fauna storage of water and recreation.

Each area where the identified FMUs are located has studies carried out on the soil, it should be noted that these studies will be carried out as well in the areas where the new FMUs to be acquired will be located.

## Ecoregions

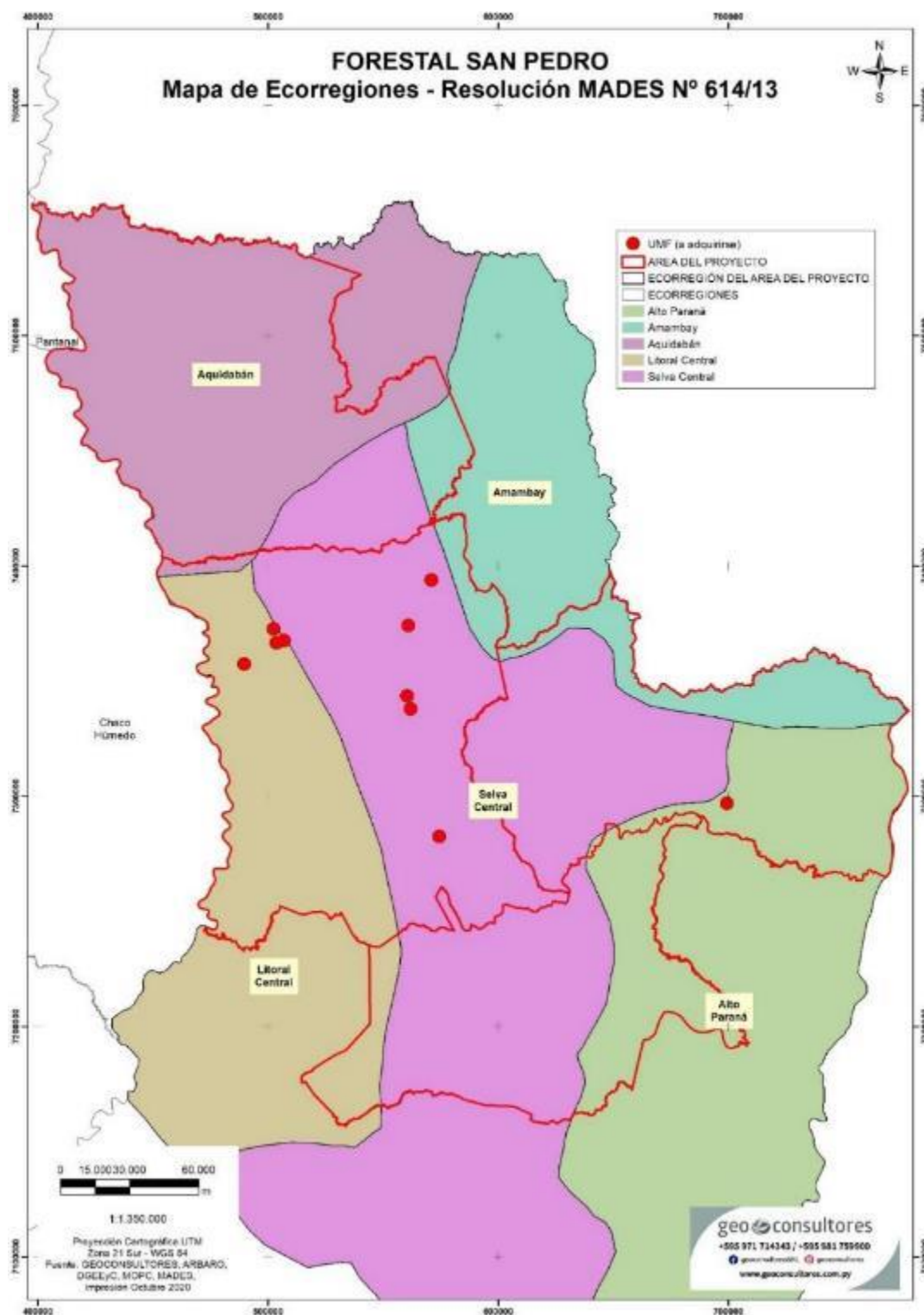
In Paraguay there are two classifications of ecoregions, one is according to Dinerstein *et al.* (1995) and the other according to Keel *et al.* (1993) the latter implemented by the Ministry of Environment and Sustainable Development (MADES). In the following maps FMUs are presented in the ecoregions according to both authors, for the FMUs identified and being acquired.

Below we look at the ecoregions in the area of influence of the project according to Dinerstein *et al.* (1995).



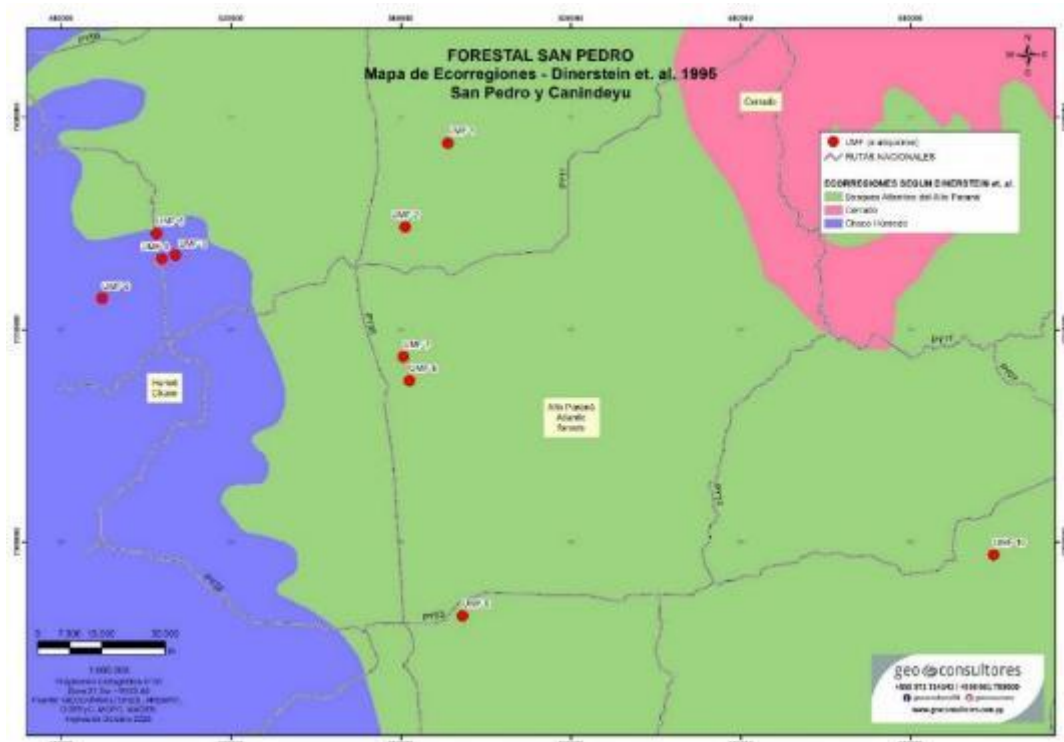
Map 15. Map of Ecoregions - according to Dinerstein *et al.* (1995).

Ecoregions according to Keel *et al.* (1993) implemented by MADES, in the areas of influence of the Project.



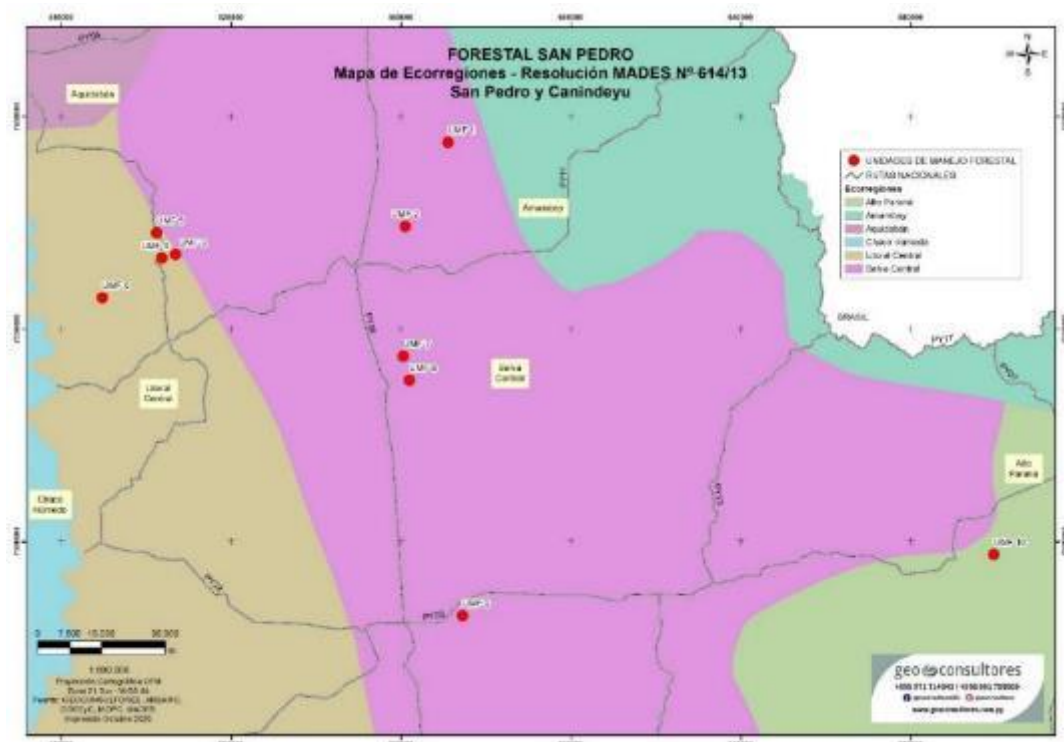
Map 16. Map of Ecoregions according to Keel *et al.* (1993)

Ecoregions according to Dinerstein *et al.* (1995) in the areas of influence of the identified FMUs.



Map 17. Map of Ecoregions according to Dinerstein et al. (1995)

Ecoregions according to Keel *et al.* (1993) implemented by MADES, in the areas of influence of the identified FMUs.



Map 18. Map of Ecoregions according to Keel et al. (1993)



The ecoregions present in the area of influence of the Project are described below.

#### Ecoregion Upper Paraná Atlantic Forest

The ecoregion of the Upper Paraná Atlantic Forest is the wettest in Paraguay, characterized by the tall and humid forest that is part of the Ecoregional Complex of the Atlantic Forest. It is one of Paraguay's most deteriorated and most threatened ecoregions.

The ecoregion is composed mainly of a sub-tropical hygrophytic forest, in which the Alto Paraná forest predominates. It has also been described as warm temperate wet forest and High Paraná Forest by Tortorelli. In the ecoregion are presented the following types of communities: Esteros, Peatlands, Gallery Forests, Rivers, Arroyos, Nascents, Jumps, High Semideciduous Forests (more than 25 meters high), Medium Semideciduous Forests (15-20 meters), Kuri'y Forests, Cerrado and Cliffs.

Botanical species include the tree fern (*Alsophylla atrovirens*), the yerba mate (*Ilex paraguariensis*), the pink lapacho (*Tabebuia heptaphylla*), the yvyra pyta (*Peltophorum dubium*), etc.

Among the animals are the harpy eagle (*Harpia harpyja*), the mountain pava (*Pipile jacutinga*), the capuchin monkey (*Cebus apella*), the tapir (*Tapirus terrestris*), the jaguar (*Panthera onca*), the bell bird (*Procnias nudicollis*), etc.

#### Ecoregion Wet Chaco

The fauna that occurs in the Wet Chaco is usually not very distinguishable from the fauna of other ecoregions associated with wetlands. However, it has some characteristics that can make it quite distinguishable from others, such as the great abundance of aquatic species such as the case of carpincho or kapi'i yva (*Hydrochaeris hydrochaeris*), lobo ( *Lontra longicaudis*), and other savannah species such as aguara guasu (*Chrysocyon brachyurus*).

In relation to birds, species shared with other ecoregions are generally present, with a large abundance of aquatic species, mainly ducks, herons, storks and flags. Among the most emblematic birds we can find in the pyrizal the guyrao pyt or federal (*Amblyramphus holosericeus*) and in the pastures and savannahs the guyra añumby or woodman (*Anumbius annumbi*). In the forest among the most beautiful birds stands out the tuko guasu or large tocán (*Ramphastos toco*).

In relation to its herpetofauna most of the species and subspecies present in the great Wet Chaco, are also found in other areas of the country, in some cases with very different environmental characteristics. For example, species such as *Micrurus baliocoryphus*, *Bothrops mottogrossensis*, *Caiman yacare*, *Mussurana bicolor*, *Eunectes notaeus*, *Helicops leopardinus*, *Erythrolamprus almadensis* and *Erythrolamprus semiaureus*

Wet Chaco is an area of convergence where species of different flora are mixed. Species that are purely chaqueñas are present such as the red ravine (*Schinopsis balansae*), the chañar (*Geoffroes decorticans*), the guayacon (*Caesalpinia paraguariensis*) and the black algarrobo (*Prosopis nigra*).

#### Ecoregion Cerrado

The dominance of the soils is that of a sandy mantle located later on the old clay plain, with red sands of coarse grain and, with boulders of different thickness on the surface and with rocky outcroppings, in some cases with inlays of Ca CO<sub>3</sub>.

The physiognomy of vegetation is that of a wooded savannah, more open, with isolated trees or islets of forests, (closed fields) with species in general completely deciduous in the winter season and for the purposes of flowering and that of a continuous tree stratum of woody and other forms of vegetation. The predominant species are as follows: *Tabebuia alba*, *Cordia* aff. *glabrataglabrata*,

*Luehea divaricata*, *Magonia pubescens*, *Hymenaea stigonocarpa*, *H. coubaril*, *Cochlospermum regium*, *C. tetraporum*, *Helicteres guazumaefolia*, *H. Ihotzkyana*, *Sterculia striata*, *Muelleria variabilis* (Mereles et al. 2011), among others. This Ecoregion continues to add new mentions for Paraguayan flora as knowledge progresses; *Muelleria variabilis* and *Ceiba samauma*, Mereles et al. 2011 and De Egea et al. 2012, respectively, are mentioned. The types of plant formations are enclosed fields dominated by the most open spaces on the islets of isolated forests or woody; the following species appear: *Sterculia striata*, *Helicteres guazumaefolia*, *H. Ihotzkyana*, *Annona nutans*, *Pseudobombax tomentosum*, *Tabebuia aurea*, *Magonia pubescens*, among others. Cerradones, which have a single stratum of vegetation, quite dense formation, with woody that do not exceed 6-7 m in height, trunks usually at most 10 cm in Diameter at Chest Height (DAP). Species such as *Commiphora leptophloeos*, *Zeyheria tuberculosa*, *Muelleria variabilis*, *Simira sampaioana*, *Magonia pubescens*, *Aspidosperma triternatum*, *Anadenanthera pewregina*, *Luehea divaricata*, among others, stand out. Other plant formations present are palm savannahs and wetlands.

The fauna of this ecoregion presents some elements whose distributions are much more northern, such as the Andean Precordillera, Amazonian species and species of Cerrado proper, closely associated with the fauna of the Chiquitos region, in Bolivia. In mammals, for example, the presence of at least two species of squirrels (*Sciurus urucumus* and *Sciurus ignitus*) and one bat (*Mimon crenulatum*), confirm the y una de murciélago (said). In birds, species such as the jaku pet (*Pipile cumanensis*), the brown-headed chiripepé (*Pyrrhura molinae*), the guasu guaguingue (*Nyctibius grandis*), the guyra karaguataty or cinnamon pijuí (*Poecilurus scutatus*), the mbatará or batará pardo (*Thamnophilus sticturus*), and the black-bellied (*Formicivora me*). The tie pepitero (*Saltator atricollis*) is endemic to Cerrado proper (from central Brazil and eastern Bolivia and Paraguay) that nevertheless has a population in this ecoregion. Another characteristic of the ecoregion bird is the presence of species typical of the humid forests of the Eastern Region, as a real crestada eagle (*Spizaetus ornatus*), gua'a pyto (*Ara chloropterus*), yasyateré grande (*Dromococcyx phasianellus*), yvyja'u mbyju'i (*Lurocalis semitorquatus*), guyra straw (*Momotus momota*), tuere hũ (*Tityra inquisitor*) and guyra vera (*Hethra*).

#### Ecoregion Central Littoral

It is a thermo-mesophilic ecoregion consisting of herbaceous clusters in irregular and heterogeneous masses and masses, alternating with abras and fields of origin, sometimes edenic and sometimes anthropic. They are forested masses of transition between those of the Central Forest, Aadabán and those of eastern Chaco. The types of natural communities in the ecoregion are (Vera, 1988, inéd.): Lagunas, Bañados, Esteros, Forests in gallery, Rivers, Arroyos, Nascents, Medium and Low Semi-Caducifolio Forests and Grasslands.

The most common species of flora are: Kurupika'y (*Sapium haematospermum*); Tataré (*Pithecellobium scalare*); Timbó (*Enterolobium contortisiliquum*); Crown spine (*Gleditsia amorphoides*); Ceibo (*Erythrina crista-galli*); Sauce (*Salix humboldtiana*); Yvyrá á itá (*Diplokeleba floribunda*).

In relation to the presence of Chaqueña flora can be quoted Red Quebracho (*Schinopsis balansae*) and Karanda'y (*Copernicia alba*).

As for plants threatened in this ecoregion, the information currently in place is scarce.

This ecoregion has a strong Chaqueña influence on its fauna. The presence of large steeds makes the ecoregion the habitat of many aquatic species and a large number of birds. It is also important for migrant birds in both hemispheres.

### Ecoregion Central Forest

The ecoregion is typically a subtropical forest, also described as a warm temperate rainforest, with a combination of mostly high forest, interceding with natural meadows to a lesser degree. The following natural communities are observed: Lagos, Lagunas, Esteros, Peatlands, Gallery Forests, Rivers, Arroyos, Nascents, Jumps, Upper and Medium Semi-Caducipholum Forests, Closed, Grasslands, Roquedales and Cliffs.

The forest has tree specimens up to 35 m high. The predominant plant species are: Lapacho (*Tabebuia* sp.); Cedar (*Cedrela* sp.); Ybyrá pytá (*Peltophorum dubium*); Yvyrá ró (*Pterogyne nitens*); Incense (*Myrcarpus frondosus*); Guatambú (*Balfourodendron riedelianum*); Yvyrá yú (*Albizia hassleri*); Cancharana (*Cabralea* sp.).

The species of plants considered threatened are: Peroba (*Aspidosperma polyneuron*); *Callistene hassleri*; *Myrcia genmiflora*; *Friarsp.*; *Faramaea cyanea*; *Lacistema hasslerianum*; *Trichilia stellatomentosa* and *Vochysia cinnamomea*.

Similar faunistic characteristics as the Alto Paraná ecoregion, it has nevertheless been a pole of development and exploitation for a long time, especially in the central and southern part (Contreras, J.; Hail, T. in press). Thus, the alteration he has experienced has significantly influenced his current faunistic composition. With the exception of some species such as Serrucho Duck, Pine Coludito, Choraó and others, the Central Forest ecoregion has a fauna very similar to that of Alto Paraná.

### Ecoregion Amambay

The natural communities present in the ecoregion are Esteros, Forest in Gallery, Arary Forest, Arroyos, Nascents, Caves, High Semi-deciduous Forest (> 25m), Middle Semi-deciduous Forest (15-25 m), Coastal Forests, Bambuzales, Cerrados, Grasslands and Cliffs.

In the high forests of the hill in the mountain ranges there is a dominance of more than 50% of *Aspidosperma polyneuron* (Peroba) whose wood is highly appreciated and overexploited. Other predominant plants are *Annona amambayensis*, *Cariniana estrellensis* (Ka'í kayguá) and *Vochysia tucanorum* (Palo-de-vino) that are restricted to this ecoregion; the others such as *Xylopia brasiliensis* (Yvyrá katú), *Sweetia fruticosa* (Taperyvá guazú), *Gochnatia polymorpha*, *Tabebuia impetiginosa* (Lapacho), *Anadenanthera colubrina* (Kurupa'y), *Plathymenia foliolosa* (Morosyó), *Trichilia pallida* (Cedrillo), *Didymopanax morototon* (Amba'yguazú), *Casearia gossypiosperma* (Mbavy guazú), *Hymenaea courbaril* (Jatayvá) and *Pithecellobium saman* (Manduvirá) have a wider distribution. The rare species are *Roupala meisneri*, *Amburana cearensis* and *Tillandsia esseriana* in forests, *Vochysia cinnamomea* in enclosed and *Callistene hassleri* in enclosed fields.

This ecoregion is the only place where you can find Gua'a sayjú (*Ara ararauna*) highly threatened. It is also the only ecoregion where the presence of the Yacaré itá (*Paleosuchus palpebrosus*), whose distribution is restricted to the Apa River and one of the few sites where the Guasutí (*Ozotoceros bezoarticus*) is probably still alive.).

### Ecoregion Aquinas

The plant formations of this ecoregion show, by climate influence, a type of transition characterized by forests interspersed with extensive fields. Natural communities consist of Lagunas, Esteros, Bañados, Forests in Gallery, Rivers, Arroyos, Nascents, Caves, Middle Semi-deciduous Forests (15- 20 m High) and Low (10-15 m), Cerrados, Wooded Savannas, Grasslands and Cliffs.

Forests are characterized by the presence of *Amburana cearensis* (clover), an overexploited species currently endangered. Other high-frequency forest species include *Peltophorum dubium* (yvyra pyta),

*Anadenanthera colubrina* (Kurupa'y), and *Enterolobium contortisiliquum* (timbo) in the east. The following species: *Schinopsis balansae* (red brittle), *Prosopis kuntzei* (spinel), *Calycophyllum multiflorum* (white stick), *Phyllostylon rhamnoides* (juasy'y guasu), and *Astronium urundeuva* (urunde'y mi) are common in the west. The predominant plants in the other terrestrial communities are *Anadenanthera peregrina* (kurupa'y), *Guibourtia chodatiana* (kuruñai) and *Butia yatay* (yata'i) in closed, *Axonopus affinis*, and *Psidium arasa* (Arasa-pe) in wooded savannah, *Andropogon lateralis* in grass meadow, *Elyonorus latiflorus* in espartillares, and *Copernicia alba* (karanda'y) in southern palm groves, and *Attalea sp.* in the north.

The Aquidabán ecoregion is the only site in the Eastern Region where 3 highly threatened species can be found: *Ara maracana* (maracaná), *Anodorhynchus hyacinthinus* (gua'á jovy) and *Pipile pipile* (jacupetí), and ecoregion can also be cited as possessing several Amazonian species.

### Vegetation in the Area of Influence of identified FMUs

For identified FMUs there are baseline studies that characterize vegetation and biodiversity in their areas of influence. These studies will be carried out in future FMUs that are part of the project, as they are identified. The most important vegetation found in studies in the identified FMUs is mentioned below.

#### Degraded semi-deciduous sub-humid forests

The largest forest remnants of the study areas belong to this forest classification. They demonstrate various degrees of alteration, which is checked by the abundance, in certain areas, of vines and pioneer species that usually appear in the clearings immediately after alterations, and by the signs of ramoneo by livestock. They have a height of approximately 15-20 m with some scattered emerging ones, evidence of the extraction in the past of larger individuals. In the canopy dominate species such as *Albizia niopoides* (yvyra ju), *Anadenanthera colubrina* (kurupa'y kuru), *Anadenanthera peregrina* (kurupa'y morosyvo), *Astronium sp.* (urundey), *Balfourodendron riedelianum* (guatambu), *Cedrela fissilis* (cedar), *Ceiba pubiflora* (samu'u), *Enterolobium contortisiliquum* (timbo), *Handroanthus heptaphyllus* (tajy hu), *Handroanthus impetiginosus* (pink lapacho), *Peltophorum dubium* (yvyra pyta), *Pterogyne nitens* (yvyraro), *Sam Tubulaanea* (manduvira) and *Cecropia pachystachya* (ambay), while in the intermediate and lower stratum *chrysophyllum gonocarpum* (aguai), *Citrus aurantium* (apepu), *All ophylus edulis* (koku), *Jacaratia spinosa* (jacarati'a), *Randia armata* (ñuati kurusu), *Trichilia elegans* (cedrillo) and *Adelia membranifolia*. The number of renewals of species in the middle and upper strata is also notable, indicating the development of regeneration processes. In the undergrowth stand out *Maytenus ilicifolia* (cangorosa), *Palicourea crocea*, *Bromelia balansae* and *Pseudananas sagenarius* (karaguatas).

Numerous heliophyte and/or own species of more open formations that appear quite frequently stand out, evidence of the processes of alteration that occurred in the past with the primary forests of the place.

In open, clear areas and on the side of the roads was also notable the presence of *Carica quercifolia* (wild mamoncito), *Manihot anisophylla* (wild cassava). Numerous vines and vines are also observed on these edges and clear.

#### Moderately altered semi-deciduous sub-humid forests

These formations correspond to the forest remnants that develop and demonstrate various degrees of alteration. In the canopy dominate species such as *Anadenanthera colubrina* (kurupa'y kuru), *Peltophorum dubium* (yvyra pyta), *Cedrela fissilis* (cedar), *Handroanthus heptaphyllus* (tajy hu), *Balfourodendron riedelianum* (guatambu), *Cordia tritomacho* (peterevy), *Astronium sp.* (urundey) and



*Samanea tubula* (manduvira), while in the intermediate stratum stand out *Chrysophyllum gonocarpum* (aguai), *Jacaratia spinosa* (jacarati'a), *Plinia rivularis* (yvaporoyty), *Zanthoxylum rhoifolium* (tembetary mi). The lower stratum is characterized by the abundant presence of *Randia armata* (ñuati kurusu), *Coussarea platyphylla* and *Actinostemon conceptionis*, as well as several species of mirtáceas. The undergrowth has species of poaceae, marantáceas and other herbs typical of these formations. The presence of renewals of several species of the upper and intermediate strata, particularly cedar, guatambú, peterevy and lapacho, is notable. On the edges and clearings of this forest stand out heliophytic species, typical of this type of ecotons.

#### Wooded savannahs

They are described as sabanoid formations over areas with poorer, sandy and acidic soils. These formations are not very extensive but the associations of species present highlight them from the rest of the landscape. In general, a grass-dominated herbaceous stratum is presented, where open scrub and scattered trees are interspersed. The dominant species in the upper stratum is *Tabebuia aurea* (paratodo). Sufrutic shrubs and herbs intermingle with scattered emerging ones, *Bauhinia mollis* and *Bauhinia unguolata* (ox leg'i), *Brosimum gaudichaudii* (rubber), *Campomanesia pubescens* (guavirami), *Ipomoea malvaeoides*, *Annona coriacea* and *Annona nutans* (wild aratiku), *Syagrus campylospatha* (palmerita) and *Schinus weinmannifolius* are common.

#### Natural grasslands on modified soils

In much of the forest management units, herbaceous-dominated formations are observed; some seemingly more natural and some on clearly modified soils. In both cases, dominant graminoid herbaceous (pastures and cyperaceae) are observed where species such as *Syagrus campylospatha* (palmerita), *Annona coriacea* and *Annona nutans* (wild aratiku), *Cereus stenogonus* (tuna), *Eupatorium spp.* are scattered. (liberal typycha), *Cissampelos pareira* (ysypo mil hombre), *Sapium haematospermum* (kurupikay) and *Tabernaemontana catharinensis* (safirangy), accompanied by numerous species of hesitoid behavior whose development is favored by the surrounding agricultural plots, *amaranthus hybridus* (ka'aruru), *Conyza bonariensis* (mbu'y hũ), *Desmodium cuneatum*, *Digitaria insularis* (kapi'i pororó), *Nicotiana longiflora* (flower tobacco), *Solanum americanum* (arachichu), *Solanum sisymbriifolium* (ñu'at pyt'), *Stachytarpheta cayennensis* (tatu ruguái), *Tridax procumbens* (bull grass), *Glandularia tenera* (yvoty la novia) and *Sidastrum paniculatum* (hũ).

#### Aquatic vegetation

In aquatic-stick plant communities, also waterlogged areas near the roads, hygrophile and sticky species such as *Erythrina crista-galli* (ceibo), *Xylosma venosa* (ñuati arroyo), *Mimosa pigra* (jukeri), *Ludwigia octovalvis* (water peach), *Paspalum sp.* (palustre grass), *Eryngium spp.* (karaguata estero) that are progressively being replaced by strictly aquatic species such as *Rhynchospora corymbosa* (reed), *Cyperus giganteus* (pyri), *Sagittaria montevidensis* (water arrow), *Echinodorus grandiflorus* (spoon), *Hydrocotyle bon Thalia geniculata* (guajó), *Typha domingensis* (totora), *Hibiscus striatus* (bath rose), *Eichhornia azurea*, *Eichhornia crassipes* and *Pontederia cordata* (aguapes or camalotes). It stands out the presence of vines such as *Cissus verticillata* (ysypo) and *Rhabdadenia ragonesei* (rose of the ester), *Guadua chacoensis* (tacuara).

#### Grasslands on sandy soils

Natural grasslands develop on sandy soils, poor and permanently saturated, where the dominant species are herbaceous plants (grasses and cyperaceae) with little coverage of woody. Unlike the aquatic vegetation communities described above, the particularity of the soils where these communities develop favors the emergence of other associations of aquatic-palustres plants, including species of the genera *Eleocharis*, *Mayaca*, *Bacopa*, *Eriocaulon*, *Syngonanthus* and several

gender representatives of *Utricularia* carnivorous plants. Also carnivorous species of the genus *Drosera* can also be found in grasslands on sandy soils.

#### Moderately Modified High Forests (BAMM)

They develop on deep soils in the highest areas of the landscape, and reach an average height of 20 m in height with risings up to 30 m. They are characterized by several strata of vegetation and by the presence of large species that stand out forming the canopy such as *Albizia niopoi-des* (yvyra ju), *Anadenanthera colubrina* (kurupa'y kuru), *Balfourodendron riedelianum* (guatambu), *Cedrela fissilis* (cedro), *Cecropia pachystachya* ('amba'), *Ceiba pubiflora* (sa-mu'u), *Copaifera langsdorffii* (kupay), *Cordia trichotoma* (peterevy), *Dahlstedtia muehlber-giana* (ka'avusu), *Diatenopterix sorbifolia* (yvyra piu'i), *Ficus luschnathiana* (guapoy, mata-palo), *Handroanthus heptaphyllus* (tajy hũ, Black lapacho), *Handroanthus impetiginosus* (tajy pyto, pink lapacho), *Holocalyx balansae* (alecrín, yvyra pepe), *Inga uraguensis* (inga guasu), *Maclura tinctoria* (tatajyva), *Myracrodruon urundeuva* (urundey), *Parapiptadenia ri-gida* (kurupay ra), *Peltorodruon urundeuva* (urundey), *Parapiptadenia ri-gida* (kurupay ra), *Pelto phorum dubium* (yvyra pyto), *Pterogyne nitens* (yvyrar), *Seguiera aculeata* (joavy guasu), *Syagrus romanzoffiana* (pindó) and *Zanthoxylum caribaeum subsp. rugosum* (tembetary hũ).

#### Cerrados and cerradones

Remaining natural vegetation with particular characteristics are found, which develop on poorer, sandy and acidic soils. In general, there is a variable physiognomy where more or less dense grasslands and forests (cerradones) are interspersed, passing through varying degrees of woody coverage, and where dominant species are characterized by adaptations such as succulence, the presence of underground organs, corky, thick and tortuous bark, pubescence, etc. Characteristic and common species in these plant communities are *Campomanesia pubescens* (guavirami), *Plathymenia reticulata* (morosyvo sa'yju), *Handroanthus ochraceus* (yellow lapacho), *Tabebuia aurea* (paratodo), *Vochysia tucanorum* (wine stick), *Psidium guajavadium* (guava), *Luehea candicans* (ka'a oveti), *Cochlospermum regium* (mandyju'i), *Bauhinia unguolata* and *Bauhinia mollis* (ox leg'i), *Pouteria cake*, *Acosmium subelegans*, *Duguetia furfuracea*, *Brazilian Caryocar*, *Andira humilis*, *Byrsonima coccolobifolia* and *Cissampelos ovalifolia*.

#### Riparian Forests (BR)

The riparian forests extend along the watercourses occupying swathes of variable width, on soils with abundant organic matter and susceptible to temporary flooding. The species that make up it are generally hygrophiles.

In the upper stratum the following species stand out for their abundance: *Esenbeckia febrifuga* (yvyra ovi mi), *Chrysophyllum marginatum* (pykasu rembi'u), *Citronella gon-gonha* (congoña, Ka'a cangói), American *Cordia* (guajayvi), *Inga marginata* (inga'i), *Luehea divaricata* (ka'a ovet'), *Nectandra lanceolata* (laurel), *Sapium haemospermum* (kuru-pikay), *Sebastiania brasiliensis* (yvyra kamby) and *Terminalia triflora* (yvyra sa'yju). Other less frequently recorded species were: *Alchornea triplinervia* (rupa chipa), *Balfourodendron riedelianum* (guatambu, yvyra net), *Campomanesia xanthocarpa* (guavira pyt'), *Casearia sylvestris* (donkey ka'a), *Cecropia pachystachya* (amba'y), *Chrysophyllum gonocarpum* (aguai), *Citrus aurantium* (orange h'i), *Cupania vernalis* (jagua rata'y), *Ocotea diospyrifolia* (laurel), *Peltophorum dubium* (yvyra pyto), *Plinia rivularis* (yvaporoiity) and *Pterogyne nitens* (yvyrar).

The intermediate stratum, with woody shrub and tree species is characterized by the presence of species such as *Actinostemon concolor* (yvyra hũ), *Allophyllus edulis* (kokũ), *Annona emargina* (araticu'i), *Bernardia pulchella*, *Celtis iguanaea* (juasy'y), *Eugenia adenantha*, Brazilian *Justice*, *Merostachys clausenii* (takuapi), *Myrciaria sp.* *Trema micrantha* (kurundi'y), *Trichilia catigua* (katigua pyto) and *Trichilia elegans* (cedrillo).

## Biodiversity in the Area of Influence of identified FMUs

Below is the most important fauna and flora found in baseline studies conducted in the identified FMUs, Annex 1 details the list of all species found in the study areas.

### Fauna Birds

Ten species of birds were found in CITES II category (Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES Convention on International Trade in *Endangered Species of Wild Fauna and Flora*: raptors both day and night and parrots: *Buteogallus meridionalis*, *Rupornis magnirostris*, *Glaucidium brasilianum*, *Athene cunicularia*, *Caracara plancus*, *Milvago chimachima*, *Falco sparverius*, *Myiopsitta monachus*, *Pyrrhura frontalis* and *Psittacara leucophthalmus*. Two species of birds with threat category were recorded; one corresponding to grasslands, *Sporophila palustris* (White breast capuchin), in the category "Endangered" at national and global level, and another of the native forest, *Procnias nudicollis* (Bell Bird), in the category "Vulnerable" globally and "Endangered" at the national level (MADES).

Eight southern migratory species were recorded in the categories AS and AN: *Patagioenas picazuro*, *Chordeiles nacunda*, *Myiodynastes maculatus*, *Empidonax varius*, *Tyrannus melancholicus*, *Tyrannus savana* and *Progne tapera*.

According to CMS criteria, ten species of birds are in category CMS II: a duck, a chorlo, vultures and raptors: *Amazonetta brasiliensis*, *Vanellus chilensis*, *Cathartes aura*, *Cathartes burrovianus*, *Coragyps atratus*, *Buteogallus meridionalis*, *Rupornis magnirostris*, *Caracara plancus*, *Milvago chimachima* *Falco sparverius*

In one of the FMUs, the number of birds recorded was 51, 7% of Paraguay's total grouped into 26 families.

In another of the FMUs, 53 species of birds were recorded grouped into 27 families, representing 7% of the total birds recorded in Paraguay.

In another FMU about 56 new species of birds, which together with the above list give a total of 87 species. At the national level 2 of these species are considered in the category "Threatened", *Pyriglena leucoptera* (Batará negro) and Tiotoi, dancer olive or Flautín (*Schiffornis virescens*). There were 16 species included in Appendix II to the CITES Convention (International Trade in Endangered Species of Wild Fauna and Flora), and 8 species of birds endemic to the Atlantic Forest: *Phaethornis eurynome*, *Trogon sur melanerpes flavifrons*, *Pyrrhura frontalis*, *Pyriglena leucoptera*, *Myiornis auricularis*, *Procnias nudicollis*, and *Schiffornis virescens*.

In the baseline of other FMUs, there were 63 species of birds in total; of these, 10 are in CITES II *Buteogallus meridionalis*, *Rupornis magnirostris*, *Glaucidium brasilianum*, *Athene cunicularia*, *Caracara plancus*, *Milvago chimachima*, *Falco sparverius*, *Myiopsitta monachus*, *Pyrrhura frontalis* and *Psittacara leucophthalmus*. No species were registered in IUCN and MADES categories.

### Amphibians

One of the FMUs recorded 10 amphibian species in 3 families, 12% of the total for Paraguay.

In another FMU, 11 amphibian species were recorded in 4 families, 12% of the total species registered for the country.

37 species were known for the departamento of San Pedro, in the survey 2 new species were recorded for the department: *Pseudis platensis* and *Leptodactylus gracilis*, thus increasing in 39 the species

known to St. Peter. Another important record is *chiasmocleis albopunctata*, which represents the second record of the species in the department.

### Reptiles

In one of the FMU it was registered, from the list of species ameborn locally: the Boa constrictor amarali, and the teju guazú *Salvator merianae*. In addition, a kind of reptile was observed, the *Teiurus* sp. or teju, *Eunectes murinus* (Mboi Jagua), the species of yarará *Bothrops jararacussu* is considered "Threatened" nationally.

The alligator found in one of the FMUs (*Caiman latirostris*), although it has less commercial value in Paraguay than its congener *C. yacare*, has value for the fur industry (Appendix I of CITES). Anaconda (*E. murinus*), like the previous species, is also mainly pursued by leather for the fur market and is categorized in CITES Appendix II. Also *Thamnodynastes strigatus* and *Amerotyphlops brongersmianus*.

### Mammals

While the specific identity of one of the felines found cannot be determined, (*Leopardus* sp.), two species of this genus fall into some category of threat: Tiríka, Mbaracaja'i or Tigrillo (*Leopardus guttulus*):VU (IUCN) and Tiríka, Jaguarete'i or Margay (*Leopardus wiedii*):NT(IUCN), and both are threatened nationally in the Endangered category (SEAM, Res. 2243). *Procyon cancrivorus* or Aguará popé and the *Cerdocyon thous* or Aguará'i and Pecari tajacu o Kure'i. "Critically Endangered" and *Epicrates crassus* (Mboi Ro'y), in the "Vulnerable" category, both nationally (MADES.).

Also in another FMU was observed the *Procyon cancrivorus* or Aguará popé and the *Cerdocyon thous* or Aguará'i.

### Flora

Two species of globally threatened plants (IUCN 2017), both in the category of "Endangered" (EN): *Cedrela fissilis* (cedar) and *Balfourodendron riedelianum* (guatambú), have been recorded in one of the study FMUs. The species *Pterogyne nitens* (yvyraro) has also been evaluated by IUCN, although it is not within a threat category, but has been classified as "low risk" (LR/nt). According to national conservation status assessments (SEAM 2006) there are five *threatened species* *Handroanthus heptaphyllus* (tajy hu), *Handroanthus pulcherrimus* (tajy sa'yju), *Cordia trichotoma* (peterevy), in addition to guatambu and cedar. While there are numerous commercially value timber species found in the project area, such as tajy hu, guatambú, cedar, peterevy, yvyraro pyta, among others, only cedar is found within CITES Appendix III.

Endangered" (EN): *Cedrela fissilis* (cedar) and *Balfourodendron riedelianum* (guatambú). The species *Ilex paraguariensis* (yerba mate) and *Pterogyne nitens* (yvyraro) have also been evaluated by IUCN, although it is not within a threat category, but has been classified as "low risk" (LR/nt). According to national conservation status assessments (SEAM 2006) there are four *threatened species* *Handroanthus heptaphyllus* (tajy hu), *Cordia trichotoma* (peterevy), in addition to guatambu and cedar.

### Protected Wilderness Areas

Protected areas are essential to conserve natural and cultural biodiversity, the environmental goods and services they provide are essential to society. Through economic activities, such as tourism among others, many protected areas are important for the sustainable development of local communities, especially indigenous communities that depend on them for their survival. Protected landscapes embody important cultural values; some of them reflect sustainable land use practices (IUCN, 2017).



In our country protected wilderness areas have different management depending on their category, which can be according to the IUCN or according to SINASIP. The driving categories are explained below.

Globally, the International Union for Conservation of Nature (IUCN) developed a preliminary category system for the management of protected areas, as follows:

Category I: Comprehensive protection – Strict Nature Reserve.

The. Strict Nature Reserve.

Ib. Wild Natural Area

Category II: Ecosystem Conservation and Tourism - National Park

Category III: Conservation of natural characteristics - Natural Monument

Category IV: Conservation through Active Management - Habitat Management Area

Category V: Conservation of land and seascapes, and recreation - Protected Land and Marine Landscapes

Category VI: Sustainable use of natural ecosystems - Protected Area with Managed Resources

The National System of Protected Areas of Paraguay (SINASIP) is the set of Protected Wilderness Areas of ecological and social relevance, at the international, national and local levels, that allows to comply with the conservation objectives and policies established by the Paraguayan government.

The following is an equivalence between the management categories promoted by IUCN and SINASIP in Paraguay.

**IUCN:** Category I

**SINASIP:** Scientific Reserve

**Definition of category:** These are those natural areas with ecosystems that contain prominent or representative geomorphological traits, as well as species of fauna and flora, and that under comprehensive and strict protection are intended for scientific research and environmental monitoring.

**Characteristics of the category:** As far as possible they do not have any human settlement or in any case the area is in the process of depopulation;

Scientific research is the only activity allowed; The property on which the area sits is public property;

The Administration is exclusive to the En implementation Authority.

**IUCN:** Category II

**SINASIP:** National Park

**Definition of category:** These are those natural areas with ecosystems that contain outstanding geomorphological traits, as well as species representative of a natural region and that under protection are intended for research, education and tourism in nature.

**Characteristics of the category:** Controlled public use, including recreation activities, tourism and scientific research; Carrying out activities aimed at the maintenance of Environmental Services; The property on which the area is located is publicly owned; The Administration is exclusive to the Implementation Authority; The populations that are within, and make traditional use of the resources of the area through activities considered sustainable.

**IUCN:** Category III

**SINASIP:** Natural Monument

**Definition of category:** These are areas that contain unique natural or cultural characteristics or traits of outstanding cultural value and that under protection are intended for scientific research and recreation when conditions permit

**Characteristics of the category:** Allow the realization of activities aimed at the conservation of specific landscape aspects, If possible they will not possess any type of human settlement or in any case the area will be in the process of depopulation; Scientific research and education activity shall be permitted as long as the protected resource so permits; The property on which the area sits is public property; The use of the category is exclusive to the implementation authority; The Administration may not be exclusive to the En implementation Authority, through co-management.

**IUCN:** Category IV

**SINASIP:** Wildlife Refuge

**Category definition:** These are those preferably natural areas for the conservation of species and ecosystems through active management

**Characteristics of the category:** Possess active human intervention for the management of species and habitats included in the area; It should contain populations of wildlife species that may be subject to management; The degree of alteration of resources should be minimal. In the case of ecosystems or habitat they must be in the best possible state of conservation; A minimal presence of human settlements and whose activities will fall within the respective Management Plan; Carrying out activities aimed at maintaining environmental services, scientific research and education; The administration of the area may be exercised by the Implementation Authority or by third parties, under its control.

**IUCN:** Category V

**SINASIP:** Protected Landscapes

**Definition of the category:** These are those natural areas intended for the protection of terrestrial and aquatic landscapes and recreation.

**Characteristics of the category:** Possession of natural elements of important scenic beauty, The realization of activities aimed at the conservation of landscapes and recreation; Human settlements are allowed; The degree of alteration of protected landscape resources should be minimal; Carrying out activities aimed at maintaining environmental services, lifestyles or traditional productive forms and tourism

**IUCN:** Category VI

**SINASIP:** Managed Resource Reserve

**Definition of the category:** They are those areas that allow to combine the maintenance of biological diversity with the sustainable use of ecosystems and their components.

**Characteristics of the category:** Possess at least % of the surface with minimal anthropic alterations, or in natural conditions; Human settlements are allowed. Production must be through environmentally compatible systems, promoting sustainable production; Carrying out activities aimed at the maintenance of Environmental Services; The property(s) on which the area sits may be private or public property, or heritage in the municipal public domain; The administration of the area may be exercised by the Implementation Authority or by third parties, under its control.

**IUCN:** Special Category

**SINASIP:** Ecological Reserve

**Definition of the category:** These are those natural areas that meet the characteristics of a scientific reserve or a national park, but which, for various reasons, such as, among others, the size, tenure of

the land, the shape and the degree of alteration do not qualify to be included in the categories mentioned.

**Characteristics of the category:** Production does not pursue, but certain productive activities can be carried out in accordance with the particularities and characteristics of the area; Carrying out activities aimed at the maintenance of Environmental Services; Carrying out activities aimed at the restoration of ecosystems; May have settlements

**IUCN:** Special Category

**SINASIP:** Nature Reserve

**Definition of category:** These are those natural areas that are settled on privately owned properties have samples of ecosystems considered important for biodiversity conservation and that at the same time are appropriate for the realization of production activities in a sustainable way

**Category Features:** Your establishment is at the request and initiative of its owner and its recognition is carried out by the Implementation Authority; The realization of productive activities in accordance with the potential of the natural resources of the area; Carrying out activities aimed at the maintenance of Environmental Services;

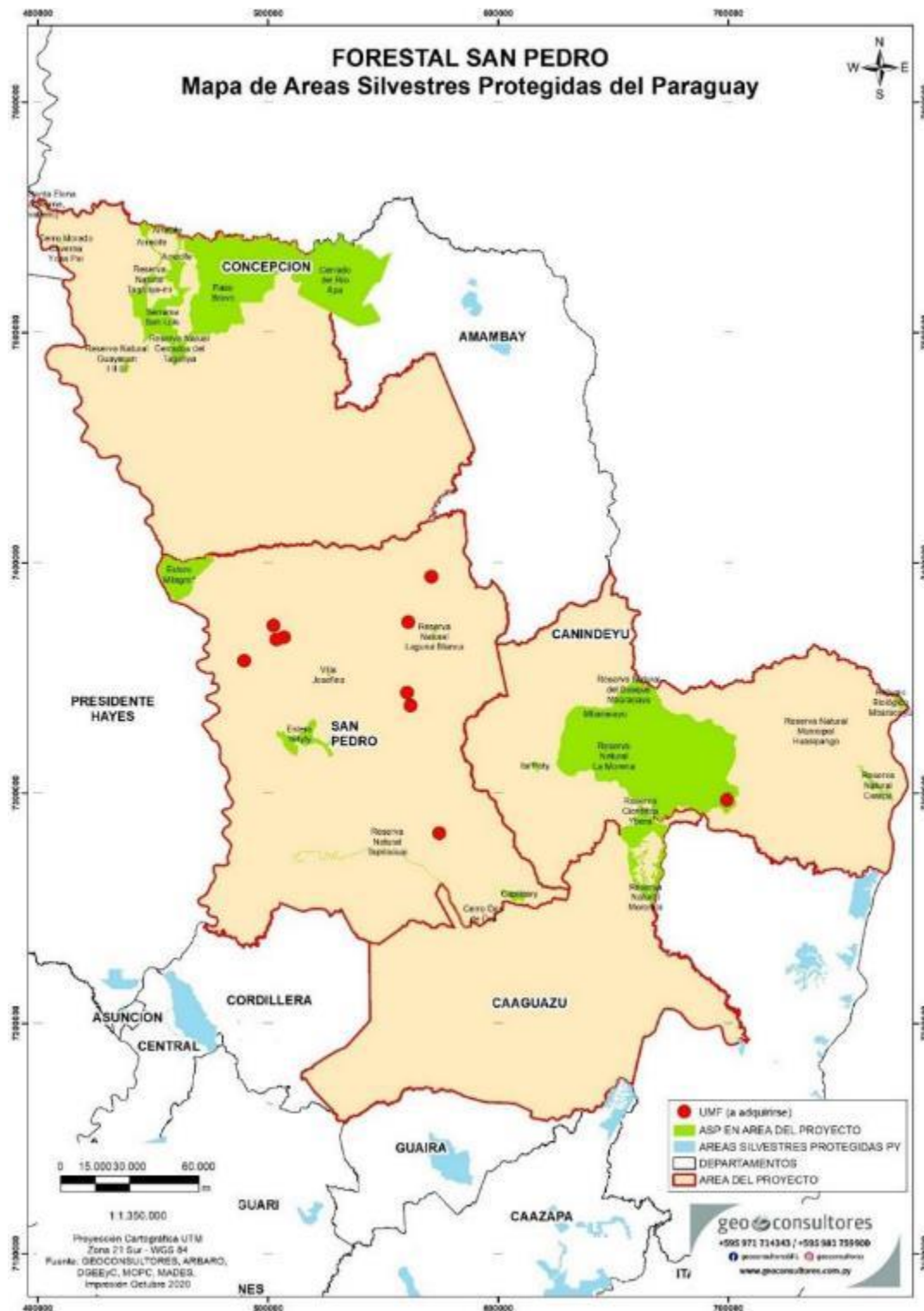
Carrying out activities aimed at the restoration of ecosystems; The possibility of human settlements; The property on which the area is located is private property, belonging to natural or legal persons.

The following are the Protected Wilderness Areas involved within the Project's areas of influence:

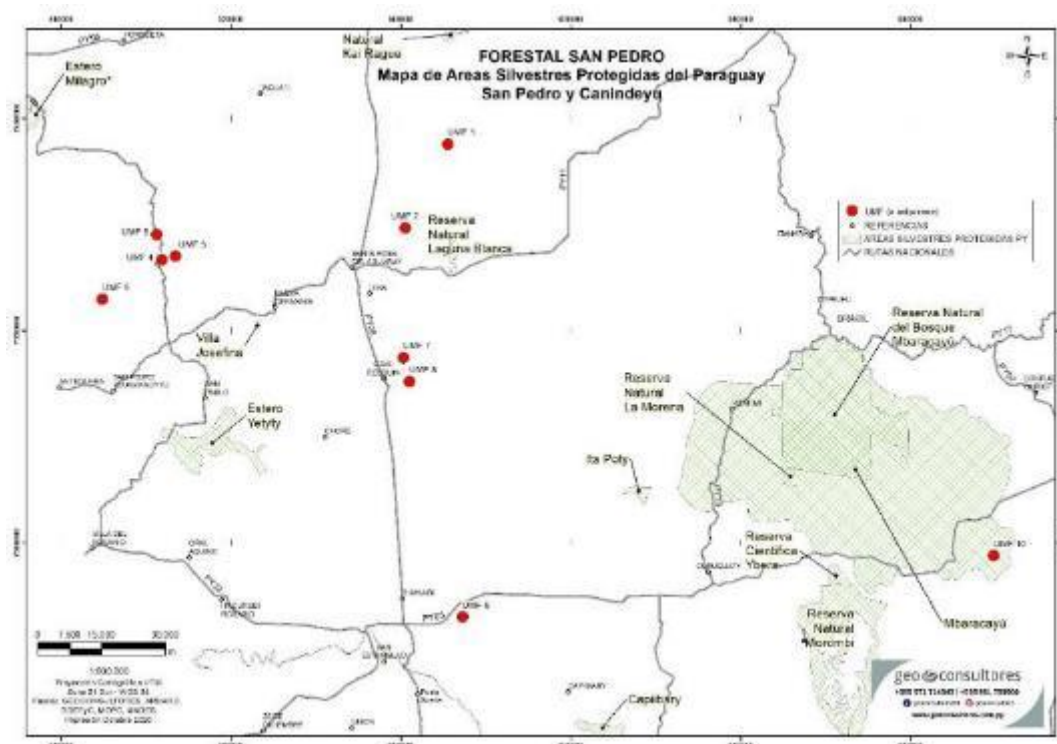
Protected Area	Category	System	Law	Decree
St. Helena (cavern, Vallemit)	Natural Monument	Private	4577/11	
Kamba Hopo Cavern	Natural Monument	Public	4577-11	
Three Cerros-santa caverna-14 de Julio and Santa Caverna	Natural Monument	Public	4577-11	
Cerro Morado Caverna Ycua Pai	Natural Monument	Public	4577-11	
Huasipango Municipal Nature Reserve	Other Categories	Public	3106-06	
Capiibary	Ecological Reserve	Public		18219-02
Cerro Dos de Oro	Protected Landscape	Public	2971-06	
Paso Bravo	National Park	Public		20712-98
Tagatiya-mi Nature Reserve	Nature Reserve	Private		
Guayacan Nature Reserve I II III	Nature Reserve	Private		1230
Mbaracayú Forest Nature Reserve	Nature Reserve	Private		
Laguna Blanca Nature Reserve	Nature Reserve	Private	3998	
Morombi Nature Reserve	Nature Reserve	Private		
La Morena Nature Reserve	Nature Reserve	Private		1273
Tapiracuai Nature Reserve	Nature Reserve	Private		4647

Protected Area	Category	System	Law	Decree
Cara'í Nature Reserve	Binational Entities Reserve	Private		
Mbaracayú Biological Refuge	Binational Entities Reserve	Autarquico		
Miracle Estero	Ramsar Sites	Ramsar		
Closed Apa River	Rio Apa Biosphere Reserves	Biosphere Apa		
Mbaracayú	Mbaracayú Biosphere Reserves	Mbaracayú Biosphere		
Ybera Scientific Reserve	Cientifica Reserve	Public	5530	
Reef	Nature Reserve	Private		
Villa Josefina	Nature Reserve	Private		
Ita Poty	Nature Reserve	Private		7973
Estero Yetyty	Protected Landscape	Municipal Public	6062-18	
Serranía San Luis	National Park	Public		11964-91





Map 19. Map of Protected Wilderness Areas of Paraguay



Map 20. Map of Protected Wilderness Areas of the FMU Area of Influence

One of the FMUs is located within the Mbaracayú Forest Biosphere Reserve. Its management is governed by SEAM Resolution No. 200/01 BY WHICH MANAGEMENT CATEGORIES ARE ASSIGNED AND REGULATED; ZONING AND USES AND ACTIVITIES.

Article 22: These are characteristics of areas with Managed Resource Reserve category:

- (a) Possess at least 50 % of the surface area with minimal anthropic alterations, or in natural conditions;
- b) Human settlements are allowed. Production must be through environmentally compatible systems, promoting sustainable production;
- (c) Carrying out activities aimed at the maintenance of Environmental Services;
- d) The property on which the area sits may be publicly or privately owned; as well as those in the public or private municipal domain;
- (e) The administration of the area may be exercised by the en implementation authority or by third parties, under the control of the same

BAAPA covers most of the reserve and is described as a semi-tropical subtropical forest. At the regional and national levels it is highly threatened and fragmented and approximately 7% of the original coverage persists to the present day.

The forests of the Mbaracayú Forest Nature Reserve are the remnants of this type of ecosystem in better condition in Paraguay. It identifies several natural communities that include different types of forests, grasslands, lagoons, steeds, rivers, streams, jumps and water springs. In addition, hundreds of species of birds, mammals, reptiles, fish and amphibians are recorded.

Protected areas have a management system according to their category, the National System of **Protected Areas of Paraguay (SINASIP)** is the set of Protected Wilderness Areas of ecological and social relevance, internationally, nationally and locally, under an orderly and directed management that allows to comply with the conservation objectives and policies established by the Paraguayan government, according to Article 5 of the Law on Protected Wilderness Areas. Law No. 352/94 "On

Protected Wild Areas" aims to establish general standards for the regulation and management of SINASIP.

### Analysis and Description of the Socio-Economic Aspect

The Area of Influence of the project includes the departments of San Pedro, Concepción, Caaguazú and Canindeyú. The following are the most relevant socio-economic aspects affecting these departments.

#### Economy

The pandemic affects the country, which was in a process of recovery after economic growth stalled in 2019. There are many industries that suffered an economic setback and others that had the opportunity to discover a different edge of their own business, also industries that increased economic movement and other new opportunities from the pandemic. This recession is likely to lead to a reduction in GDP. Next year, GDP growth is expected to return to the same, as the world economy recovers.

The country's economy began to increase in the second half of this year, as agricultural production recovered. All departments in the country were severely affected, especially border departments as the flow of people stopped, the rest of the departments were also affected in their local shops.

In the departments involving the project, agricultural production stands out for having a large area and economic movement destined for it. We must not forget the economic movement of retail, wholesale, trade and repair, food processing, food services, financial services, wood production and teaching.

#### Education

The Ministry of Education and Culture is the entity responsible for the public administration of the education system with the mission of promoting a social pact that guarantees the consolidation and construction of a high quality educational system (MEC, 2020).

This year, due to the covid-19's state of the world, education is another of the world's most affected and local edges. Education is expected to adapt to the new normal next year.

Below are the results of the department surveys that are included within the Project Influence Area. The data presented in the following table are from 2017 and 2018 (DGEEC, 2018).

Population per year of the survey, according to department and main indicators of education. Period 2017-2018		
Department and indicator	Year of the survey	
	2017	2018
<b>San Pedro</b>		
Average years of study of the population aged 10 and over	7,2	7,3
Assistance population aged 6-14 years (%)	97,3	96,0
Attendance population 6 -14 years old (absolute value)	88.204	87.106
<b>Canindeyú</b>		
Average years of study of the population aged 10 and over	7,4	<sup>1/</sup>
Assistance population aged 6-14 years (%)	96,9	<sup>1/</sup>
Attendance population 6 -14 years old (absolute value)	44.143	<sup>1/</sup>
<b>Concepcion</b>		
Average years of study of the population aged 10 and over	7,6	<sup>1/</sup>
Assistance population aged 6-14 years (%)	97,2	<sup>1/</sup>
Attendance population 6 -14 years old (absolute value)	51.736	<sup>1/</sup>
<b>Caaguazu</b>		
Average years of study of the population aged 10 and over	7,7	7.7
Assistance population aged 6-14 years (%)	97,6	95.5
Attendance population 6 -14 years old (absolute value)	104.096	105.512
Source: DGEEC. Permanent Household Survey, 1997/98-2016. DGEEC. Permanent Continuous Household Survey 2017-2018		
<sup>1/</sup> Data not available		

## Health

Our country is going through a pandemic that has tested the quality of public and private health service. A service that has been affected many years ago, especially in decentralized care, in departments that were previously in a precarious situation.

The Ministry of Public Health has on its official website the different existing health units by districts and georeferenced for easy location.

Below is a table with information about access to the type of health service for each department involved in the project's area of influence.



Population per year of the survey, according to department and main health indicators. Period 2017-2018		
Department and key health indicators	Year of the survey	
	2017	2018
<b>San Pedro</b>		
<b>Percentage</b>		
Population with health insurance coverage <sup>1/</sup>	12,3	11,9
Access to health <sup>2/</sup>	65,4	67,5
<b>Absolute value</b>		
Population with health insurance coverage <sup>1/</sup>	51.531	50.574
Access to health <sup>2/</sup>	143.397	130.499
<b>Canindeyú</b>		
<b>Percentage</b>		
Population with health insurance coverage <sup>1/</sup>	10,4	3/
Access to health <sup>2/</sup>	66,3	3/
<b>Absolute value</b>		
Population with health insurance coverage <sup>1/</sup>	23.081	3/
Access to health <sup>2/</sup>	77.126	3/
<b>Concepcion</b>		
<b>Percentage</b>		
Population with health insurance coverage <sup>1/</sup>	14,7	3/
Access to health <sup>2/</sup>	71,5	3/
<b>Absolute value</b>		
Population with health insurance coverage <sup>1/</sup>	35.936	3/
Access to health <sup>2/</sup>	92.788	3/
<b>Caaguazu</b>		
<b>Percentage</b>		
Population with health insurance coverage <sup>1/</sup>	16,9	13,5
Access to health <sup>2/</sup>	64,3	61,7
<b>Absolute value</b>		
Population with health insurance coverage <sup>1/</sup>	92.355	74.369
Access to health <sup>2/</sup>	179.860	154.991
Source: DGEEC. Permanent Household Survey, 1997/98-2016		
DGEEC. Permanent Continuous Household Survey, 2017-2018		
<sup>1/</sup> Includes IPS and other insurance		
<sup>2/</sup> Includes the sick or rugged population you consulted		
<sup>3/</sup> Data not available		

### Communities adjacent to the Influence Area of FMUs identified

Within the framework of environmental and social policy, it is sought to generate positive socio-economic impacts within the framework of the forestry project, through the generation of local employment and the design and implementation of projects with a strong socio-economic component. In addition, the social management of the project includes constant communication with vulnerable communities in the project region.

The project is developed within a framework of environmental, social and public policies covering a number of commitments with neighboring and surrounding communities. Within the project, before working with an FMU basic data is taken that helps the project to get an idea of the current situation of the community and thus allow the work to always be beneficial for both. Most staff come from communities that are in a shortage of economic development opportunities due to the difficulty of marketing agricultural products and the absence of a strong business fabric at the local level, have generated a significant migration to other regions of the country in search of employment opportunities.

### Diagnosis in the Communities

In all communities, rural diagnostic studies are carried out before FMUs are established. These studies serve to know the state of the communities, so that the project can know how to work with them, how the community can improve. Meetings are also held where the project is presented to the community and explain the benefits to the community and solve any kind of doubt.

Diagnosis of communities surrounding the area of influence of identified FMUs and future diagnostics of the project's area of influence provide data such as; Community History, Current Community Map, Development Maps (Productive Vision, Community Future Vision, Farm and Chacra Map, Current Land Use Map), Community People Activities, Problem and Possible Solutions Analysis, Community Demographics. All of these studies will be conducted on all identified FMUs.

The following infrastructure data is established within the current community map:

#### Basic Infrastructure

If the community has an artesian well or tank that distributes drinking water to them and under what conditions it is, also who is responsible for administering. The roads and how they are currently located. Know who supports the community with all needs. What is the support of the Governorate, Municipality and Livestock Producers. Electricity services, trash, cleaning public areas.

#### Social Infrastructure

Public Institutions.

Basic School.

Initial Education.

Secondary Education.

Employment situation.

The table below is presented with the neighbouring communities of the FMUs currently identified.

Neighboring communities in the identified FMUs	Number of families	Communication and mailboxes	Outgrower program
Correa Ruguá	65	Yes	Yes
Kororo'i	70	Yes	Yes
Barbero Kue	80	Yes	No
Barbero Kue		Yes	No
Ya'aguy Poty (indígena)	23	Yes	No
1º de mayo	96	Yes	No
Calle 8000 Defensores del Chaco	55	Yes	No
Cañada Santa Rosa	160	Yes	No
Paloma 1 y 2 (indígena)	60	Yes	No

### Social Management of Stakeholders

In our country, mainly in rural areas, communities and producers are adversely affected by social structures and often lack economic and educational opportunities for many decades.

Taking into account all these disadvantages and factors, the integration of socio-economic objectives as a fundamental part of the project is part of the social and human commitment. Where the objectives are:

- Identification of potential social impacts and implementation of mitigation measures.
- Provision of local jobs.
- Transparent communication and commitment.
- Implementation of joint activities.

These goals seek to improve community opportunities. Integrating workers from surrounding and local communities maintaining a transparent flow of communication so that they can detect potential impacts and mitigate them. Joint activities are also sought to provide economic opportunities for smallholders for both land use and the supply of basic needs.

### Land tenure situation

According to information on communities and interviews conducted as part of preparatory studies, a portion of the communities surrounding FMUs has a title owned by INDERT. Most of the population has 10 hectares, while older settlers still keep 20 hectares of land loted outside the urban area of the community. This situation of non-regularization of land tenure is replicated in all communities and at the country level. Since 2014 there has been the Geographical Land Information System (SIRT/INDERT) responsible for the digitization of existing plans, survey of data of the inhabitants, parceling of new occupations and mass titling. But the impediments to regulation lie in problems such as lack of documents, farm overlays, payments or others.

This untitled occupation situation is an impediment for villagers to access the participation of certain social projects.

### Situation of women and young people

In communities most women are engaged in the family chakra and hold fairs in municipal markets, carrying livestock products of minor animals (milk, cheese, eggs) and agricultural products such as cassava, sweet potato, corn, peanuts, beans, peas and others.

Women in the surrounding communities are engaged in the production and sale of the same products they obtain, such as milk, orchard products, meat, in items such as garment making, hairdressing and manicure, bakery and confectionery, horticultural production, poultry breeding and chicken coops.

Indigenous women are actively involved in all areas of agricultural work, in the rearing of domestic animals, orchards and in the elaboration of handicrafts. A percentage of indigenous youth are students, and received teacher classes at the community's own school.

#### Social support

The Ministry of Social Development of Paraguay (MDS) and the Paraguayan Indigenous Institute (INDI), with the support of FAO Paraguay, work inter-agencyly to protect, promote and facilitate the effective implementation of the right to food security and the nutrition of people in poverty and vulnerability, with an emphasis on indigenous peoples.

In February 2019, a commitment act was signed in one of the indigenous communities surrounding the project to support the operation of the community dining room. In addition, nutritional assessments and anthropometric measurements were carried out to children, as well as the delivery of materials by the Ministry of Agriculture (MAG) to strengthen the community's food production capacities.

#### OUTGROWER Project

This project, already established with some of the members of some communities, is about technical assistance and inputs to the producer who is interested in the production and sale of wood and has additional space in its batch. The project pays an annual lease fee and half the profits from the sale of the wood. The producer must commit to a lease of a production cycle, and must have the title of ownership or title of occupation of INDERT. The social manager supports producers with the marketing, maintenance, implementation of pots and raleo if necessary.

The forest stand in the photo on the next page belongs to a beneficiary of the OUTGROWER project.

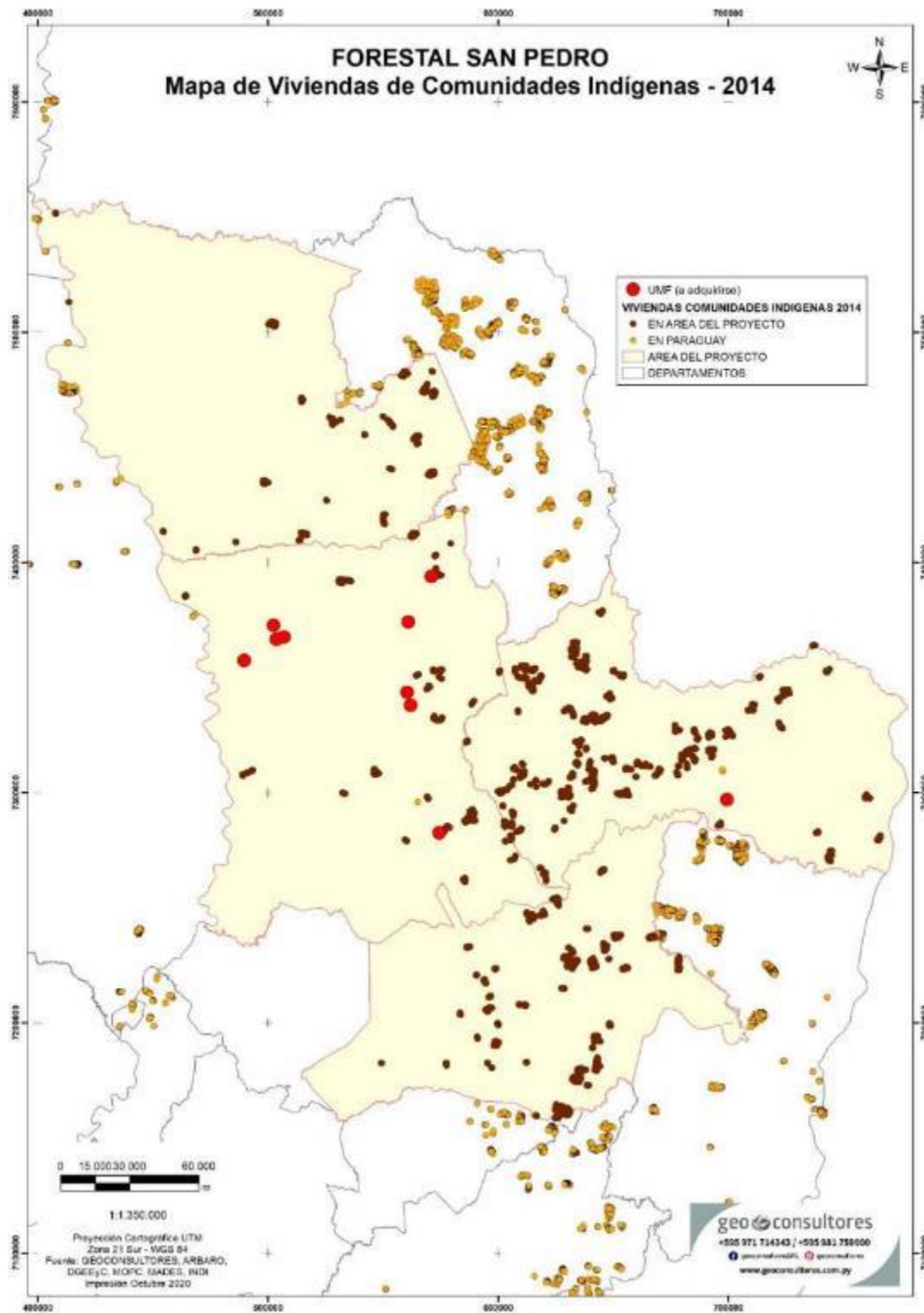


### Indigenous Communities

In Paraguay there are 112,848 indigenous inhabitants, according to the III National Census of Population and Housing for Indigenous Peoples 2012. In San Pedro and Canindeyu there are the ethnic groups Ava Guaraní, Guaraní Occidental, Mbca, Pa'i Tavyter, Ybytoso, Aché, and Toba Qom, in the communities of Ka'aa Poty, Yvy Poty, Moi Kua, Yapy Poty, San Antonio, Javier Kue Rugua, Arroyo Moroti, Jeroky Oka, Kapi'i Itindy, U Rugua, Yvamindy, Urukuy Las Palmas, Boquerón, St. Louis, Ka'a Poty, Ypotyju, Tapyi Kue, , Naranjito Santa Lucia, Naranjay, U Apu'a, Ypachi, U Poty, Rio Corriente mi, Rio Verde, Parakau Keha; Santa Isabel, Arroyo Sa'yju, Popcorn, Mburukuya, Arroyo Sa'ju, Arroyo Cora, Carioca, Guyra Keha Guavira, Tekoha Poty Vera, Happiness, Ynambu Ygua, Tekoha Ryapu Laguna Hovy, Paso Jovai, Cerro Pyta, Arroyo Pora, Rice Tygue, New Hope, June 12.

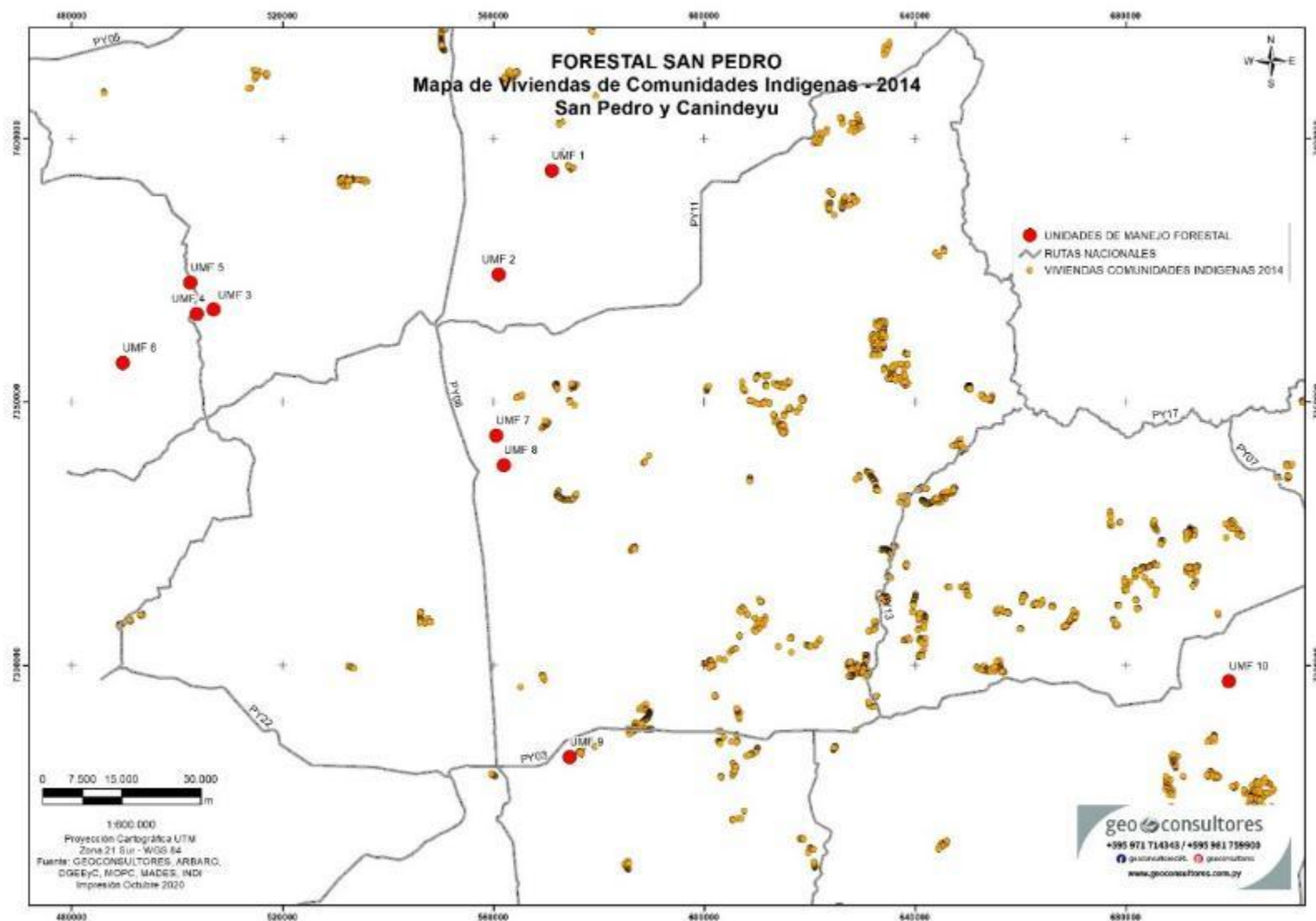
It is important to know that indigenous communities are censused and their locations are georeferenced. Below is a georeferenced map of the indigenous communities censused in 2014 within the area of influence of the project and within the area of influence of the FMUs already identified.





Map 21. Map of indigenous community housing within the project's area of influence





Map 22. Map of housing of indigenous communities within the area of influence of the FMUs already identified

## Environmental and Social Impact Study

### Methodology for the Environmental and Social Impact Study

A project or productive activity is part of sustainable development when its effects do not exceed the rates of renewal or consumption, nor the load capacity (reception) of the territory or assimilation of environmental components. The methodology of this study included a set of activities, research and technical tasks that were carried out in order to comply with the national laws and international criteria mentioned above.

It is based on the potential impacts of the entire project considering the impacts observed on the already carried out operations of the FMUs identified in acquisition process. It is important to emphasize that all FMUs identified are FSC-certified and have an environmental license in the country, so it is important to continuously learn and improve based on what is observed and compiled from reports submitted for each of the FMUs.

### Cause-Effect Matrix Method

This methodology identifies the different actions that could affect environmental and social components and cause negative and positive impacts. It is then possible to identify the different factors of the environment that could be affected.

Considering the data collected in the review of the various technical work, reports, forms and the field visit, the relevant information on the environmental variables that may affect it is obtained.

With the data obtained, a cause/effect matrix is developed with anthropic actions that can alter the environment and environmental characteristics, which are the environmental factors that can be affected in a positive or negative way. Thus, one can define the interactions that exist and then proceed to the valuation of the indicators according to each impact.

The next step is to develop a concept of Mitigation and Monitoring of all the environmental and social impacts that were identified in the different stages (presented in the next chapter).

### Definition of Environmental Factors

Middle		Environmental Factor	Definition
Physical	Soil	Soil Quality	The physical properties of the soil (texture, structure and porosity). The chemical properties of soil (pH, nutrients etc.).
	Water: Superficial, Underground	Water Quality	The physical properties of water (temperature, density, color, odor, etc.). Self-depuration capacity (water courses). Recharge capacity (water table). The chemical properties of water (pH, conductivity etc.).
	Air	Air Quality Noise	The physical properties of the air (particulate matters, odor, noise etc.). The chemical properties of air (gaseous composition).
	Landscape		Set of visual elements.
	Flora Fauna	Factoris Biotics (Diversity)	Native, endemic, exotic, endangered species with commercial value (or CITES).

Middle		Environmental Factor	Definition
Anthropic	Social	Employment	Recruitment of temporary and permanent labour service in accordance with legislation in force in the country and fundamental principles and rights at work: free association, elimination of forced labour, abolition of child labour, elimination of discrimination in employment and occupation: such as nationality, religion, disability, gender, sexual orientation, age, political opinion, membership of trade unions or a political party.
		Health and Safety	Quality of life, well-being of staff and people in the surrounding area, includes hiring staff with Social Security Benefits (IPS).
		Local economy	Economic flow that happens within the study area.

Definition of indicators for the assessment of the impacts used in the impact identification matrix presented.

- Positive (+), Negative (-): Depending on whether it is a positive or negative effect on the environment. Quantitative values are assigned to the effects caused by impactful actions on environmental factors on a scale of 1 to 3, and may be the same low (1), medium (2) and high (3).

- Direct (D) or Indirect (I): indirect effects derive from direct effects; direct ones are generated immediately by the project action that provokes them.

- Temporary (T) or Permanent (P): reflects the persistence of the effect over time, being determined in case of temporary and indefinite for permanents.

- Reversible (R) or Irreversible (I): when the impact is negative, it is evaluated whether natural processes are able to assimilate the effects caused, these are called reversible; otherwise, irreversible.

- Simple (S) or Synergistic (G): the first are those that affect a single environmental component, while synergistic ones increase their severity by intervention of other effects or actions.

- Short (C), Medium (M) or Long Term (L): reflects the elapsed time so that the impact can be measured. In the first case it is considered an instant effect, in the second case it is considered a time of one year and in the third more than one year.

#### Defining project actions

In the following the project's activities that would have environmental impacts to the above factors are listed.

Forest Activities	
Actions	Definition
Preparation	<p>Cleaning and preparation of the soil for plantation of woody species. Following topographic survey and soil studies, soil preparation is carried out in order to promote root development of the species to be planted. Includes demarcation and distribution of planting materials.</p> <p>This stage represents an action for future FMUs, with current FMUs being in more advanced stages.</p>



Forest Activities	
Actions	Definition
<b>Planting</b>	<p>Plantation of planting materials of woody species such as <i>E. grandis</i> and <i>E. urophylla</i>. Planting can be under silvopastoral system or in pure plantation system. Planting materials from outsourced suppliers are received in pots or tubettes containing the specific nutrients that protect the roots, it is recommended to keep them in a humid place, outdoors and must be watered at least 3 times a day.</p> <p>Silvopastoral system: Space of 5 x 9 x 2 meters. Thus reaching approximately 714 trees/ha.</p> <p>Pure planting system: 5 x 2 meters and 5 x 2.5 meters. Thus reaching approximately 800-1000 trees/ha.</p> <p>It also refers to blanking, a stage that replaces plants of the first plantation that did not survive with the aim of repopulating and maintaining a minimum of survival.</p> <p>This stage represents an action for future FMUs, with current FMUs being in more advanced stages.</p>
<b>Maintenance</b>	<p>Manual control and application of agrochemicals for timely control of insects, bacteria, fungi, or unwanted vegetation.</p> <p>It includes the control, maintenance of forest ground by permanent cleaning, and all activities related to fire prevention.</p> <p>Thinning: at 2, 5 and 8 years old. Selection of trees for removal as needed.</p> <p>Pruning: up to 9 meters in 3-4 interventions within the first 3 years. They aim to eliminate basal branches to increase growth rate, wood quality and ornamental quality.</p>
<b>Harvesting and Transport</b>	<p>Directional felling: control of the fall of the tree, taking care of the safety of the personnel in charge and taking care of the quality of the forest product and optimization of the extraction.</p> <p>Wood extraction.</p> <p>Transport of commercial. Includes logs registration, sectioning, loading, and potentially sawing (mobile saw).</p> <p>Includes maintenance of vehicles and machinery, including saw blade sharpening.</p>
<b>Installation and Infrastructure for Industrial Wood Development - Sawmill</b>	<p>The set of operations covered by a timber company with a focus on sawing and preservation areas, as well as the services and dependencies, includes for its activity several factors. The flow of activities such as sawing on the one hand and preservation on the other must have a directional continuity from the entry of the logs to the dispatch of the elaborated wood product. To do this, it is necessary to allocate the spaces essential for the performance of the unit activities that are part of the process and it is necessary to combine those spaces so that the whole works most effectively. Of course, the possible formulas are very varied, depending on the volume of the company, the equipment and the operations it chooses to include in its process, the physical space available, the previous existence or not of constructions, roads, railways and water.</p> <p>The necessary and sufficient spaces are provided for the storage of logs, for the area for indoor or outdoor drying castles, the drying preparation area, spaces for large truck manoeuvres and also consider future widenings of the installation.</p> <p>The arrangement of equipment in the sawmill "Line-Out"- Sawmill Design: these are the terms with which it is possible to present the multiple solutions that can be given to rationally distribute the elements of a sawmill. The multiplicity of solutions derives from the very diverse situations, which is possible or that need to be raised with the factors that come into play, volume of production, types of parts to be obtained, types of woods to be made, maximum dimensions of the logs, all this refers to the technical issues of the plant.</p>

## Forest Activities

Actions	Definition																																
	<p>It is essential to combine equipment and wood mobility devices, so that there are no material vacuums (or potholes), bottlenecks or jams.</p> <p>To do this, the first thing that needs to be ensured is the fluid feeding of the sawmill from the log storage yard, follow in a coordination of tasks in the units of the sawing equipment. This should be based on the permissible feed rate in each and the ability to make one or more cuts simultaneously. Sectors where bottlenecks are quite common is in saws for resawing, edgers and markers and in the sorting chain. One way to lessen this problem is to provide for a temporary storage area (or tables) before some of those machines.</p> <p>The opening of the logs and the immediate subdivision is achieved with endless saws. The next steps of the process continue with double and multiple circulars to be edged and sawn if necessary, the sides are stored to be resawn (in smaller parts) or to be chipped or collected for charcoal production. The logs are fed to the sawing machine by chains in inclined planes, at the other end the sawn parts are descending through the sorting chain or a conveyor, towards the immersion bath or towards the preparation for drying.</p> <p>According to the final product, the wood can enter the laminating machine, the pole derailing tool, the rocker drill, or the endless carpentry (Herebia 2014).</p> <p>The Pan American Committee on Technical Standards (2018) has summarized the name of the sawn parts as follows:</p> <table><tr><th>Piezas</th><th>Espesor</th><th>Ancho</th><th>Largo</th></tr><tr><td>Chapa</td><td>menos de 5 mm</td><td>variable s/uso</td><td>variable s/uso</td></tr><tr><td>Tablilla</td><td>de 5 a 10 mm</td><td>variable s/uso</td><td>variable s/uso</td></tr><tr><td>Tabla</td><td>desde + de 10mm Hasta – de 50mm</td><td>mayor de 100mm</td><td>variable s/uso</td></tr><tr><td>Tablón</td><td>desde 40mm hasta 125 mm</td><td>200mm o más</td><td>variable s/uso</td></tr><tr><td>Tirante</td><td>desde 50 a 75mm</td><td>desde 50 a 150mm</td><td>no menos de 2 m</td></tr><tr><td>Vigueta</td><td>desde 125mm hasta menos de 200mm</td><td>desde 125mm hasta menos de 200mm</td><td>no menor de 2 m</td></tr><tr><td>Viga</td><td>200mm o más</td><td>200mm o más</td><td>no menos de 2 m</td></tr></table>	Piezas	Espesor	Ancho	Largo	Chapa	menos de 5 mm	variable s/uso	variable s/uso	Tablilla	de 5 a 10 mm	variable s/uso	variable s/uso	Tabla	desde + de 10mm Hasta – de 50mm	mayor de 100mm	variable s/uso	Tablón	desde 40mm hasta 125 mm	200mm o más	variable s/uso	Tirante	desde 50 a 75mm	desde 50 a 150mm	no menos de 2 m	Vigueta	desde 125mm hasta menos de 200mm	desde 125mm hasta menos de 200mm	no menor de 2 m	Viga	200mm o más	200mm o más	no menos de 2 m
Piezas	Espesor	Ancho	Largo																														
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Vigueta	desde 125mm hasta menos de 200mm	desde 125mm hasta menos de 200mm	no menor de 2 m																														
Viga	200mm o más	200mm o más	no menos de 2 m																														

## Associated Activities

Actions	Definition
<b>Livestock</b>	<p>Although this activity is not part of the FSP Project, the farms that lease the property may have an agricultural production. In addition, in silvopastoral plantations, owners use these areas for cattle grazing.</p> <p>Activity that includes the arrival of cattle at the establishment for marking, caravan placement, weighing, etc. For introduction to the silvopastoral system.</p> <p>Cattle grazing within silvopastoral plantations in order to consume grass for weight gain. The system used in paddocks is rotating and outsourced. Outsourced services include activities such as weaning, castration, partition control, rodeo, breeding, breeding-finishing, wintering. This action also includes the staff of the livestock sector to be able to carry out the activities with the support of labor.</p>

Associated Activities	
Actions	Definition
<b>Sanitation and Vaccination</b>	<p>Although this service is outsourced, it is an essential activity for livestock introduced to the silvopastoral system.</p> <p>Vaccination: Preventive treatment against diseases such as aftosa, anthrax, rabies, brucellosis, etc.</p> <p>Dewositation/Sanitation: It consists of the periodic treatment of the animal mainly against verme, tick, lice, flies, uras, etc. The sanitation of the calf's navel and worms should be considered mainly.</p> <p>It should be done throughout the herd periodically and on a plan basis.</p>
<b>Constructions: Wires, Water, Plumbing, Infrastructure</b>	Manual excavation of wells for the placement of poles every 5-8 meters with 4-5 wire barbed or smooth with 3 rockers. Soil excavation for placing PVC pipes for water distribution, maintenance of existing pipes. Soil movement and surface leveling for the construction and maintenance of infrastructures and roads.

### Identification and valorization of potential impacts of the FSP Project

Activity	Environment	Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
Preparation	<b>Soil</b>	Soil surface layer erosion due to removal of plant cover*. Soil degradation. Compaction of the floor by the machinery and trampling of the staff. Soil contamination by poor disposal of fluorescent tubes used to illuminate work areas.	- 2**	D	T	R	S	C
	<b>Water</b>	Increased surface runoff and the transport of sediments to surface waterways. Alteration of the hydrological cycle.	-2	D	T	R	G	M
	<b>Air</b>	Dust by movement of earth and particulate matter. Alteration of air quality by the generation of combustion gases of trucks and machinery.	-1	D	T	R	S	C
	<b>Landscape</b>	Landscape disturbance.**	-1	I	P	I	G	C
	<b>Vegetation</b>	Habitat reduction for species due to decreased plant coverage of the site area and carbon capture.	- 1**	D	P	I	G	C
	<b>Fauna</b>	Displacement of fauna due to habitat reduction. Affectation of microfauna (soil).	-2	D	T**	I	S	C
	<b>Health and Safety</b>	<p>Incidents, accidents to operators. Occurrence of Professional Disease</p> <p>-Incident: event that decreases safety, arising from or occurs during the work, when it does not carry personal injury or that only require first aid treatment.</p> <p>-Work accident: event derived from or that occurs during the work and can cause fatal and non-fatal injuries.</p> <p>-Professional disease: illness contracted as a result of risk factors caused by a work activity.</p>	-3	D	T	I	S	C

Activity	Environment	Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
	<b>Employment / Local economy</b>	Job creation. Increased zonal economy by outsourcing services.	+3	D	T	-	S	C

Activity	Environment	Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
<b>Planting</b>	<b>Soil</b>	Decreased erosion effect.	+3	D	P	-	S	M
	<b>Water</b>	It promotes the development of the water cycle through evapotranspiration.	+2	D	P	-	S	M
	<b>Air</b>	Carbon capture by the constant growth of woody species.	+3	D	P	-	G	M
	<b>Landscape</b>	Landscape disturbance.**	-1	I	P	I	G	C
	<b>Vegetation</b>	Displacement of native vegetation by introduction of exotic species.	-2**	D	P	R**	G	C
	<b>Fauna</b>	Immigration of species to a new ecosystem of eucalyptus trees in pure plantations or silvopastoral plantations.	-1	I	P	I	G	M
	<b>Social and Security</b>	Incidents, accidents to operators. Occurrence of Professional Disease -Incident: event that decreases safety, arising from or occurs during the work, when it does not carry personal injury or that only require first aid treatment. -Work accident: event derived from or that occurs during the work and can cause fatal and non-fatal injury. -Professional disease: illness contracted as a result of risk factors caused by a work activity.	-3	D	T	I	S	C
	<b>Employment / Local economy</b>	Job creation. Increased zonal economy by outsourcing services. Appreciation of the land~~	+3 +3	D I	T P	- -	S G	C L

Activity	Environment	Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
<b>Maintenance</b>	<b>Soil</b>	Contamination of the soil by chemical compounds and by the final disposal of the containers.	-2	D	P	I	S	M
	<b>Water</b>	Water contamination by chemical compounds of agrochemicals that by runoff reach the watercourses.	-2***	I	P	I	G	M
	<b>Air</b>	Air pollution by chemical compounds.	-2***	D	P	I	G	C
	<b>Vegetation</b>	Improvement of species of interest by removal of weeds (competitive species) and pests.	+3	D	T	-	S	C
	<b>Social and Security</b>	Incidents, accidents to operators. Occurrence of Professional Disease. Especially from poisoning. -Incident: event that decreases safety, arising from or occurs during the work, when it does not carry personal injury or that only require first aid treatment.	-3	D	T	I	S	C



Activity	Environment	Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
		-Work accident: event derived from or that occurs during the work and can cause fatal and non-fatal injury. -Professional disease: illness contracted as a result of risk factors caused by a work activity.						
	<b>Employment / Local economy</b>	Job creation. Increased zonal economy by outsourcing services.	+3	D	T	-	S	C

Activity	Environment	Environmental Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
<b>Harvesting and Transport</b>	<b>Soil</b>	Damage to enabled roads****. Possible alteration of soil capacity from accidental spillage of hydrocarbons from trucks and machinery. Compaction of the floor by the machinery and trampling of the staff. Contamination of the soil by spillage of oils, fuels during the maintenance and operation of both machinery, vehicles and transformers if any.	-3	D	T	R	G	M
	<b>Air</b>	Dust. Alteration of air quality by the generation of combustion gases of trucks and machinery.	-2	D	T	R	G	C
	<b>Fauna</b>	Danger of hit-and-run wildlife on the road.	-2	D	P	I	S	C
	<b>Social and Security</b>	Incidents, accidents to operators. Occurrence of Professional Disease. Occurrence of road accidents that could cause incidents, accidents to villagers. -Incident: event that decreases safety, arising from or occurs during the work, when it does not carry personal injury or that only require first aid treatment. -Work accident: event derived from or that occurs during the work and can cause fatal and non-fatal injury. -Professional disease: illness contracted as a result of risk factors caused by a work activity.	-3	D	T	I	S	C
	<b>Employment / Local economy</b>	Job creation. Increased zonal economy by outsourcing services.	+3	D	T	-	S	C

Activity	Environment	Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
Industrial Processing Activity - Sawmill	<b>Soil</b>	Contamination of soils by hydrocarbon spills (mineral oils) during the entry of vehicles linked to the productive operation. Visual and sanitary contamination from uncontrolled accumulation of used toilet papers from bathrooms. Contamination by inadequate final disposal of disused fluorescent tubes, depleted batteries, transformers. Visual contamination by uncontrolled accumulation of disposable clothing generated in the production area (Protection equipment for example: mouth cap, etc.).	-3	D	T	R	S	C
	<b>Water</b>	Contamination of surface and/or groundwater sources (infiltration) by uncontrolled discharge of sewage; uncontrolled discharge of wastewater from cleaning the facility; hydrocarbon spills (mineral oils) during the entry of vehicles linked to the production operation.	-3	D	T	R	G	M
	<b>Air</b>	Fire due to uncontrolled accumulation of wood remains (sawdust, etc.) from sawing. Fire by dust explosion (rapid combustion of fine particles suspended in the air). Air pollution by emission of flue gases (CO <sub>2</sub> ; NOX) during the influx of vehicles directly or indirectly linked to the work. Air pollution from unpleasant odors from the uncontrolled accumulation of bathroom waste (contaminated toilet papers). Air pollution by lifting dust by earth movement and particulate matter from wood sawing.	-3	D	T	R	S	M
	<b>Landscape</b>	Disruption of the landscape.	-2	I	P	I	G	C
	<b>Social and Security</b>	Incidents, accidents to operators. Occurrence of Professional Disease. Occurrence of road accidents that could cause incidents or accidents to villagers. Occupational hazards especially from incorrect handling of equipment and materials (use of sharp tools); inhalation of particulate matter produced by wood sawing; incorrect handling in electrical installations, height work, etc. by maintenance personnel; Risk to occupational health and risk of damage to the physical heritage of the company due to the generation of breeding sites of disease-transmitting vectors, by	-3	D	T	I	S	C

		uncontrolled accumulation of solid waste generated in the facility. -Incident: event that decreases safety, arising from or occurs during the work, when it does not carry personal injury or that only require first aid treatment. -Work accident: event derived from or that occurs during the work and can cause fatal and non-fatal injuries. -Professional disease: illness contracted as a result of risk factors caused by a work activity.						
	<b>Employment / Local economy</b>	Direct source of work to officials/ collaborators of the company, contributing to the human and economic development of them. Contribution to the tax office (through the payment of taxes and ratings) and monetary contribution to the local economy. Indirect source of work to companies associated with the operation of sawn wood production: Suppliers of inputs and raw materials; Suppliers of equipment and/or materials; Personal Protective Equipment Providers; Office and cleaning material suppliers; Etc. Indirect source of work to professionals in charge of the maintenance of equipment, machinery and professionals in charge of the different trainings proposed later in the mitigation measures for possible negative environmental impacts. Appreciation of the land~~	+3	D	T	D	S	C
			+3	I	P	-	G	L

#### Identification and Valorization of potential impacts of activities associated with the FSP Project

Activity	Environment	Environmental Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
Livestock	Soil	Compaction of the soil by trampling cattle on the paddocks. ~	-2	D	P	R	G	M
		Contamination of soil by faeces, urine from livestock, household waste and liquid effluents generated by staff.	-3	D	P	R	G	M
	Water	Contamination of watercourses by faeces by runoff or infiltration.	-3	I	P	R	G	M
	Air	Generation of gaseous emissions and odors.	-3	D	P	R	G	M
	Vegetation	Degradation of plant resources due to grazing, trampling and excrement. ~	-3	D	P	R	G	M
	Fauna	Reduction of genetic variety as a result of the selection of species of interest.	-1	I	P	R	G	L
	Social	Occurrence of accidents to operators.	-3	I	T	I	S	C
		Job creation. Increased zonal economy by outsourcing services. Food Safety. Valuation of the terrain~~	+3	D/I	P		G	L

Activity	Environment	Environmental Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
Sanitation & Vaccination	Soil	Soil contamination from poor disposal of syringes and empty packaging of medicines.	-2	D	P	R	S	M
	Fauna	Improving the quality of life of the animal. ~~~	+3	D	T	-	S	C
	Social	Job creation. Generation of sources of work in the elaboration of materials. Increased zonal economy by outsourcing services.	+3	D	T		S	C

Activity	Environment	Environmental Impact	+/-	D/I	T/P	R/I	S/G	C/M/L
Constructions: Wires, Water, Plumbing, Infrastructure.	Soil	Soil compaction.	-1	D	P	R	S	L
	Water	Alteration of the water balance of the water cycle by having wells, slashes to store and direct water.	-1	D	T	R	G	M
	Air	Alteration of air quality by generating dusts and noises.	-1	D	T	R	S	C
	Vegetation	Increased fire hazard by having more fuel in the form of vegetation under the wires.	-2	D	P	-	S	M
	Fauna	Immigration of aquaculture species in the tajamares.	+2	I	T	-	S	M
	Social	Positive impact on the quality of life and well-being of staff by the availability of water for consumption and recreation. Recruitment of temporary labor service.	+3 +3	D D	P T	-	S S	M C

\* Changing land use produces significant impacts because it causes soils to experience high temperatures, accelerating chemical soil degradation, and adding the effects of increased precipitation impact intensity, resulting in more severe erosion.

\*\* The land use where FMUs are and where future FMUs will be is agricultural use. It is considered a low/medium impact as use changes from pasture / agricultural use to pure or silvopastoral forestry.

\*\*\* The use of agrochemicals in forestry projects is minimal and timely.

\*\*\*\* Roads in case they are not adequately plotted can become true channels when carcavas of considerable size occur in times of abundant precipitation. There is also a deterioration in existing public roads, due to heavy loads with logs.

~ Overgrazing is widespread in livestock lands and poses a worrying threat to wildlife habitat and can lead to conflict over foreign competition. Excessive animal load accelerates erosion (FAO, 1993).

~~ As regards land appreciation, farms with agricultural and forestry development will have greater value. There will also be the possibility that public services such as electricity, drinking water, new roads and maintenance of existing neighborhood roads may be accessible within a certain period of time.

~~~ The health of the animal is important so as not to spread diseases and improve livestock herd.

## Environmental and Socioeconomic Impact and Risk Management Plan

Environmental and Social Management is the set of actions and mechanisms aimed at achieving, on the one hand, maximum rationality in the decision-making process related to the conservation, defense, protection and improvement of the environment, and on the other hand promotes social inclusion and the effective linkage of the community in social projects from an interdisciplinary and global approach.

An instrument of Environmental and Social Management is the Environmental and Social Management Plan (ESMP) which are programs to accompany the evolution of the negative impacts caused by operations. Therefore, the Environmental and Social Management Plan should contain Prevention, Mitigation and Monitoring Program.

In the previous chapter, the impacts of project activities are rated, this chapter details the mitigation and risk monitoring programmes associated with the impact.

| ESMP – Forestal San Pedro                      |                                                                                  |
|------------------------------------------------|----------------------------------------------------------------------------------|
| Socio-Economic Impact and Risk Management Plan | Risk 1: No observation of minimum labor benefits (salary, social security, etc.) |
|                                                | Risk 2: Risk of Incidents, Accidents. Health and Safety                          |
|                                                | Risk 3: Risk of road accidents                                                   |
|                                                | Risk 4: Reputational risks                                                       |
| Fire Impact and Risk Management Plan           | Risk 5: Fires                                                                    |
| Environmental Impact and Risk Management Plan  | Risk 6: Erosion, Soil Compaction                                                 |
|                                                | Risk 7: Water pollution and water balance disruption                             |
|                                                | Risk 8: Pollution of soil, water and air from hazardous waste                    |
|                                                | Risk 9: Pollution of soil, water and air from common waste                       |
|                                                | Risk 10: Affecting native flora and fauna                                        |

With respect to the Impact and Risk Management Plan of Associated Activities, livestock are considered within the FMUs with silvopastoral plantations as an activity associated with potential risks of soil, water and air contamination because of a lack of management of its excreta, effluents, gaseous emissions and tree browsing. For this reason, good practices are enlisted:

| ESMP – Forestal San Pedro                           |                                                  |
|-----------------------------------------------------|--------------------------------------------------|
| Associated Activity Impact and Risk Management Plan |                                                  |
| Livestock                                           | Management of excreta and effluents of livestock |
|                                                     | Handling gaseous emissions                       |
|                                                     | Handling beef ramoneo                            |

## Socio-Economic Impact and Risk Management Plan

The mitigation hierarchy principle describes the sequence in which different types of management actions are applied, starting with actions to avoid impacts and ending offsets if applicable. The integration of socio-economic objectives as a fundamental part of the project is part of the social and human commitment. Where the objectives are:

- Provision of local jobs.
- Transparent communication and commitment.



-Implementation of joint activities.

These goals seek to improve community opportunities. Integrate workers from surrounding and local communities while maintaining a transparent flow of communication so that they can detect potential impacts and mitigate them. Joint activities are also sought to provide economic opportunities for smallholders for both land use and the supply of basic needs.

The previous chapter rates the socio-economic impacts of the activities of the high-impact project, which is why mitigation and risk monitoring programmes associated with social impact are enlisted.

Risk 1: No observation of minimum labor benefits (salary, social security, etc.)

## 1. Mitigation Measures

### **-Establish criteria for hiring corporate staff and collaborators in general**

The work teams are integrated taking into account selection processes, remuneration and functions established by the board. It promotes integrating workers from surrounding and local communities without discriminating on the grounds of nationality, religion, disability, gender, sexual orientation, age, political opinion, union membership or a political party.

### **-According to the organization chart and workflow establish the minimum positions and number of staff to meet the objectives**

Minimally, it should have been commissioned to provide information on everything necessary to address the use of agrochemicals; Advisory and Training Managers; responsible for the proper purchase of clothing, supplies; social leaders; Responsible for advising, disseminating and supervising in the safe use of machines; Forestry technicians, responsible for enforcing the forestry procedure; machine contractors, responsible for keeping the machines to be used in forestry production in good condition; Employees are responsible for their specific roles and also have the responsibility to perform visual monitoring to collaborate with the responsibilities of the staff with functions mentioned above.

### **1.1. Monitoring Plan**

#### **-Supervision of contractor labor practices and conditions of subcontracted personnel**

Include social requirements and staff management in contracts with service providers. Assistance to contractors to determine the most appropriate modality of work, in accordance with Paraguayan legislation that allows social prevention coverage for seasonal and intermittent work. In the case of inexperienced contractors, require them to hire an accountant appointed to keep their books in order and ensure compliance with all formalities before the Ministry of Labour. Check the conditions provided by the contractor to staff, including housing, health and safety conditions and the application of interviews and complaint mailboxes to subcontracted staff to assess job satisfaction. Develop a task force responsible for monitoring work practices to record the following data:

Minimum legal salary in force (minimum wage).

Secured in IPS.

Permanent and temporary subcontracted staff must be mostly surrounding communities.

Staff must be of legal age (over 18 years old).

The number of outsourced personnel participating in training on FSC, Health and Safety, Agrochemical Management, Social Security and Fire Prevention is increased by a percentage set according to the need each year.

## Risk 2: Risk of Incidents, Accidents. Health and Safety

### 2. Mitigation Measures

**-Training and Capacity building:** Includes a Training Plan: emergency training and simulations, ongoing on-the-job training for specific hazardous tasks. Annually, emergency trainings and drills are pre-established, identifying the risks. It is also recommended to hire personnel in the area of occupational safety who are also suitable in health, i.e. for instance hire nurses who are also occupational safety technicians. Preparation of an operating and handling manual.

**-Use, proper storage and application of agrochemicals:** Fertilization and control of ants require staff to have the application suit (pants, shirt and cap), activated carbon filters (pair) 3M, masks 6200 3M for organic vapors, prefilters for masks and 3M retainer, pvc resistant long gloves, mat for mixing (for which it prepares), rubber boots, anti-wearers/protective lenses. Staff conduct timely monitoring in infestation areas. After the application the staff must have shower and area with eye wash for emergency. The acquisition of agrochemicals must be of quality products, with the correct labelling, that have all the conditions of use according to the criteria of the National Plant and Seed Quality and Health Service (SENAVE), which is the entity that establishes all the parameters for use, purchase and storage.

**-Supply of first aid kits:** The minimum supplies needed are established and a recharge should be carried out periodically. It is considered that the medicine cabinet must have sufficient supplies to be able to assist several workers at once and that the items of each medicine cabinet must be adapted to the risks of the tasks that are performed (Example: if the kit is for the field it must have anti-phidic serum, if the kit is for office this is not necessary).

**-Placement of signage:** Installation of warning signs in hazardous places and placement of emergency exit (refractory) billboards at strategic points and contingency measures with the creation of an emergency brigade in the sawing industry. It establishes the places of danger upon entry of workers. As new knowledge emerges, the signals must be adapted and renewed. Decree No. 14390/92 sets some standards of colors and minimum sizes.

**-Provision of food and accommodation in the FMUs that require it and/or in industry:** The FMU and/or industry that have hosted personnel must have the minimum provisions established in Decree No. 14390/92 regarding minimum air space and volume that each staff must have in their home. Food should be prepared in healthy, nutritious conditions according to the cultural customs of the area. Workers with medical situations such as diabetes, cholesterol, etc. should be provided with foods according to their diet. Assign areas to eat and rest.

**-Provision of PPE:** according to each type of activity, provision of the respective personal protective equipment. Individual protective equipment must be available for forestry activities. All activities require reinforced toe shoe and leather leggings.

For pruning, thinning and harvesting are necessary gloves for chainsaws, pruning yarn gloves, anti-siders/protective lenses, anti-tank trousers (for chainsaw), 3M H 700 orange common helmet with harness, helmet with ear cover and face protector.

Visitors should use protective equipment to visit the facility due to the risk posed by entry into forest plots of professional visitors, auditors or anyone outside of protection activities. The

teams are; helmet 3M H 700 orange with pinlock harness, yellow or orange reflective vests, leather legs and cloth hats.

For fire prevention the necessary protective equipment is 3M H 700 yellow helmet with pinlock harness, anti-siders/protective lenses, leather gloves, half-cane leather boots (Personal), mouth-cloth cap, facial protector, cotton shirt (yellow), cotton trousers (green).

**-Annual staff check and Accident Registration:** Annual medical check to check the health status of employees, with special attention to those trained for the heaviest physical activities. Accident log including date, rest days, cause of accident and severity for continuous improvement.

### 2.1. Monitoring Plan

**-Training and Capacity building:** Keep records of those involved, the date and content of each training. Compare attendance percentages annually to increase participant numbers.

**-Use, storage and proper application of agrochemicals:** Maintain records of use and storage of equipment and agrochemicals. Visual control of the shower area and washing of agrochemical clothing. Keep regular records of good working condition of showers and eye washes.

**-Supply of first aid kits:** Periodic control of supplies:

Mobile kits must be present with each workgroup in the field. Each forest contractor must have a main kit. All kits must have the list of medicines on the field form.

**-Signal placement:** Daily display on workers' routes.

**-Provision of food and accommodation in the FMUs that requires it:** Bimonthly monitoring of staff job satisfaction.

**-Provision of PPE:** Monitoring the use and status of PPE periodically, is recommended bimonthly. PPE Status and Usage Assessment Form. For occasions where protective equipment is missing or damaged in the workplace, they will need to be returned to the contractor and request replacement. Monitor claims and requests constantly. Given the current health situation by Covid-19, working staff must have protection from masks/caps, handwashing sites and have alcohol available for disinfection.

Records that are used for PPE control.

Records of PPE delivery to the contractor.

PPE delivery record to contractor staff.

PPET stock monitoring record.

Registry of evaluation of the use and status of PPE.

**-Annual staff check and accident log:** Periodic visual monitoring of worker safety. Annual monitoring of the medical report. Reading accident logs to identify hazards and develop continuous improvements.

### Risk 3: Risk of road accidents

#### 3. Mitigation Measures

**-Road education and signage placement where necessary:** Signs of speeding along the internal roads. Annual road education training.

**-Requirement of adequate clothing in the means of transport:** While the use of closed helmets and shoes is part of road education training, the timely requirement for the use of helmets and closed shoes in motorcyclists is noted as an independent mitigation plan.

### 3.1. Monitoring Plan

**-Road education and signage placement where necessary:** Visual monitoring of signage by workers who walk the roads where they are located. Road education training records.

**-Requirement of adequate clothing in the means of transport:** Monitoring the use of helmet and shoes closed to motorcyclists.

## Risk 4: Reputational risks

### 4. Mitigation Measures

**Interdisciplinary integration for holistic decision-making:** Keep records of multidisciplinary actors involved in management decisions.

**FSC Certification:** Be FSC certified. Disseminate with stakeholders about the FSC management system to communicate the best practices implemented.

**A grievance mechanism will be in place:** The project ensures the existence of different ways in which workers can express their concerns, needs and conformities. Some of the channels are anonymous and some are more direct. In addition, there is a suggestion system where workers and locals can make their claims in a way that they feel comfortable and there is a social manager responsible for ensuring that such complaints are heard, and problems resolved. Communication with contractor staff and communities is oral, and only when a responsible person is present. Therefore, the project assigns a responsible person for this job. Any verbal communication must be recorded in writing. The elapsed time to give a response must be recorded.

**Identification of stakeholders:** Locate communities adjacent to FMUs, identifying farm owners and community leaders.

**Development of Socio-Economic Projects with Communities:** The people with whom direct communication will be made to develop the projects are identified. All possible opportunities in which the project can be involved with the community are considered, especially if it is within a synergy, such as the *OUTGROWER project*. Community leaders are identified in order to organize meetings to convey to the community information about the project, some change that will happen within areas of interest and learn whether or not the community agrees with what is planned within the project. In these meetings also the scope of the project to help the community is discussed, the benefits that can be given as part of its social responsibility are communicated, for this it must be preset what aid the project can and cannot give, and what are the possibilities of alliances with other governmental or non-governmental entities.

**Dissemination of aid to communities:** Establish a mechanism for the dissemination of donations, assistance and projects that benefit communities. This achieves effective communication with all stakeholders.

### 4.1. Monitoring Plan

**Interdisciplinary integration for decision-making in a holistic way:** Monitor the recruitment of multidisciplinary professionals.

**FSC Certification:** Visualization of FSC certificate publication in different media. Records of talks with stakeholders on the importance of an FSC certificate.

**A complaint mechanism will be in place:** Control of written complaints and control of verbally filed and annotated complaints. Control of response time or solution to each complaint for continuous improvement. Controlling stakeholder satisfaction with the given response.

**Stakeholder Identification:** Verify stakeholder location maps and community data. Verify personal data forms of stakeholder leaders or owners.

**Development of Socio-Economic Projects with Communities:** Control of forms on the needs of stakeholders. Control of responses to needs, be they communications, physical elements, assistance, etc. Monitoring delivery and ordering of donations.

**Dissemination of aid to communities:** Registrations of communication measures.

### Fire Impact and Risk Management Plan

Forest fire is any burning of living or dead vegetation, outside the urban environment, its scope encompasses all scheduled or unscheduled fires in natural forests, planted forests, protected natural areas, meadows, grasslands, scrub, shrubs and other types of vegetation, including fires in peatlands, marshes, swamps and swamps. It also includes surface or canopy fires in agricultural vegetation of any kind, when fire has not been programmed and executed as part of an accepted agricultural technique. A fire in this context also includes a fire that, from a natural area or another area, affects a rural or urban environment or a cultural or historical area, affecting existing buildings (FAO 2005).

#### Risk 5: Fires

##### 5. Mitigation Measure

**-Training to human resources:** They must be well trained and organized considering local conditions, the means of extinction available. Such training should be theoretical and practical with an emphasis on safety on the fire front, correct forms of communication in front of fire, proper use of tools during combat, and proper maintenance of post-combat tools. Such recommendations should be continuous and permanent. It should be emphasized that the main methodology of fire combat is to eliminate fuel, for this it is necessary to have well-sharp tools, users with basic training and in good physical shape with protective equipment to safeguard the safety of personnel. According to the available human resources, work teams must be organized, assigning a crew leader and two teams so that they can rotate the crews. During training, preventive actions such as non-smoking at work and no fire should be taught, as well as stress the importance of maintaining the signal that recalls these prohibitive and preventive actions.

**-Development of action plans in case of fire:** Have access roads for fire vehicles and transport of supplies. Have clearly marked water access points, moisturizing agents, dry chemical powder extinguishers. Have firewalls for lines of defense during fire burning. These checks should be done regularly, so a professional should be required to assess the periodicity of such control.

**-Quantification of losses:** Develop location forms, amount of affected area, type of affected vegetation (pasture, forest, etc.), losses and pastures.

**-Identify high-risk areas:** Identify high-risk areas in each FMU such as forest plantation areas, grasslands, areas exposed to north wind, areas adjacent to communities that use fire as a practice for pasture regeneration. Identify areas of high occurrence such as entry to the rooms to place signals about the state of fire hazard considering temperature, fire seasons, drought, and amount of fuel.



Increase travel frequency and other forms of detection in critical areas where more fires are carried out in times of greatest risk. In the industries it is necessary to have a fire plane where the quantity and location of firefighting equipment are established according to the location of the raw materials, the location of the machinery and the location of the personnel since there must be easy access to fire extinguishers, fire hydrants, etc. It is important to emphasize the importance of having dry chemical powder extinguishers at distances of 5 meters from transformers.

**-Elimination of fuel load:** Eliminate fuel load in areas identified as high risk according to preset criteria, areas to be cleaned are evaluated according to priority. Plan of prescribed burns with accompaniment of suitable professionals. In sawmill industries, there is a risk of fire from dust explosion (rapid combustion of fine particles suspended in the air). The establishment must be kept open and aerated, and extinguishers placed according to fire plane prepared in conjunction with the suitable manager.

**-Obtaining and maintaining resources and infrastructures:** To prevent fires, resources and infrastructure are required, among which they can be cited as basic; vehicles, water supply, water access points, water storage tanks with hoses, fuel-removing tools (whisk, machetes, forest shovel, McLeod Rake, Pulaski axe, squid, shovels, rakes, hoees, backpack extinguisher), fire hydrants, water pumps, dry chemical dust extinguishers. The amount of water tanks available must be adjusted according to the surface to be supplied, the length of the hose, taking into account the volume of the tank. Each property has a list of fire extinguishers with validity and site location data.

### 5.1. Monitoring Plan

**-Training to human resources:** Records of dates, content and delivery of equipment during trainings. Monitoring the percentage of attendances to increase annually. Evaluation of practices against real combat data. Control of crew records assigned by FMU.

**-Development of fire action plans:** Visual control of access roads, water access points, wetting agents, dry chemical dust extinguishers, and firewalls for defense lines during fire burning in each FMU.

**-Quantification of losses:** control of forms containing location, amount of surface affected, type of vegetation affected and loss or decesses.

**-Identify high-risk areas:** Control of the written document where it makes it clear which areas are identified according to each FMU. Signal control.

**-Fuel load removal:** Visually everyone should look at the high-risk areas during all stages of operation.

**-Obtaining and maintaining resources and infrastructures:** Control of the registration of quantity, quality and maintenance date of equipment and infrastructure. Control of documents that guarantee the purchase and replacement of them. Control of records with the expiration dates of the extinguishers.

## Environmental Impact and Risk Management Plan

### Risk 6: Erosion, Soil Compaction

#### 6. Mitigation Measure

**-Identification of roads in bad condition:** When detecting any problems related to the state of roads and associated drainage, immediate repair should be performed. Implemented drainage maintenance and correction measures must be recorded on schedules.

**-Restrict the movement of heavy machinery:** Provide for the movement of heavy machinery on the tracks and indicate to the driver the planned itinerary.

#### 6.1. Monitoring Plan

**-Identifying roads in bad condition:** Monitoring involves visually checking the status of roads after corrections according to schedules.

**-Restrict the displacement of heavy machinery:** Random routes of 5% of the pull tracks planned to visualize footprints and record episodes of compaction observed outside the pull tracks or very deep footprints.

#### Risk 7: Water pollution and water balance disruption

#### 7. Mitigation Measure

**-Arrangement of sewage effluents in blind wells. Conduction of cleaning water to the register that directs the water to the blind well.** Wastewater contains different pollutants that, if not treated, can affect our health and the quality of the environment in which we live. These pollutants include: pathogenic microorganisms; organic matter that consumes oxygen from water when degraded and produces odors; nutrients that promote eutrophication; other contaminants such as oils, acids, paints, solvents, poisons, etc. In areas without sewer service, wastewater is dumped into absorbent wells, also known as blind or black wells. It is a closed chamber that serves to facilitate the decomposition and separation of organic matter contained in the waters using the work of bacteria existing in the same waters. As a result of this process, organic matter is transformed into gases, liquid and mud, which is deposited at the bottom of the tank. The Grease Box aims to intercept the fats and soaps present in the water to prevent the infiltration field from becoming waterproof and does not fulfil its function of absorbing the liquid from the septic well. The Distribution Box has the function of collecting the liquid from the septic well and facilitating its uniform distribution, also allowing to inspect the pipes in case of malfunction or during periodic system reviews. The use of biodegradable cleaning products is recommended.

**-Water quality analysis:** The water sampling can be monthly and annual to be planned as needed to ensure that drinking water is drinkable. In situ water temperature parameters, pH, electrical conductivity, turbidity and dissolved oxygen are analyzed and in the laboratory minimally bacteriological analysis: total and faecal coliforms. In the event that there is a water course in the FMUs near the places of application of agrochemicals and/or in the event that the Ministry of Environment and Sustainable Development requires in the environmental licence the water analysis to detect agrochemicals glyphosate analysis should be carried out and if there is methodology, Fipronil will also be carried out. The laboratory where the tests are performed must have all relevant permissions.

**-Register of wells with the Ministry of Environment and Sustainable Development (MADES):** There is an intrinsic relationship between water and land use. Decisions on water use elsewhere in the watershed may present opportunities and limitations for users elsewhere. For this reason, integrated watershed-level planning should be in place to ensure that water is not over-committed. Through a watershed water balance, upstream users are sought not to deprive downstream and for growth and development within each basin to be maintaining a balance of their water resources. A watershed is an area of land that drains water at a common point, such as a stream, stream, river, or nearby lake. Law No. 3239/07 of the Water Resources of Paraguay aims to regulate the sustainable and integral management of all the waters and territories that produce it, whatever their location, physical

condition or their natural occurrence within the Paraguayan territory, in order to make it socially, economically and environmentally sustainable for the people who inhabit the territory of the Republic of Paraguay. By Resolution No. 2194/07, SEAM decides in Article 1 to Establish the National Register of Water Resources (HR) in accordance with the provisions of Law No. 3239/07 "Of the Water Resources of Paraguay". The objective of the registration is to create the first National Water Harvesting Inventory. The information generated here will be very useful in planning the efficient use of the Water Resource of all the basins that make up the national territory. Knowing the availability of water that each property has is essential so that the producer can plan and manage their production system efficiently.

For this reason, if drilling of wells is necessary, it must be done by companies that are environmentally licensed and who are aware of current legislation of studies necessary for the registration of such wells. The registration of the wells must be carried out by the owner with each renewal of his environmental license.

**-Identification and protection of waterways and nascent:** Using geographic information systems and routes in the field, the absence of permanent, intermittent and nascent waterways is verified. According to the width of the channel and the location of risings, MADES approves a water protection zone, establishing the forested area to be maintained as protection of the water resource. Once the channels, nascent and protection areas have been established, the status of the channels should be checked by means of tours with forms, GPS and photographic camera to evaluate obstructions, color, visible turbidity, works, logging, etc.

### 7.1. Monitoring Plan

**-Arrangement of sewage effluents in blind wells. Conduction of cleaning water to the register that directs water to the blind well:** Monitoring and recording of construction plans of the blind well. Visual monitoring of water conduction to the registry. Periodic system reviews leading to blind well and visual control of blind well load level.

- **Water quality analysis:** Reading the results of laboratory water analysis. In the event that contamination of drinking water wells with results outside acceptable parameters for health, measures such as cleaning, closing, relocation of the well and revisiting mitigation plans for greater control of the use of chemicals should be taken immediately.

**-Register of wells with the Ministry of Environment and Sustainable Development:** Request the owners the records of the wells submitted to the Environmental System (SIAM) of the MADES and verify correspond to the wells of the FMU.

**-Identification and protection of waterways and rising:** For new FMUs, nascent maps and maps of water protection zones are controlled. Once the maps are generated, the results of the routes to the field are controlled. In case of results of non-compliance, the corrective measures to be taken are analysed on a case-by-case basis.

#### Risk 8: Pollution of soil, water and air from hazardous waste

This category covers packaging of the chemicals used, be they these herbicides, insecticides, fungicides, etc., mercury-containing fluorescent tubes and vehicle fuels and oils.

## 8. Mitigation Measure

**-Formulations should be carried out with good practice:** The mixing of formulations should be carried out with the necessary care to avoid contaminating the soil and nearby watercourses, using the necessary instruments, for exclusive use for this purpose.

**-Contracting companies that adopt the principle of extended producer responsibility for the purchase of agrochemicals:** The principle of extended producer responsibility (which operates in the country with certain producers) implies that producers, importers or distributors must be responsible for the products they place on the market until the end of their useful life. For this reason, acquisition of agrochemicals whose packaging may be taken to a collection centre where producers, importers or distributors remove empty packaging and take them to their empty packaging recycling plant.

**-Washing and drilling empty agrochemical containers:** The containers of agrochemicals once empty must be rinsed three times and then drilled so that they cannot be used again. The contents of the rinse are poured into the spray tank. Empty, washed and perforated containers should be taken to a collection site that minimally has waterproof, indoor and ventilated floors.

**-Collection and removal for final disposal of fluorescents:** It consists of the collection of fluorescent tubes in a collection area for the removal of the same and adequate final disposal.

**-Agrochemical Deposits following recommendations from SENAVE:** In FMUs that have agrochemical tanks or containers, they must have waterproof flooring, drainage pathways, ventilation, spill pits, cleaning equipment, septic chamber, extinguishers, sand buckets, emergency showers, changing room with operator showers, eyewash, first aid kit, antidotes and use thereof is exclusive for agrochemicals, which must be ordered with manuals detailing their information and schedule with a date of expiration. FMUs that do not have their own tanks will have suitable containers for the storage of agrochemicals, with the basic conditions required, waterproof soil, PPE, cleaning equipment, buckets of sand for spill containment, container containers in case of spillage. These sites must have dry chemical dust extinguishers.

**-Check oil and fuel storage:** Fuel tanks and oils must be ordered and located on a support system with waterproof floor, ceiling and in appropriate locations. If you choose to place your own Consumption Post, the tank must necessarily have a concrete or cement containment system. Plastic containers and sawd iron for absorption should be available on site in case of spillage.

**-Certify the non-content of PCBs in transformers:** Existing transformers and transformers to be purchased in the FMUs must necessarily have PCB Free Certificates issued by Paraguayan laboratories that are authorized by MADES. By RESOLUTION MADES No. 1190/08, each owner must submit a register of transformers attaching the PCB-free certificate, for this reason the Project must have the certificate and documents showing that the maintenance of the transformers was carried out by companies that are environmentally licensed.

**-Maintenance of machinery and trucks:** Although this activity is carried out by contractors, the maintenance of the machinery must be verified by means of a register.

**-Alliance with National University of Asunción (UNA) for the continuous research of alternatives for agrochemical uses:** Continue strategic alliance with UNA to look for alternatives to the use of agrochemicals typical of reforestation, specifically for the control of ants.

### 8.1. Monitoring Plan

**-Formulations should be carried out with good practice:** Every two months the implementation tasks and product mixes are checked. Then proceed to the correction of faults and then record on the forms.

**-Recruitment of companies that adopt the principle of extended producer responsibility for the purchase of agrochemicals:** Check withdrawal records of empty packaging from collection sites.

**-Washing and drilling of empty containers:** Every three months it should be checked with a form and the empty containers checked at the collection sites. In case of displaying empty containers not perforated or unwashed should be communicated to the person responsible for the tank and reinforce communication with personnel in charge for compliance.

**-Recruitment of companies for final disposal of fluorescents:** Check the records showing who was in charge of the final disposal of fluorescent tubes.

**- Agrochemical Deposits following recommendations from SENA:** In FMUs that have agrochemical tanks or containers, they must have waterproof flooring, drainage routes, ventilation, pits in case of spillage, cleaning equipment, Septic chamber, extinguishers, sand buckets, emergency showers, changing room with operator showers, eyewasher, first aid kit, antidotes and use of it is exclusive for agrochemicals, they must be ordered, labeled, elevated with respect to the level of the floor, in cool places and must have manuals detailing the information of protocols for the different situations that may happen. Preparation of records: PPE Delivery, PPE Evaluation, Work Order for agrochemical application, Stock Form, Agrochemical Entry Control. FMUs that do not have their own tanks will have suitable containers for the storage of agrochemicals, with the basic conditions required, waterproof soil, PPE, cleaning equipment, buckets of sand for spill containment, container containers in case of spillage. These sites must have dry chemical dust extinguishers.

**-Check oil and fuel storage:** Monitoring every 3 months with forms. In case of displaying non-compliance, the infrastructure should be improved.

**-Certify non-PCB content in transformers:** Annual monitoring of the validity of the PCB Free certificate.

**-Machinery maintenance:** Monitoring every 3 months of daily maintenance records of machinery and trucks. In case of non-compliance, there should be a discussion with contractor responsible and the environmental and safety importance of this activity emphasized.

**-Alliance with UNA for the continuous research of alternatives for agrochemical uses:** Annual review of new research to look for alternatives for ant control.

#### Risk 9: Pollution of soil, water and air from common waste

Comprehensive solid waste management must be from generation to final disposal. It aims to prevent health risks and deteriorate environmental quality. Comprehensive solid waste management, as an approach, seeks to transform today's waste disposal culture into one that avoids waste through sustainable production and consumption practices. Thus, the first purpose of comprehensive management is to avoid generation, if it is not possible to avoid, minimization should be sought using the concept of 3R (reduce, reuse, recycle), if this minimization is not possible, then treatment should be considered and only when treatment is not feasible, one should just think about the final provision.

This risk also refers to wood scraps (sawdough, etc.) from sawing as part of the industrial process.



## 9. Mitigation Measures

**-Good practices:** In any farm some type of stored raw material is available. It is good practice to review these stored products for storage conditions and how long they can remain stored. This prevents the generation of waste by expiry of the products. The practice is to review the warehouses of the holding, mainly checking the expiry of raw materials and their storage conditions; Fill in a form indicating the name of the raw material and the information collected from it (expiration date and storage conditions). Analyze the information obtained, in order to detect possible products about to expire or poorly stored. Reorganizing warehouses, the products that have been in stock longer will be rotated to be the first to be consumed, thereby reducing the possibility of generating waste by expiration. Store in better condition (cold, non-humidity, etc.) those products that have been detected that were not in proper storage condition.

It is recommended to purchase materials that can be reused, refurbished or recycled. It is recommended to assign an area of the establishment for the temporary collection of inorganic materials for further segregation. Those materials that can be reused will be sanitized and reinstated to the inputs. For example, plastic food containers can be reused for storage of other products, etc. Once the possibility of reusing the waste has been ruled out, it is recommended to separate the recyclable materials and coordinate with the Municipality for proper treatment. Other solid waste must be disposed of in accordance with the laws in force in coordination with the Ordinances of the Municipality of the district.

Most of the raw materials purchased for the facilities arrive with different packaging, be they paper, cardboard, plastic, etc. A good practice is to minimize this waste generation. Some applicable ideas are to consume the products in larger packaging, thereby reducing the number of packages generated. Even some products can be supplied in returnable tanks to further reduce waste generation. Make agreements with suppliers so that distributed products have fewer packaging. Purchase of bulk products whenever possible.

It is recommended that organic waste generated from the preparation of food and the cleaning of green areas be managed in composters or in a health pit on the premises of the establishment.

Law No. 3.956/09 - INTEGRAL MANAGEMENT OF SOLID RESIDUES IN THE REPUBLIC OF PARAGUAY.

Article 29.- Landfills. "Waste that cannot be recycled and processed through available technologies shall be used for a permanent final disposal system, through Landfills".

Article 33.- Prohibition. "The burning or incineration and disposal of solid waste in open pits, in watercourses, in lakes or lagoons or in places of final disposal other than landfills is prohibited. The participation of minors in any stage of management is also prohibited."

**-Distribution of trash cans:** All FMUs have trash cans located in strategic areas, in good condition. They should be dry, uninsured, should not say goodbye to bad odors, and around it should be clean.

**-Final disposal in sanitary pit/central landfills:** All FMUs have central landfills and deposition wells or health pits, which are carried out in isolated camps in the central areas. These must be dry, with sufficient waterproofing, the area around it must be clean, it should be signposted and properly closed. In the case of central landfills, waste is compacted.

**-Final disposal of wood remains of the industry:** Periodic removal of wood remains from industrial development.

### 9.1. Monitoring Plan

- Distribution of trash cans:** Every 3 months garbage bins must be checked with control forms.
- Final disposal in sanitary grave/central landfills:** Every 3 months the pits and landfills of each FMU should be visited and verified.
- Final disposal of wood remains of the industry:** Every 3 months it must be traveled with visual control forms of the removal of the wood remains.

Risk 10: Affecting native flora and fauna

## 10. Mitigation measure

- Awareness and signalling of prohibition of illegal activities:** To prevent illegal logging and hunting, the company adopts a ban on staff from performing such activities. The carrying of weapons should be monitored and visually monitored for the existence of evidence of hunting and logging in the homes of the personal. Communication and recording of incidents of suspicious activity.
- Analysis of satellite images to visualize change of use of native forests:** Annually we proceed to the interpretation of satellite images to check for changes in the use of native forests. The prohibition of the change of use of the native forest in the eastern region is recalled.
- MADES Environmental License Requirement:** The property must necessarily have an Environmental Impact Statement approving an Environmental Management and Resolution Plan, that is approved by Audit of the Environmental Management Plan every 2 years.
- Identification of Areas of High Conservation Value (HCV):** Studies are carried out with flora and fauna experts to identify fragile ecosystems before starting activities in each FMU. If HCV ecosystems are verified, updates to the flora and fauna inventory should be made to verify the status of the ecosystem.
- Establish location and percentage of seed plantings and eucalyptus clones:** Forest plantations must have topographical studies to know the contours and topography of the area to establish the location of the stands, the planting lines must be parallel to the contours. Forest plantations must have preset the percentage of the same clone that can be planted, integrating sexually produced plantings into a also preset percentage. In case of any disease in the plantations, it should be recorded which species are affected. Plantings must be acquired from companies with track record.

### 10.1. Monitoring Plan

- Awareness and signalling of prohibition of illegal activities:** Every 6 months staff homes are entered to verify whether or not there is evidence of illegal hunting and logging activities. Control with forms logging events. Warning to the staff and contractor responsible in case of non-compliance. For recidivisms evaluate suspension or dismissals.
- Analysis of satellite images to visualize change of use of native forests:** Monitoring the change of use according to maps presented by the controller in Geographic Information Systems.
- MadeS environmental licensing requirement:** Registration of the dates of granting and expiration of environmental licenses and subsequent decisions of the MADES.

**-Identification of High Conservation Value Areas (HCVs):** Records of baseline studies, records of flora and fauna inventories before starting forest plantations. If HCV is verified, transects should be defined to traverse and record species found every 3 years and analyze management implications.

**-Establish percentage of seed plants and eucalyptus clones:** Monitoring strict compliance with the planning of the stands according to the topography of the area. Records of the number of clones and seed plantings planted per stand in the FMU. Disease records.

### Associated Activity Impact and Risk Management Plan

Livestock within forestry plantations generate impacts and their management is the responsibility of each owner, who although it is outside the FSP project, it is important to know the good management practices since these could also adversely affect the production of wood.

#### Management of excreta and effluents of livestock

Cattle faeces often destroy vegetation by obstruction and shade. On the other hand, urine from livestock can cause plant mortality during periods of drought due to salt concentration. The rotary system of paddocks is recommended to take advantage of the fertilization of the pasture avoiding overgrazing. The forage close to the faeces can remain for a long time without being shepherded, mostly by the smell, allowing natural fertilization since the dejections return to the soil Nitrogen, Phosphorus, Calcium, Magnesium, Potassium and Sulfur.

#### Handling gaseous emissions

According to FAO (2013), improving the nutritional value of low-quality fodder in ruminant diets can have a great benefit in herd productivity, while maintaining it with constant or lower CH<sub>4</sub> production. Chemical treatments of low-quality feed, strategic supplementation in diet, ration balance and crop selection for better quality hay are effective mitigation strategies.

In cases where ruminants feed on grasslands, emissions of CH<sub>4</sub> from their droppings are very low and losses of N<sub>2</sub>O through urine can be significant. Restrictive grazing, at a time when conditions for the formation of N<sub>2</sub>O are more favourable, is a way to more evenly distribute urine in the soil and optimize the application of fertilizers and is therefore a possible option for the decrease of N<sub>2</sub>O produced by grazing ruminants.

Reducing the concentration of nitrogen in manure, preventing the formation of anaerobic conditions and reducing the entry of degradable carbon into manure are effective strategies for reducing GHGs from soil manure.

Increasing animal productivity can be a very effective strategy for reducing GHG emissions per unit of animal product. For example, improving the genetic potential of animals through planned crossings or in-race selection and achieving this genetic potential through adequate nutrition and improvements in reproductive efficiency, animal health and reproductive life are effective approaches to improving animal productivity and reducing the intensity of GHG emissions. Food efficiency-based selection will produce animals with a lower GHG emission intensity. The difference between breeds in relation to food efficiency should also be considered as a mitigation option, although in this the present the data available in this regard are insufficient. Reducing the age for slaughter of cattle and the number of days animals feed on fattening pens through improvements in feed and genetics can have a significant impact on GHG emissions from meat production systems from cattle or other animals.

Improving animal health and reducing mortality and morbidity are expected to increase herd productivity and decrease the intensity of GHG emissions in all livestock production systems. The

application of a set of technologies for the management of reproduction, under intensive and extensive conditions, offers a significant opportunity for the reduction of such emissions. Recommended approaches focus on increasing rates of conception of livestock, milk, meat and reducing embryo loss in all species. The result will be the fewest replacement animals, the decrease in the number of males where artificial insemination is adopted, a longer productive life and higher productivity per breeding animal.

#### Handling beef browsing

The palatability of a plant influences its opportunities for achievement when grown in competition with other plants and in this context eucalyptus plants are ramoned by cattle who have a variety of foods to choose from. Continuous monitoring is recommended to prevent forest losses.

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## Environmental and Social Management Plan implemented in the identified FMUs

In the previous chapter, the mitigation and monitoring programmes of the Environmental and Social Management Plan associated with the FSP Project were detailed. This chapter details the Environmental and Social Management Plans already implemented in the identified FMUs that are being acquired.

The FSP Project operations will be carried out by UNIQUE Wood Paraguay SA, the same company currently responsible for the ESMP in the identified FMUs. Continuity of measures, roles and responsibilities is therefore expected.

|                    | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Monitoring Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsible     |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Reputational risks | Stakeholder Participation and Information Disclosure: Stakeholder participation improves the quality of project implementation and fosters mutual trust. It refers to stakeholders as individuals or groups that are affected or may be affected by the project and those who may have an interest in the project. It includes parties likely to be affected by the project due to real impacts or potential risks to their physical environment, health, safety, cultural practices, well-being or livelihoods. Particular interest is paid to vulnerable or less favoured parties. Stakeholder participation related to the project begins at the project identification stage and continues until the project closes. The FMUs identified and in the process of being acquired have the approval of stakeholders and a manager who maintains open lines of communication. | <p>*Records of stakeholder identification.*Records of stakeholder participation in meetings prior to project initiation.*Project information disclosure records prior to initiation.*Consult stakeholders on concerns.*Address and respond to complaints and complaints.</p> <p><i>*The identified FMUs have been plantations for several years. Prior to starting the project, identified communities surrounding the FMUs participated in meetings where they were provided with information on forest development, FSC Certification and community support that would be provided. This meeting recorded the participants, the date and level of satisfaction, but did not record the specific consultations that stakeholders had. However, the current social manager, who signed the register verbally communicated during an interview with GEOCONSULTORES that consultations at all meetings were related to job opportunities: those who could be hired, what remuneration would look like, the temporaryity of employment and whether employment is by work area or for time worked. All concerns were answered at the time, thus leaving records signed by stakeholders of satisfactory participation).</i></p> | Social Officer. |



|                                                                           | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Monitoring Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsible                                            |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Reputational risks                                                        | Complaint Mechanism: For continuous communication with all interested parties the following means of communication are enabled:• Written: Complaint mailboxes are installed and maintained, one must necessarily be at the entrance of the farms for access by the surrounding communities and another located within the FMUs for workers' access. • Verbal: The representative assigned to ensure the company's social responsibilities has a telephone number available to receive calls from stakeholders and can also personally approach to chat.                                                                                                                                                                                                                                                                                                | Records of all concerns raised. Records of responses to such concerns. ( <i>*According to records submitted for this study, the main complaints are discomfort during the use of some PPE by chainsaws, late payment from some contractors and request better conditions in some one-off bathrooms</i> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Social Manager.                                        |
|                                                                           | Development of socio-economic projects with communities:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Record the needs of stakeholders and responses to such needs, be they communications, physical elements, assistance, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Social Manager.                                        |
| No observation of minimum labour benefits (salary, social security, etc.) | Establish criteria for hiring corporate staff and collaborators in general. The work teams are integrated taking into account selection processes, remuneration and functions established by the board. It promotes integrating workers from surrounding and local communities without discriminating on the grounds of nationality, religion, disability, gender, sexual orientation, age, political opinion, union membership or a political party. Assistance to contractors to determine the most appropriate modality of work, in accordance with Paraguayan legislation that allows social prevention coverage for seasonal and intermittent work. In the case of in-experience contractors, require them to hire an accountant appointed to keep their books in order and ensure compliance with all formalities before the Ministry of Labour. | Supervision of contractor labor practices and conditions of subcontracted personnel, including compliance with contracts with service providers on social requirements and staff management. Check the conditions provided by the contractor to your staff, including housing, health and safety conditions and the application of interviews and complaint mailboxes to subcontracted staff to assess job satisfaction. Records of: Minimum legal wage in force (minimum wage); IPS insured; The permanent and temporary sub-contracts of the project must be mostly from surrounding communities; Staff must be of legal age (be over 18 years of age); number of under-contracted personnel participating in trainings on FSC, Health and Safety, Agrochemical Management, Social Security and Fire Prevention. | In charge of FMU in collaboration with Social Manager. |

|                                                  | Mitigation Measure                                                                                                                                                                                                                     | Monitoring Plan                                                                                                                                                                                                                                    | Responsible                                       |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Risks of Incidents, Accidents. Health and Safety | Training and Training. Training Plan. Emergency drills. Constant on-the-job training for specific hazardous tasks. Annually, emergency trainings and drills are pre-established, identifying the risks. Recruitment of suitable staff. | Keep records of those involved, the date and content of each training. Compare attendance percentages annually to increase participant numbers. In the event of accidents, accident logs and mitigation measures.                                  | FMU Manager in collaboration with Social Manager. |
|                                                  | Proper use, storage and application of agrochemicals: Use of adequate PPE, Have facilities for shower and eye wash area.                                                                                                               | Maintain records of the use and storage of equipment and agrochemicals. Visual control of the shower area and washing of agrochemical clothing. Keep regular records of good working condition of showers and eye washes.                          | FMU Manager in collaboration with Social Manager. |
|                                                  | Supply of first aid kits. Mobile kits must be present with each workgroup in the field. Each forest contractor must have a main kit. All kits must have the list of medicines on the field form.                                       | Periodic control of supplies. Content records; replenishment of the kits; to whom the medicine cabinet is delivered.                                                                                                                               | Social Manager.                                   |
|                                                  | Signal placement: Installing warning signs in hazardous locations                                                                                                                                                                      | Daily visualization on workers' routes.                                                                                                                                                                                                            | Social Manager.                                   |
|                                                  | Provision of food and accommodation in FMUs that requires it                                                                                                                                                                           | Bimonthly monitoring of staff satisfaction. Records of housing conditions.                                                                                                                                                                         | Social Manager.                                   |
|                                                  | Provision of PPE                                                                                                                                                                                                                       | Records that use the PPE.<br>REGISTRATION of PPE delivery to the contractor.<br>PPE delivery record to contractor staff. EPI stock monitoring record.<br>Registry of Evaluation of the use and status of PPE.                                      | FMU Manager in collaboration with Social Manager. |
|                                                  | Good practices for the use and maintenance of machinery and training for proper use during operations by the personnel in charge                                                                                                       | Training records. Visual control of the proper use of machinery.                                                                                                                                                                                   | FMU Manager in collaboration with Social Manager. |
| Fire                                             | Training and training to human resources; Development of action plans in the event of a fire; Identify high-risk areas.                                                                                                                | Records of dates, content and deliveries of equipment during training and training; Visual control of access roads, water access points, wetting agents, dry chemical dust extinguishers, and firewalls for defense lines during firewood burning. | FMU manager.                                      |

|                                                           | Mitigation Measure                                                                                                                                                                                                                                            | Monitoring Plan                                                                                                                                                                                                                                                                                                                          | Responsible                                              |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Erosion, Soil Compaction                                  | Identification of unhealthy roads; Restrict the displacement of heavy machinery                                                                                                                                                                               | Visually check the condition of the roads; Random routes of 5% of the pull tracks planned to visualize footprints and record episodes of compaction observed outside the pull tracks or very deep footprints.                                                                                                                            | Environmental Manager in collaboration with FMU Manager. |
| Water pollution                                           | Water quality analysis: In situ water temperature parameters, pH, electrical conductivity, turbidity and dissolved oxygen are analyzed and in the laboratory minimally bacteriological analysis: total and faecal coliforms.                                  | Reading the results of the laboratory water analysis. In the event that contamination of drinking water wells with results outside acceptable parameters for health, measures such as cleaning, closing, relocation of the well and revisiting mitigation plans for greater control of the use of chemicals should be taken immediately. | Environmental Manager                                    |
| Contamination of soil, water and air from hazardous waste | Formulations should be carried out with good practice: The mixing of formulations should be carried out with the necessary care to avoid contaminating the soil and nearby watercourses, using the necessary instruments, for exclusive use for this purpose. | Every two months, application tasks and product mixes are verified. Then proceed to the correction of faults and then record on the forms.                                                                                                                                                                                               | Environmental Manager in collaboration with FMU Manager. |
|                                                           | Washing and drilling of empty agrochemical containers.                                                                                                                                                                                                        | Every three months it should be checked with a form and the empty containers checked at the collection sites. In case of displaying empty containers not perforated or unwashed should be communicated to the person responsible for the tank and reinforce communication with personnel in charge for compliance.                       | Environmental Manager in collaboration with FMU Manager. |
|                                                           | Check oil and fuel storage                                                                                                                                                                                                                                    | Monitoring every 3 months with forms. In case of displaying non-compliance, the infrastructure should be improved.                                                                                                                                                                                                                       | Environmental Manager in collaboration with FMU Manager. |
|                                                           | Maintenance of machinery and trucks                                                                                                                                                                                                                           | Monitoring every 3 months of daily maintenance records of machinery and trucks. In case of non-compliance, the contractor responsible should be discussed and the environmental and safety importance of this activity emphasized.                                                                                                       | Environmental Manager in collaboration with FMU Manager. |
|                                                           | Alliance with National University of Asunción (UNA) for continuous research of alternatives for agrochemical uses                                                                                                                                             | Regular meetings with research teachers.                                                                                                                                                                                                                                                                                                 | Environmental Manager                                    |

|                                                 | Mitigation Measure                                                           | Monitoring Plan                                                                                                                                                                                                                                                                          | Responsible                                              |
|-------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Soil, water and air pollution from common waste | Distribution of trash cans; Final disposal in sanitary pit/central landfills | Every 3 months, garbage bins must be cycled through with control forms; Every 3 months you should visit and check the pits and landfills of each FMU.                                                                                                                                    | Environmental Manager                                    |
| Affectation of native flora and fauna           | Awareness-raising and signalling of prohibition of illegal activities        | Every 6 months staff homes are entered to verify whether or not evidence of illegal hunting and logging activities exists. Control with forms logging events. Warning to the staff and contractor responsible in case of non-compliance. For recidivisms assess suspension or dismissals | Environmental Manager                                    |
|                                                 | MADES environmental licensing requirement                                    | Registration of the dates of granting and expiration of environmental licenses and subsequent decisions of the MADES. <i>(Existing Forest Plantations only operate on environmentally licensed properties of MADES)</i>                                                                  | Environmental Manager                                    |
|                                                 | Identification of High Conservation Value Areas (HCVs):                      | Records of baseline studies, records of flora and fauna inventories before starting forest plantations. If HCV is verified, transects should be defined to traverse and record species found every 3 years and analyze implications for management                                       | Environmental Manager                                    |
|                                                 | Set location and percentage of seed plantings and eucalyptus clones          | Monitoring compliance with the planning of the stands according to the topography of the area. Records of the number of clones and eucalyptus seed plantings planted per stand in the FMU. Disease records                                                                               | Environmental Manager in collaboration with FMU Manager. |
|                                                 | Satellite image analysis to visualize change in native forest usage          | Monitoring the change of use according to maps presented by the person responsible in Geographic Information Systems.                                                                                                                                                                    | Responsible for Geographic Information Systems           |

According to the documents submitted to prepare this ESIA and the field visit made, it is visualized that, for the most part, the Environmental and Social Management Plan is fulfilled in each FMU. There is acceptance of the project by the interviewees, members of the surrounding communities including members of indigenous peoples involved in the project. There are monitoring documents that each responsible for social and environmental aspects develops where compliances and breaches of mitigation measures are recorded. There is a need for more social and environmental officers for better control of all FMUs, because FMUs are not adjacent and there is currently only one social officer.

There are pollution risks not included in the Environmental and Social Management Plan of the identified FMUs that can be found in the previous chapter, such as registering water wells with MADES to plan nationally the efficient use of the Water Resource of all basins that make up the territory, hiring companies qualified for final disposal of fluorescent tubes containing mercury and certification of non-PCB content in transformers.

Of the total number of employees, a percentage greater than 60% are inhabitants of surrounding communities, of which a percentage less than 20% are women. While offers give equal opportunity to both sexes, the nomination continues to be mostly male, and it is recommended the implementation of training courses to encourage women to hold positions that are generally being filled by men.



## Audit

In the framework of the development of the project, we made a technical visit to the different forest management units. On this visit we had the opportunity to know the facilities, forest stands, also conduct interviews with the Social Manager (RS), UNIQUE Technicians and several members of the surrounding communities.

As part of the result of this visit, we developed a photo record between the dates of October 22 and 23 of the current year. They accompany the points developed in this document and their compliance.

## Photographic Records



Image 1: Firewood, cut from one meter, desixed to the edge of the road, corresponding to the first thinning in one of the identified FMUs being acquired are observed. Roads and firewalls are observed.



Image 2, 3, 4 and 5: FMUs are classified according to their objective, which may be Pure Plantation or Silvopastoral







Image 4 and 5





Figure 6: As part of the Environmental Monitoring Plan it is included to control the footprints left by heavy machinery to prevent soil compaction. In addition, registration of maintenance performed on machinery is required in order to mitigate the impacts of combustions that could contaminate air, soil and water.



Image 7. The OUTGROWER project is carried out within the social framework of the project. Owners of surrounding communities who have an interest in wood production and wish to allocate part of the property benefit from technical assistance, materials and 50% of the profit from the sale of the wood. Generally speaking, this project is considered to have a high positive impact for those who meet the requirements. However, it also reflects a reality of the rural countryside that not everyone has a title from their properties.

Since the title of the property is a requirement, not everyone accesses the benefit. The report detailed some public institutions and projects that untitled owners can go to.





Figure 8 and 9: As part of the Environmental Monitoring Plan, the conditions under which the trash cans are located are recorded. They are located in strategic locations to prevent waste from ending up in

ecosystems.

Images 8, 9, 10 and 11 display a correct signage arrangement. Figure 10 details information about the current health situation and contagion prevention measures. Figure 11 details the mandatory uses of PPE.



Figure 10.

Figure 11.







Image 12, 13, 14, 15



The fire hazard is an identified risk whose mitigation plan partly is training, billboard indicating the state of danger, and team and planning of combat crews. In the images 12, 13 you can see billboards With Different levels of danger taken in the same day. This Variation relates to drought, wind, amount of fuel, etc. In Figure 14 there is a training done on October 23 of the current year where a professional in the field visits the site to perform the practical training. Content, date and participants is recorded in a Training Register (Image 16). Image 17 shows an FMU where under the wire where grazing is carried out there is pasture that the animal does not consume, and this represents fuel. For this reason, areas of special care for manual cleaning to eliminate fire fuel are identified. Figure 15 shows a mobile water tank to fight fires.



Image 16.



Image 17

Figure 17 shows the use of solar energy to power the electrical fences. While the use of renewable energy is not a requirement of the company, the field route shows the use of solar panels.



Image 18.



Image 19.

Image 18 and 19. PPE is mandatory in all processes, with some clothing being necessary and others not according to each operation. This is why epi deposits are available where individual protective equipment is kept in an orderly manner for the personal and as seen in Figure 21 there is also PPE for visits. PPE tanks are separated from the tanks where agrochemical application tanks are stored as shown in Figure 20.



Figure 20: Agrochemical application equipment.



Figure 21: EPI for visit.



Figure 22: Tree pruning work. The use of PPE, the distance between staff, the proper use of equipment, are part of good practices to avoid accidents.



Figure 23: Implementing continuous improvements is part of sustainable development, for this reason a new mitigation measure consisting of a buffer area under the power line where there will be no forest plantation has been implemented.



Figure 24: As part of the social framework, complaint mailboxes are enabled for written communication with stakeholders. These mailboxes are located on project premises.



Figure 25 and 26. Water storage tanks for workers and also in surrounding communities.





Of the total number of employees, a percentage greater than 60% are inhabitants of surrounding communities, of which a percentage less than 20% are women. While the so-called gives both sexes equal opportunity, the nomination remains mostly masculine. Images 27 and 28 show 2 collaborators. Training courses are recommended to encourage women to hold positions that are generally being held by men.



Figure 27 and 28: Dining room and Gate (Access to Property)







Image 29 and 30: Species found during the FMU field visit. Piririta (*Guira guira*) and Tejú hovy (*Ameivaameiva*).



## Consultations

For each farm where the identified FMUs are located, the following consultation materials were available to prepare this report:

- Environmental Impact Assessments and Environmental Audits submitted to MADES.
- Baseline Reports.
- Reports submitted by ARBARO and UNIQUE WOOD Paraguay.

In addition, interviews were conducted with stakeholders during the field visit on 22-23 October 2020.

- Day 1:
  1. Social Officer for FMUs identified and being acquired.
  2. Collaborator of UNIQUE WOOD Paraguay: a manager of the identified FMUs.
  3. Representatives of Community Inmaculada: 3 people who are also subcontracted workers of the FMU.
  4. Representatives of Colonia Correa Ruguá of the Barrio San José: 2 people who are not contracted or subcontracted workers of the FMU. One is a teacher and the other president of the Fortaleza Producers Association.
- Day 2:
  1. Social Manager for FMUs identified and being acquired.
  2. Unique WOOD Paraguay employees: two managers of the FMUs identified
  3. Forest contractor: one staff.
  4. Company hired for thinning: one staff
  5. A manager of one of the farms where one of the FMUs is located.
  6. An FMU manager.

## Bibliography

Arbaro. 2018. About the Arbaro Fund *online*. Retrieved 23oct2020. Available in <https://www.arbaro-advisors.com/arbaro-fund/>

Allevato, H. Porphyry, D. 2002. Environmental Management of Agrochemical Waste Packaging. REPEAT. Viewed at: 28-mar-2017. Available in: [http://www.msal.gob.ar/agroquimicos/pdf/EnvaAgro\\_CEPIS-OPS.pdf](http://www.msal.gob.ar/agroquimicos/pdf/EnvaAgro_CEPIS-OPS.pdf)

World Bank. 2020. Paraguay: Overview 2020 *online*. Retrieved 23oct2020. Available in <https://www.bancomundial.org/es/country/paraguay/overview>

Clark, PT. 2013. Wet Chaco Ecoregion (online). Retrieved 02-May-2017. Available in: <http://parquesnacionalesdelparaguay.blogspot.com/2013/01/ecorregion-chaco-humedo.html>

Cotán-Pinto Arroyo, S. 2007. Environmental Impact Assessment (online). Viewed at: 05-abr-2017. Available in: [http://api.eoi.es/api\\_v1\\_dev.php/fedora/asset/eoi:48150/componente48148.pdf](http://api.eoi.es/api_v1_dev.php/fedora/asset/eoi:48150/componente48148.pdf)

DGEEC. 2018. Population per year of the survey, according to department and main health indicators. Period 1997/98-2018 *online*. Retrieved 23oct2020. Available in <https://www.dgeec.gov.py/default.php?publicacion=28>

DGEEC. 2018. Main population health indicators per year of the survey, depending on area of residence. Period 1997/98 - 2018 *online*. Retrieved 23oct2020. Available in <https://www.dgeec.gov.py/default.php?publicacion=28>

Fao. 1993. Use of wildlife in Latin America *online*. Retrieved 27oct2020. Available in <http://www.fao.org/3/T0750S/t0750s00.htm#cont>

Fao. 2013. FAO Animal Production and Health. *online*. Retrieved 29oct2020. Available in: <http://www.fao.org/3/a-i3288s.pdf>

Fao. 2017. Paraguay in one glance (online). Viewed at: 14-mar-2017. Available in: <http://www.fao.org/paraguay/fao-en-paraguay/paraguay-en-una-mirada/es/>

Fao. No date. Eucalyptus in forest repopulation. *online*. Retrieved 15oct2020. Available in: <http://www.fao.org/3/ac459s/AC459S12.htm>

Fsc. 2020. FSC certification *online*. Retrieved 22oct2020. Available in <https://fsc.org/es/unete/certificacion-fsc>

Fsc. 2012. The FSC Principles and Criteria *online*. Retrieved 15oct2020. Available in: <https://es.fsc.org/es-es/certificacin/los-principios-y-criterios-del-fsc>

Moisés Bertoni Foundation. 2020. Mbarakayú Forest Reserve. *online*. Retrieved 15Oct2020. Available in: [http://www.mbertoni.org.py/reserva\\_natural\\_mbaracayu.php](http://www.mbertoni.org.py/reserva_natural_mbaracayu.php)

Herebia Maldonado. 2014. Presentations of the Forest Industry Chair. Faculty of Agricultural Sciences UNA.

Mec. 2020. Online Vision Mission. Retrieved 28Oct2020. Available in <https://www.mec.gov.py/cms/?ref=296221-descripcion-de-la-politica-institucional>

MSPBS. 2020. Where I Can Consult *Online*. Retrieved 28Oct2020. Available in <https://www.mspbs.gov.py/donde-consulto.php>



## Annexes

Annex 1. Table of species found in Baseline studies in each of the properties where FMUs are located.

Table 1. Flora

BHS: Wet Forest & Semi-Forest; BH: Hygrophilic forest; PE: Eucalyptus plantation.

| BOTANIC FAMILY | SCIENTIFIC NAME                      | COMMON NAME     | Bhs | Bh | Pe |
|----------------|--------------------------------------|-----------------|-----|----|----|
| Acanthaceae    | <i>Brazilian justice</i>             |                 | X   | X  |    |
| Amaranthaceae  | <i>Amaranthus (scraper)</i>          |                 |     |    | X  |
| Amaranthaceae  | <i>Amaranthus hybrids</i>            | ka'aruru        | X   |    | X  |
| Amaranthaceae  | <i>Amaranthus sp</i>                 | ka'aruru        | X   | X  |    |
| Amaranthaceae  | <i>Amaranthus spinosus</i>           | ka'aruru        |     |    | X  |
| Anacardiaceae  | <i>Astronium fraxinifolium</i>       | urunde' and for | X   |    |    |
| Anacardiaceae  | <i>Schinus sp</i>                    |                 |     | X  |    |
| Anemiaceae     | <i>Phyllitidis anemia</i>            |                 |     | X  |    |
| Annonaceae     | <i>Rollinia emarginata</i>           | araticu         | X   |    |    |
| Apiaceae       | <i>Hydrocotyle ranunculoides</i>     | akaryso         |     | X  |    |
| Apocynaceae    | <i>Funastrum sp</i>                  |                 | X   |    |    |
| Apocynaceae    | <i>Tabernaemontana catharinensis</i> | sapirangy       | X   | X  | X  |
| Araceae        | <i>Anthurium sp</i>                  |                 |     | X  |    |
| Araceae        | <i>Philodendron bipinnatifidum</i>   | Guembe          | X   | X  |    |
| Araliaceae     | <i>Pentapanax warmingianus</i>       |                 |     | X  |    |
| Arecaceae      | <i>Acrocomia aculeata</i>            |                 | X   |    |    |
| Arecaceae      | <i>Syagrus romanzoffiana</i>         | Pindo           | X   | X  |    |
| Asparagaceae   | <i>Cordyline dracaenoides</i>        | water stick     |     | X  |    |
| Aspleniaceae   | <i>Asplenium sp</i>                  | Amambay         |     | X  |    |
| Asteraceae     | <i>Baccharis sp</i>                  |                 |     |    | X  |
| Asteraceae     | <i>Chaptalia nutans</i>              | cow tongue      |     |    | X  |
| Asteraceae     | <i>Phorophyllum ruderales</i>        |                 |     |    | X  |
| Asteraceae     | <i>Pterocaulon sp</i>                |                 | X   |    |    |
| Asteraceae     | <i>Senecio sp</i>                    |                 | X   |    |    |
| Asteraceae     | <i>Spilanthes sp</i>                 |                 |     |    | X  |
| Asteraceae     | <i>Vernonia sp</i>                   |                 |     |    | X  |
| Asteraceae     | <i>Vernonia Tweediana</i>            | jagua pety      |     |    | X  |
| Bignoniaceae   | <i>Adenocalymma marginatum</i>       | ysypo ha        | X   |    |    |



| BOTANIC FAMILY | SCIENTIFIC NAME                      | COMMON NAME      | Bhs | Bh | Pe |
|----------------|--------------------------------------|------------------|-----|----|----|
| Bignoniaceae   | <i>Handroanthus impetiginosus</i>    | tajy pyto        |     | X  |    |
| Bignoniaceae   | <i>Macfadyena unguis-cati</i>        | cat's fingernail | X   |    |    |
| Bombacaceae    | <i>Ceiba speciosa</i>                | samu'u           | X   | X  |    |
| Boraginaceae   | <i>American Cordia</i>               | guajayvi         | X   | X  |    |
| Boraginaceae   | <i>Cordia trichotoma</i>             | peterevy         | X   | X  | X  |
| Bromeliaceae   | <i>Bromelia sp</i>                   | air key data     |     | X  |    |
| Bromeliaceae   | <i>Pseudananas saganarius</i>        |                  |     | X  |    |
| Cactaceae      | <i>Rhipsalis baccifera</i>           | loose with loose | X   |    |    |
| Caricaceae     | <i>Carica papaya</i>                 | Sucker           | X   |    | X  |
| Cecropiaceae   | <i>Cecropia pachystachya</i>         | amba'y           | X   | X  | X  |
| Celtidaceae    | <i>Celtis sp</i>                     | juasy'y          | X   |    |    |
| Chenopodiaceae | <i>Chenopodium ambrosioides</i>      | ka'ar            | X   |    | X  |
| Commelinaceae  | <i>Commelina benghalensis</i>        |                  |     |    | X  |
| Commelinaceae  | <i>Commelina diffusa var difussa</i> | Saint Lucia hovy |     |    | X  |
| Commelinaceae  | <i>Commelina erecta</i>              | Saint Lucia hovy | X   |    |    |
| Commelinaceae  | <i>Dichorisandra hexandra</i>        |                  |     | X  |    |
| Commelinaceae  | <i>Tripogandra sp</i>                |                  |     | X  |    |
| Convolvulaceae | <i>Ipomoea nil</i>                   |                  |     |    | X  |
| Convolvulaceae | <i>Ipomoea sp</i>                    |                  | X   |    | X  |
| Cucurbitaceae  | <i>Jacaratia spinosa</i>             | jakarati'a       | X   | X  |    |
| Cucurbitaceae  | <i>Momordica charantia</i>           | Pumpkin          | X   |    |    |
| Cucurbitaceae  | <i>Pisonia aculeata</i>              | jagua pinda      | X   | X  |    |
| Cyatheaceae    | <i>Alsophila cuspidata</i>           | chacha           |     | X  |    |
| Cyperaceae     | <i>Cyperus rotundus</i>              |                  |     |    | X  |
| Cyperaceae     | <i>Cyperus sp</i>                    |                  | X   |    |    |
| Cyperaceae     | <i>Rhynchospora sp</i>               |                  |     | X  |    |
| Euphorbiaceae  | <i>Actinostemon concolor</i>         | yvyra ha         |     | X  |    |
| Euphorbiaceae  | <i>Alcornea triplinervia</i>         | rupa chipa       | X   | X  |    |
| Euphorbiaceae  | <i>Euphorbia hirta</i>               |                  |     |    | X  |
| Euphorbiaceae  | <i>Euphorbia serpens</i>             | tupasy kamby     |     |    | X  |

| BOTANIC FAMILY | SCIENTIFIC NAME                 | COMMON NAME      | Bhs | Bh | Pe |
|----------------|---------------------------------|------------------|-----|----|----|
| Euphorbiaceae  | <i>Jatropha sp</i>              | tuja kaso        | X   |    |    |
| Euphorbiaceae  | <i>Manihot sp</i>               | guasu mandi'o    | X   | X  | X  |
| Euphorbiaceae  | <i>Sapium haematospermum</i>    | kurupika'y       | X   | X  | X  |
| Euphorbiaceae  | <i>Tragia sp</i>                |                  | X   | X  |    |
| Fabaceae       | <i>Acacia sp</i>                | jukeri           | X   | X  |    |
| Fabaceae       | <i>Albizia niopoides</i>        | yvyraju          | X   |    | X  |
| Fabaceae       | <i>Anadenanthera colubrina</i>  | kurupa' and kuru | X   | X  | X  |
| Fabaceae       | <i>Apuleia leiocarpa</i>        | yvyra pere       | X   |    |    |
| Fabaceae       | <i>Bauhinia forficata</i>       | ox leg           | X   |    |    |
| Fabaceae       | <i>Calliandra sp</i>            | scouring child   | X   | X  |    |
| Fabaceae       | <i>Crotalaria sp</i>            | mbói aguai       | X   |    | X  |
| Fabaceae       | <i>Holocalyx balansae</i>       | yvyra pepo       | X   | X  |    |
| Fabaceae       | <i>Inga affinis</i>             | inga guasu       | X   | X  |    |
| Fabaceae       | <i>Inga laurina</i>             | Inga             | X   |    |    |
| Fabaceae       | <i>Inga uraguensis</i>          | inga guasu       |     | X  |    |
| Fabaceae       | <i>Lonchocarpus leucanthus</i>  | tail ita         |     | X  |    |
| Fabaceae       | <i>Machaerium sp</i>            | ysapy' and pyto  | X   |    |    |
| Fabaceae       | <i>Machaerium stipitatum</i>    | ysapy' and       | X   |    |    |
| Fabaceae       | <i>Rigid parapiptednia</i>      | kurupa'yra       | X   |    |    |
| Fabaceae       | <i>Peltophorum dubium</i>       | yvyrapyt         | X   | X  | X  |
| Fabaceae       | <i>Pterogyne nitens</i>         | yvyraro          | X   |    | X  |
| Fabaceae       | <i>Samanea saman</i>            | manduvira        |     |    | X  |
| Fabaceae       | <i>Senna sp</i>                 |                  | X   |    | X  |
| Heliconiaceae  | <i>Heliconia sp</i>             | bananita         | X   | X  |    |
| Lamiaceae      | <i>Hyptis sp</i>                |                  |     |    | X  |
| Lauraceae      | <i>Nectandra lanceolata</i>     | Laurel           |     | X  |    |
| Lauraceae      | <i>Nectandra megapotamica</i>   | laurel hu        | X   |    |    |
| Lauraceae      | <i>Ocotea dyospirifolia</i>     | Laurel           | X   | X  |    |
| Lauraceae      | <i>Ocotea sp</i>                | Laurel           | X   |    |    |
| Lecythidaceae  | <i>Carinian strellensis</i>     | ka'i ka'ygua     |     |    | X  |
| Lygodiaceae    | <i>Lygodium volubile</i>        |                  |     | X  |    |
| Lythraceae     | <i>Cuphea sp</i>                |                  |     |    | X  |
| Malvaceae      | <i>Bastardiopsis densiflora</i> | white parrot     | X   | X  |    |

| BOTANIC FAMILY   | SCIENTIFIC NAME                 | COMMON NAME   | Bhs | Bh | Pe |
|------------------|---------------------------------|---------------|-----|----|----|
| Malvaceae        | <i>Guazuma ulmifolia</i>        | kamba ak'     | X   |    |    |
| Malvaceae        | <i>Malvastrum sp</i>            | typycha ha    | X   |    | X  |
| Malvaceae        | <i>Spiny AIDS</i>               | typycha ha    | X   |    | X  |
| Maranthaceae     | <i>Marantha sp</i>              |               |     | X  |    |
| Melastomastaceae | <i>Miconia sp</i>               |               |     | X  |    |
| Melastomastaceae | <i>Tibouchina sp</i>            |               | X   |    |    |
| Meliaceae        | <i>Cabralea canjerana</i>       | cancharana    | X   | X  |    |
| Meliaceae        | <i>Cedrela fissilis</i>         | Cedar         | X   |    | X  |
| Meliaceae        | <i>Guarea kunthiana</i>         | karaja ball   |     | X  |    |
| Meliaceae        | <i>Melia azederach</i>          | Paradise      | X   |    |    |
| Meliaceae        | <i>Trichilia catigua</i>        | katigua       | X   |    |    |
| Moraceae         | <i>Dorstenia brasiliensis</i>   | tarope        |     | X  |    |
| Moraceae         | <i>Ficus enormis</i>            | handsome'y    | X   |    |    |
| Moraceae         | <i>Tinctoria maclura</i>        | tatajyva      | X   | X  |    |
| Moraceae         | <i>Sorocea bonplandii</i>       | ñandypami     |     | X  |    |
| Myrtaceae        | <i>Campomanesia xanthocarpa</i> | guavira pyto  |     | X  |    |
| Myrtaceae        | <i>Eugenia sp</i>               |               |     | X  |    |
| Myrtaceae        | <i>Hexachlamys edulis</i>       | yva hai       |     | X  |    |
| Myrtaceae        | <i>Myrcianthes pungens</i>      | guaviju       |     | X  |    |
| Myrtaceae        | <i>Plinia rivularis</i>         | yvaporoit     |     | X  |    |
| Nyctaginaceae    | <i>Boerhavia diffusa</i>        | ka'arurupe    |     |    | X  |
| Onagraceae       | <i>Ludwigia sp</i>              |               |     | X  |    |
| Orchidaceae      | <i>Trichocentrum jonesianum</i> | ka'i tembet   |     | X  |    |
| Orchidaceae      | <i>Oncidium sp</i>              |               |     | X  |    |
| Passifloraceae   | <i>Passiflora caerulea</i>      | mburucuya     | X   |    |    |
| Passifloraceae   | <i>Passiflora sp</i>            |               |     | X  |    |
| Phyllanthaceae   | <i>Phyllanthus orbiculatus</i>  | for para'i    |     | X  |    |
| Phytolacaceae    | <i>Phytolacca dioica</i>        | ombu          | X   |    | X  |
| Piperaceae       | <i>Peperomia arifolia</i>       |               |     | X  |    |
| Piperaceae       | <i>Piper hispidum</i>           | tuja renymy'a | X   |    |    |
| Piperaceae       | <i>Piper medium</i>             | tuja renymy'a | X   | X  |    |
| Plantaginaceae   | <i>Angelonia sp</i>             |               |     | X  |    |
| Poaceae          | <i>Andropogon bicornis</i>      |               |     |    | X  |

| BOTANIC FAMILY | SCIENTIFIC NAME                    | COMMON NAME        | Bhs | Bh | Pe |
|----------------|------------------------------------|--------------------|-----|----|----|
| Poaceae        | <i>Andropogon paniculatum</i>      | aguara ruguai      |     |    | X  |
| Poaceae        | <i>Brachiaria sp</i>               |                    |     |    | X  |
| Poaceae        | <i>Cenchrus sp</i>                 |                    |     | X  | X  |
| Poaceae        | <i>Digitaria insularis</i>         |                    |     |    | X  |
| Poaceae        | <i>Guadua sp</i>                   | Bambu              |     | X  |    |
| Poaceae        | <i>Leersia sp</i>                  |                    |     | X  |    |
| Poaceae        | <i>Lithachne sp</i>                |                    |     | X  |    |
| Poaceae        | <i>Merostachys clausenii</i>       | tacuapi            | X   |    |    |
| Poaceae        | <i>Panicum maximum</i>             | colonial grass     | X   |    | X  |
| Poaceae        | <i>Panicum sp</i>                  |                    | X   |    |    |
| Poaceae        | <i>Paspalum sp</i>                 |                    | X   | X  |    |
| Polypodiaceae  | <i>Microgramma squamulosa</i>      |                    |     | X  |    |
| Pontederiaceae | <i>Pontederia sp</i>               |                    |     | X  |    |
| Portulacaceae  | <i>Portulacca oleracea</i>         |                    |     |    | X  |
| Portulacaceae  | <i>Talinum patens</i>              |                    |     |    | X  |
| Pteridaceae    | <i>Adiantopsis radiatta</i>        |                    |     | X  |    |
| Pteridaceae    | <i>Doryopteris sp</i>              | Amambay            |     | X  |    |
| Rubiaceae      | <i>American Genipa</i>             | ñandypa            | X   |    |    |
| Rubiaceae      | <i>Richardia brasiliensis</i>      | ype rupa           | X   |    | X  |
| Rutaceae       | <i>Balfourodendron riedelianum</i> | guatambu           | X   | X  |    |
| Rutaceae       | <i>Esenbeckya febrifuga</i>        |                    | X   |    |    |
| Rutaceae       | <i>Esenbeckya grandiflora</i>      |                    |     | X  |    |
| Rutaceae       | <i>Helietta apiculata</i>          | yvyra ovi          | X   |    |    |
| Rutaceae       | <i>Zanthoxylum petiolare</i>       | kuratur            | X   |    |    |
| Salicaceae     | <i>Banara sp</i>                   |                    |     | X  |    |
| Salicaceae     | <i>Casearia sylvestris</i>         | donkey ka'a        | X   | X  | X  |
| Sapindaceae    | <i>Diatenopteryx sorbifolia</i>    | Maria preta        | X   |    |    |
| Sapindaceae    | <i>Matayba elaeagnoides</i>        | jaguarata'y moroto | X   |    |    |
| Sapotaceae     | <i>Chrysophyllum gonocarpum</i>    | aguai              | X   | X  |    |
| Smilacaceae    | <i>Smilax aff goyazana</i>         | ju'a peka          | X   |    |    |
| Solanaceae     | <i>Solanum americanum</i>          | arachichu          | X   | X  | X  |
| Solanaceae     | <i>Solanum granuloso-leprosum</i>  | hu'i moneha        | X   |    | X  |

| BOTANIC FAMILY | SCIENTIFIC NAME                   | COMMON NAME  | Bhs | Bh | Pe |
|----------------|-----------------------------------|--------------|-----|----|----|
| Solanaceae     | <i>Solanum sisymbriifolium</i>    | ñuati pyto   | X   |    | X  |
| Solanaceae     | <i>Solanum sp</i>                 | mbói rembiu  |     |    | X  |
| Tiliaceae      | <i>Luehea divaricata</i>          | ka'a ovet    | X   | X  |    |
| Ulmaceae       | <i>Trema micrantha</i>            | kurundi' and | X   | X  |    |
| Urticaceae     | <i>Urera baccifera</i>            | pyno guasu   | X   | X  |    |
| Verbenaceae    | <i>Stachytarpheta cayennensis</i> | tatu ruguái  | X   |    | X  |
| Vitaceae       | <i>Cissus sp</i>                  |              | X   |    |    |

BHS: Wet Forest & Semi-Forest; BH: Hygrophilic forest; PE: Eucalyptus plantation.



Table 2. Birds

| Status                           | Iucn | Nac | SEAM | Cites | Cms | Est | End | Habitat  |
|----------------------------------|------|-----|------|-------|-----|-----|-----|----------|
| SCIENTIFIC NAME                  |      |     |      |       |     |     |     |          |
| <i>Crypturellus undulatus</i>    |      |     |      |       |     |     |     |          |
| Ynambu kogoe                     |      | Lc  |      |       |     | R   |     | BG,BL    |
| <i>Crypturellus parvirostris</i> |      |     |      |       |     |     |     |          |
| Ynambu chororo                   |      | Lc  |      |       |     | R   |     | CN,CA,PA |
| <i>Crypturellus tataupa</i>      |      |     |      |       |     |     |     |          |
| Ynambu tataupa                   |      | Lc  |      |       |     | R   |     | BH,BL,PA |
| <i>Rhynchotus rufescens</i>      |      |     |      |       |     |     |     |          |
| Ynambu guasu                     |      | Lc  |      |       |     | R   |     | CC,PN,PA |
| <i>Nothura maculosa</i>          |      |     |      |       |     |     |     |          |
| Ynambu'i                         |      | Lc  |      |       |     | R   |     | CC,PN,PA |
| Anhimidae                        |      |     |      |       |     |     |     |          |
| <i>Chauna torquata</i>           |      |     |      |       |     |     |     |          |
| Chaha                            |      | Lc  |      |       |     | R   |     | Hu       |
| <i>Dendrocygna viduata</i>       |      |     |      |       |     |     |     |          |
|                                  |      | Lc  |      |       | II  | R   |     | HU,AD    |
| Anatidae                         |      |     |      |       |     |     |     |          |
| <i>Dendrocygna autumnalis</i>    |      |     |      |       |     |     |     |          |
| Ype suiriri                      |      | Lc  |      |       | II  | R   |     | Hu       |
| <i>Amazonetta brasiliensis</i>   |      |     |      |       |     |     |     |          |
| Ype suiriri pepot                |      | Lc  |      |       | II  | R   |     | HU,AD    |
| <i>Tachybaptus dominicus</i>     |      |     |      |       |     |     |     |          |

| Status                      | IUCN | NAC | SEAM | CITES | CMS | Est | End | Habitat   |
|-----------------------------|------|-----|------|-------|-----|-----|-----|-----------|
| Ype kutiri                  |      | Lc  |      |       |     | R   |     | HU,AD, AS |
| Columbidae                  |      |     |      |       |     |     |     |           |
| <i>Columba livia</i>        |      |     |      |       |     |     |     |           |
| Pykasu orga                 |      | Lc  |      |       |     | R   |     | Zu        |
| <i>Patagioenas picazuro</i> |      |     |      |       |     |     |     |           |
| Pykasuro                    |      | Lc  |      |       |     | AS  |     | BH,PA,ZU  |
| <i>Leptotila verreauxi</i>  |      |     |      |       |     |     |     |           |
| Jeruti                      |      | Lc  |      |       |     | R   |     | BH,BL,ZU  |
| <i>Zenaida auriculata</i>   |      |     |      |       |     |     |     |           |
| Mbairari                    |      | Lc  |      |       |     | R   |     | CA,PA,BX  |
| <i>Columbine talpacoti</i>  |      |     |      |       |     |     |     |           |
| Pyku'i pyto                 |      | Lc  |      |       |     | R   |     | CA,PA     |
| <i>Columbina picui</i>      |      |     |      |       |     |     |     |           |
| Pyku'i                      |      | Lc  |      |       |     | R   |     | CA,PA     |
| Cuculidae                   |      |     |      |       |     |     |     |           |
| <i>Guira guira</i>          |      |     |      |       |     |     |     |           |
| Piririta                    |      | Lc  |      |       |     | R   |     | CA,PA,ZU  |
| <i>Crotophaga major</i>     |      |     |      |       |     |     |     |           |
| Ano guasu                   |      | Lc  |      |       |     | AN  |     | BG,BH     |
| <i>Crotophaga ani</i>       |      |     |      |       |     |     |     |           |
| Anó chico                   |      | Lc  |      |       |     | R   |     | CA,PA,ZU  |
| <i>Piaya cayana</i>         |      |     |      |       |     |     |     |           |
| Tingasú                     |      | Lc  |      |       |     | R   |     | BH,BL,BG  |
| Nyctibiidae                 |      |     |      |       |     |     |     |           |
| <i>Nyctibius griseus</i>    |      | Lc  |      |       |     | R   |     | BH,BL,BG  |
| Urutau                      |      |     |      |       |     |     |     |           |
| Caprimulgidae               |      |     |      |       |     |     |     |           |
| <i>Chordeiles born</i>      |      |     |      |       |     |     |     |           |

| Status                          | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|---------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| Akunda                          |      | Lc  |      |       |     | AS  |     | PN,HU,CC,CA |
| <i>Lurocalis semitorquatus</i>  |      |     |      |       |     |     |     |             |
| Yvyja'u mbyju'i                 |      | Lc  |      |       |     | AN  |     | Bh          |
| <i>Nyctidromus albicollis</i>   |      |     |      |       |     |     |     |             |
| Luirivevu                       |      | Lc  |      |       |     | R   |     | BH,BL,BG,BX |
| <i>Antristomus rufus</i>        |      |     |      |       |     |     |     |             |
| Yvyja'u ravyta                  |      | Lc  |      |       |     | R   |     | BL,BG       |
| Trochilidae                     |      |     |      |       |     |     |     |             |
| <i>Hylocharis chrysura</i>      |      |     |      |       |     |     |     |             |
| Kuarahy ava                     |      | Lc  |      | II    |     | R   |     | BG,CN,ZU    |
| Aramidae                        |      |     |      |       |     |     |     |             |
| <i>Aramus guarauna</i>          |      |     |      |       |     |     |     |             |
| Karu                            |      | Lc  |      |       |     | R   |     | Hu          |
| Rallidae                        |      |     |      |       |     |     |     |             |
| <i>Aramides ypecaha</i>         |      |     |      |       |     |     |     |             |
| Ypaka'a                         |      | Lc  |      |       |     | R   |     | BG,HU       |
| <i>Aramides cajaneus</i>        |      |     |      |       |     |     |     |             |
| Syryko                          |      | Lc  |      |       |     | R   |     | BG,HU       |
| <i>Mustelirallus albicollis</i> |      |     |      |       |     |     |     |             |
| Asana'i                         |      | Lc  |      |       |     | R   |     | HU,PN,PA    |
| <i>Pardirallus maculatus</i>    |      |     |      |       |     |     |     |             |
| Ahana mbatara                   |      | Lc  |      |       |     | AN  |     | Hu          |
| <i>Gallinula galeata</i>        |      |     |      |       |     |     |     |             |
| Ahana                           |      | Lc  |      |       |     | R   |     | HU,AD       |
| Charadriidae                    |      |     |      |       |     |     |     |             |

| Status                       | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| <i>Vanellus chilensis</i>    |      |     |      |       |     |     |     |             |
| Tet                          |      | Lc  |      |       | II  | R   |     | PN,PA,HU,ZU |
| <i>Long-help bartramia</i>   |      |     |      |       |     |     |     |             |
| Mbatui   u                   |      | Nt  |      |       | II  | N   |     | PN,PA       |
| <i>Gallinago paraguaiae</i>  |      |     |      |       |     |     |     |             |
| Jakavere                     |      | Lc  |      |       | II  | R   |     | HU,PA       |
| <i>Lone Tringa</i>           |      |     |      |       |     |     |     |             |
| Mbatui   o                   |      | Lc  |      |       | II  | N   |     | Ad          |
| <i>Tringa flavipes</i>       |      |     |      |       |     |     |     |             |
| Mbatuitui                    |      | Lc  |      |       | II  | N   |     | HU,AD       |
| Jacanidae                    |      |     |      |       |     |     |     |             |
| <i>Jacana jacana</i>         |      |     |      |       |     |     |     |             |
| Aguapeaso                    |      | Lc  |      |       |     | R   |     | Hu          |
| Ardeidae                     |      |     |      |       |     |     |     |             |
| <i>Tigrisoma lineatum</i>    |      |     |      |       |     |     |     |             |
| Hoko pyto                    |      | Lc  |      |       |     | R   |     | HU,AD       |
| <i>Nycticorax nycticorax</i> |      |     |      |       |     |     |     |             |
| Tajasu guyra                 |      | Lc  |      |       |     | R   |     | HU,AD       |
| <i>Butorides striata</i>     |      |     |      |       |     |     |     |             |
| Hoko'i                       |      | Lc  |      |       |     | R   |     | HU,AD       |
| <i>Bubulcus ibis</i>         |      |     |      |       |     |     |     |             |
| Hoko'i vaka                  |      | Lc  |      |       |     | R   |     | PA,PN       |
| <i>Ardea alba</i>            |      |     |      |       |     |     |     |             |
| Guyrat                       |      | Lc  |      |       |     | R   |     | HU,AD       |
| <i>Syrigma sibilatrix</i>    |      |     |      |       |     |     |     |             |
| Kuarahy mimby                |      | Lc  |      |       |     | R   |     | CC,PN,PA,HU |
| <i>Egretta thula</i>         |      |     |      |       |     |     |     |             |
| Itaipyte                     |      | Lc  |      |       |     | R   |     | HU,AD       |
| Threskiornithidae            |      |     |      |       |     |     |     |             |

| Status                           | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|----------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| <i>Phimosus infuscatus</i>       |      |     |      |       |     |     |     |             |
| Karu'i rova pyto                 |      | Lc  |      |       |     | R   |     | Hu          |
| <i>Theristicus caudatus</i>      |      |     |      |       |     |     |     |             |
| Kurukáu for                      |      | Lc  |      |       |     | R   |     | HU,PN,PA    |
| Phalacrocoracidae                |      |     |      |       |     |     |     |             |
| <i>Phalacrocorax brasilianus</i> |      |     |      |       |     |     |     |             |
| Mbigua                           |      | Lc  |      |       |     | R   |     | Ad          |
| Cathartidae                      |      |     |      |       |     |     |     |             |
| <i>Cathartes aura</i>            |      |     |      |       |     |     |     |             |
| Yryvu ak-vir-i                   |      | Lc  |      |       | II  | R   |     | PA,BG,BL,   |
| <i>Cathartes burrovianus</i>     |      |     |      |       |     |     |     |             |
| Yryvu ak' sa'yju                 |      | Lc  |      |       | II  | R   |     | CA,HU,PA    |
| <i>Coragyps atratus</i>          |      |     |      |       |     |     |     |             |
| Yryvu hũ                         |      | Lc  |      |       | II  | R   |     | CA,PA,ZU    |
| Accipitridae                     |      |     |      |       |     |     |     |             |
| <i>Rostrhamus sociabilis</i>     |      |     |      |       |     |     |     |             |
| Taguato jatyta                   |      | Lc  |      | II    | II  | AS  |     | Hu          |
| <i>Ictinia plumbea</i>           |      |     |      |       |     |     |     |             |
| Sui sui                          |      | Lc  |      | II    | II  | AN  |     | BH,BG       |
| <i>Circus buffoni</i>            |      |     |      |       |     |     |     |             |
| Taguato vevyi                    |      | Lc  |      | II    | II  | R   |     | CC,CA,HU,PA |
| <i>Buteogallus meridionalis</i>  |      |     |      |       |     |     |     |             |
| Taguato pyto                     |      | Lc  |      | II    | II  | R   |     | CC,CA,PA    |
| <i>Rupornis magnirostris</i>     |      |     |      |       |     |     |     |             |
| Yndaje                           |      | Lc  |      | II    | II  | R   |     | BH,BG,BL    |
| Strigidae                        |      |     |      |       |     |     |     |             |



| Status                            | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat  |
|-----------------------------------|------|-----|------|-------|-----|-----|-----|----------|
| <i>Megascops choliba</i>          |      |     |      |       |     |     |     |          |
| Kavure                            |      | Lc  |      | II    |     | R   |     | CA,BH,BG |
| <i>Glaucidium brasilianum</i>     |      |     |      |       |     |     |     |          |
| Kavure'i                          |      | Lc  |      | II    |     | R   |     | BH,BL    |
| <i>Athene cunicularia</i>         |      |     |      |       |     |     |     |          |
| Urukurea chichi                   |      | Lc  |      | II    |     | R   |     | PN,CC,PA |
| Trogonidae                        |      |     |      |       |     |     |     |          |
| <i>Trogon surrucura</i>           |      |     |      |       |     |     |     |          |
| Suruku'a                          |      | Nt  |      |       |     | R   | Atl | Bh       |
| Alcedinidae                       |      |     |      |       |     |     |     |          |
| <i>Megaceryle torquata</i>        |      |     |      |       |     |     |     |          |
| Javato guasu                      |      | Lc  |      |       |     | R   |     | Ad       |
| <i>Chloroceryle amazona</i>       |      |     |      |       |     |     |     |          |
| Javato                            |      | Lc  |      |       |     | R   |     | Ad       |
| <i>American Chloroceryle</i>      |      |     |      |       |     |     |     |          |
| Javat'i                           |      | Lc  |      |       |     | R   |     | Ad       |
| <i>Baryphthengus ruficapillus</i> |      |     |      |       |     |     |     |          |
| Marakana yvyguy                   |      | Nt  |      |       |     | R   | Atl | BH,BL    |
| Bucconidae                        |      |     |      |       |     |     |     |          |
| <i>Nystalus chacuru</i>           |      |     |      |       |     |     |     |          |
| Chakuru                           |      | Lc  |      |       |     | R   |     | CN,BG,BL |
| Ramphastidae                      |      |     |      |       |     |     |     |          |
| <i>Ramphastos played</i>          |      |     |      |       |     |     |     |          |
| Tuko guasu                        |      | Lc  |      | II    |     | R   |     | BG,BH    |

| Status                          | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|---------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| <i>Ramphastos dicolorus</i>     |      |     |      |       |     |     |     |             |
| Tuko'i                          |      | Nt  |      |       |     | R   | Atl | Bh          |
| <i>Pteroglossus castanotis</i>  |      |     |      |       |     |     |     |             |
| Tuko sa'yju                     |      | Lc  |      |       |     | R   |     | BL,BH       |
| <b>Picidae</b>                  |      |     |      |       |     |     |     |             |
| <i>Picumnus cirratus</i>        |      |     |      |       |     |     |     |             |
| Ypeküne'i                       |      | Lc  |      |       |     | R   |     | BH,BL,BG,BX |
| <i>Melanerpes candidus</i>      |      |     |      |       |     |     |     |             |
| Ypeküntere                      |      | Lc  |      |       |     | R   |     | CC,CA       |
| <i>Colaptes melanochloros</i>   |      |     |      |       |     |     |     |             |
| Tinguere                        |      | Lc  |      |       |     | R   |     | BH,BG,BX    |
| <i>Campestris Colaptes</i>      |      |     |      |       |     |     |     |             |
| Ypekū wildebeest                |      | Lc  |      |       |     | R   |     | CN,CC,PA    |
| <i>Celeus lugubris</i>          |      |     |      |       |     |     |     |             |
| Ypekū at                        |      | Lc  |      |       |     | R   |     | Bg          |
| <i>Campephilus melanoleucos</i> |      |     |      |       |     |     |     |             |
| Ypekū ak-pyto                   |      | Lc  |      |       |     | R   |     | BH,BG,BL    |
| <b>Cariamidae</b>               |      |     |      |       |     |     |     |             |
| <i>Cristata Cariama</i>         |      |     |      |       |     |     |     |             |
| Sarca pyto                      |      | Lc  |      |       |     | R   |     | CN,CC,BX    |
| <b>Falconidae</b>               |      |     |      |       |     |     |     |             |
| <i>Caracara plancus</i>         |      |     |      |       |     |     |     |             |
| Kara kara                       |      | Lc  |      | II    | II  | R   |     | PN,PA,CA,ZU |
| <i>Milvago chimachima</i>       |      |     |      |       |     |     |     |             |
| Kiri kiri                       |      | Lc  |      | II    | II  | R   |     | PN,CA,PA    |
| <i>Milvago chimango</i>         |      |     |      |       |     |     |     |             |

| Status                            | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|-----------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| Kara kara chai                    |      | Lc  |      | II    | II  | R   |     | PN,CA,PA    |
| <i>Falco sparverius</i>           |      |     |      |       |     |     |     |             |
| Kiri kiri'i                       |      | Lc  |      | II    | II  | R   |     | PA,CA,ZU    |
| <i>Falco femoralis</i>            |      |     |      |       |     |     |     |             |
| Kiri kiri guasu                   |      | Lc  |      | II    | II  | R   |     | CC,PN,CA    |
| <b>Psittacidae</b>                |      |     |      |       |     |     |     |             |
| <i>Myiopsitta monachus</i>        |      |     |      |       |     |     |     |             |
| Tu'a karanda' y                   |      | Lc  |      | II    |     | R   |     | BL,CA,PA    |
| <i>Brotogeris chiriri</i>         |      |     |      |       |     |     |     |             |
| Tu'a chyriry                      |      | Lc  |      | II    |     | R   |     | BG,BL,CA,ZU |
| <i>Pionus maximiliani</i>         |      |     |      |       |     |     |     |             |
| Maitaka                           |      | Lc  |      | II    |     | R   |     | BH,BG,PA    |
| <i>Aestiva Parrot</i>             |      |     |      |       |     |     |     |             |
| Parakáu                           |      | Nt  |      | II    |     | R   |     | BG,CN,CA    |
| <i>Forpus xanthopterygius</i>     |      |     |      |       |     |     |     |             |
| Mbembéi                           |      | Lc  |      | II    |     | R   |     | BG,BH,BL,ZU |
| <i>Pyrrhura frontalis</i>         |      |     |      |       |     |     |     |             |
| Chiripepe                         |      | Lc  |      | II    |     | R   | Atl | BH,BL,BG,BX |
| <i>Eupsittula aurea</i>           |      |     |      |       |     |     |     |             |
| Tu'apyteju                        |      | Lc  |      | II    |     | R   |     | CN,BG,BL    |
| <i>Aratinga nenday</i>            |      |     |      |       |     |     |     |             |
| Indái                             |      | Lc  |      | II    |     | R   |     | Zu          |
| <i>Thectocercus acuticaudatus</i> |      |     |      |       |     |     |     |             |
| Ndai                              |      | Lc  |      | II    |     | R   |     | Ma          |

| Status                                 | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat  |
|----------------------------------------|------|-----|------|-------|-----|-----|-----|----------|
| <i>Psittacara leucophthalmus</i>       |      |     |      |       |     |     |     |          |
| Arua'i                                 |      | Lc  |      | II    |     | R   |     | BH,BG,BL |
| Thamnophilidae                         |      |     |      |       |     |     |     |          |
| <i>Taraba major</i>                    |      |     |      |       |     |     |     |          |
| Chororo                                |      | Lc  |      |       |     | R   |     | BG,CA    |
| <i>Thamnophilus caeruleus</i>          |      |     |      |       |     |     |     |          |
| Viro'o guasu                           |      | Lc  |      |       |     | R   |     | BH,BG,BX |
| Furnariidae                            |      |     |      |       |     |     |     |          |
| <i>Xiphocolaptes major</i>             |      |     |      |       |     |     |     |          |
| Arapasu ñu                             |      | Lc  |      |       |     | R   | Cha | Bg       |
| <i>Campylorhamphus trochilirostris</i> |      |     |      |       |     |     |     |          |
| Arapasu juru karapa                    |      |     |      |       |     |     |     |          |
|                                        |      | Lc  |      |       |     | R   |     | Pk       |
| <i>Lepidocolaptes angustirostris</i>   |      |     |      |       |     |     |     |          |
| Arapasu ka'ato                         |      | Lc  |      |       |     | R   |     | Cn       |
| <i>Furnarius rufus</i>                 |      |     |      |       |     |     |     |          |
| Ogaraity                               |      | Lc  |      |       |     | R   |     | CA,PA,ZU |
| <i>Phacellodomus rufifrons</i>         |      |     |      |       |     |     |     |          |
| Añumby'i                               |      | Lc  |      |       |     | R   |     | CN,BL    |
| <i>Phacellodomus ruber</i>             |      |     |      |       |     |     |     |          |
| Añumby pyto                            |      | Lc  |      |       |     | R   |     | HU,CA    |
| <i>Anumbius annumbi</i>                |      |     |      |       |     |     |     |          |
| Guyra añumby                           |      | Lc  |      |       |     | R   |     | PA,PN    |

| Status                                | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|---------------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| <i>Schoeniophylax phryganophilus</i>  |      |     |      |       |     |     |     |             |
| Chotoy                                |      | Lc  |      |       |     | R   |     | CA,PN,BX    |
| <i>Certhiaxis cinnamomeus</i>         |      |     |      |       |     |     |     |             |
| Kurutie                               |      | Lc  |      |       |     | R   |     | Hu          |
| <i>Synallaxis frontalis</i>           |      |     |      |       |     |     |     |             |
| Che tu'a                              |      | Lc  |      |       |     | R   |     | BG,BL       |
| Tyrannidae                            |      |     |      |       |     |     |     |             |
| <i>Elaenia flavogaster</i>            |      |     |      |       |     |     |     |             |
| Guyra káva ak'vot'                    |      | Lc  |      |       |     | R   |     | CA,BL,CN,PN |
| <i>Elaenia spectabilis</i>            |      |     |      |       |     |     |     |             |
| Guyra káva guasu                      |      | Lc  |      |       |     | AN  |     | BG,BL,CA    |
| <i>Camptostoma obsoletum</i>          |      |     |      |       |     |     |     |             |
| Pirikiti                              |      | Lc  |      |       |     | R   |     | CA,BH,BG    |
| <i>Suiriri suiriri</i>                |      |     |      |       |     |     |     |             |
| Suiriri                               |      | Lc  |      |       |     | R   |     | Cn          |
| <i>Polystictus pectoralis</i>         |      |     |      |       |     |     |     |             |
| Tachuri                               | Nt   | Nt  |      |       | II  | Av  |     | CC,PN       |
| <i>Hemitriccus margaritaceiventer</i> |      |     |      |       |     |     |     |             |
| Akyra'i                               |      | Lc  |      |       |     | R   |     | BG,CA       |
| <i>Hymenops perspicillatus</i>        |      |     |      |       |     |     |     |             |
| Sevo'i guasu                          |      | Lc  |      |       |     | AS  |     | Hu          |
| <i>Satrapa icterophrys</i>            |      |     |      |       |     |     |     |             |
| Suiriri sa'yju                        |      | Lc  |      |       |     | R   |     | HU,BG,CA    |



| Status                        | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|-------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| <i>Xolmis cinereus</i>        |      |     |      |       |     |     |     |             |
| Pepoasa                       |      | Lc  |      |       |     | R   |     | CC,PN,PA    |
| <i>Xolmis irupero</i>         |      |     |      |       |     |     |     |             |
| Yrupero                       |      | Lc  |      |       |     | R   |     | Pa          |
| <i>Gubernetes yetapa</i>      |      |     |      |       |     |     |     |             |
| Jiperu                        |      | Lc  |      |       |     | R   |     | PN,HU,PA,CC |
| <i>Machetornis rixosa</i>     |      |     |      |       |     |     |     |             |
| Guyra kavaju                  |      | Lc  |      |       |     | R   |     | PA,CA,ZU    |
| <i>Legatus leucophaeus</i>    |      |     |      |       |     |     |     |             |
| Eichuja'i                     |      | Lc  |      |       |     | AN  |     | BH,BL       |
| <i>Myiozetetes similis</i>    |      |     |      |       |     |     |     |             |
| Pitogue'i                     |      | Lc  |      |       |     | R   |     | CA,BL,BH    |
| <i>Pitangus sulphuratus</i>   |      |     |      |       |     |     |     |             |
| Pitogue                       |      | Lc  |      |       |     | R   |     | HU,BL,ZU    |
| <i>Myiodynastes maculatus</i> |      |     |      |       |     |     |     |             |
| Vichi vichi for               |      | Lc  |      |       |     | AN  |     | BH,BG,BL    |
| <i>Megarynchus pitangua</i>   |      |     |      |       |     |     |     |             |
| Pitangua                      |      | Lc  |      |       |     | R   |     | BH,BL,BX    |
| <i>Tyrannus melancholicus</i> |      |     |      |       |     |     |     |             |
| Suiriri guasu                 |      | Lc  |      |       |     | AN  |     | PA,BG,CA,ZU |
| <i>Tyrannus savana</i>        |      |     |      |       |     |     |     |             |
| Tuguái jetapa                 |      | Lc  |      |       |     | AN  |     | PN,PA,HU,ZU |
| <i>Casiornis rufus</i>        |      | Lc  |      |       |     | R   |     | BG,CA,BH    |
| Guyra pyto                    |      |     |      |       |     |     |     |             |
| <i>Myiarchus ferox</i>        |      |     |      |       |     |     |     |             |
| Choperu                       |      | Lc  |      |       |     | R   |     | BG,BL,CN    |

| Status                          | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat  |
|---------------------------------|------|-----|------|-------|-----|-----|-----|----------|
| <i>Myiarchus tyrannulus</i>     |      |     |      |       |     |     |     |          |
| Choperu                         |      | Lc  |      |       |     | R   |     | BG,BL    |
| Tityridae                       |      |     |      |       |     |     |     |          |
| <i>Tityra inquisitor</i>        |      |     |      |       |     |     |     |          |
| Tuere hū                        |      | Lc  |      |       |     | R   |     | BH,BG,BL |
| <i>Tityra semi-fasciata</i>     |      |     |      |       |     |     |     |          |
| Tuere'i                         |      | Vu  | 2242 |       |     | R   |     | BG,BH,BL |
| <i>Cyanocorax cyanomelas</i>    |      |     |      |       |     |     |     |          |
| Aka'ē                           |      | Lc  |      |       |     | R   |     | BG,CA,BL |
| <i>Cyanocorax chrysops</i>      |      |     |      |       |     |     |     |          |
| Aka'ē hū                        |      | Lc  |      |       |     | R   |     | BH,BL,CA |
| <i>Progne tapera</i>            |      |     |      |       |     |     |     |          |
| Aka'ē to                        |      | Lc  |      |       |     | AN  |     | PN,CN,ZU |
| Troglodytidae                   |      |     |      |       |     |     |     |          |
| <i>Troglodytes aedon</i>        |      |     |      |       |     |     |     |          |
| Masakaraguai                    |      | Lc  |      |       |     | R   |     | ZU,CA    |
| <i>Campylorhynchus turdinus</i> |      |     |      |       |     |     |     |          |
| Katatáu                         |      | Lc  |      |       |     | R   |     | Bg       |
| Polioptilidae                   |      |     |      |       |     |     |     |          |
| <i>Polio dumicola</i>           |      |     |      |       |     |     |     |          |
| Soritui                         |      | Lc  |      |       |     | R   |     | Bg       |
| Donacobiidae                    |      |     |      |       |     |     |     |          |
| <i>Donacobius atricapilla</i>   |      |     |      |       |     |     |     |          |
| Havía guasu                     |      | Lc  |      |       |     | R   |     | Hu       |
| Turdidae                        |      |     |      |       |     |     |     |          |
| <i>Turdus leucomelas</i>        |      |     |      |       |     |     |     |          |

| Status                       | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| Korochire                    |      | Lc  |      |       |     | R   |     | BH,BL,CA,ZU |
| <i>Turdus rufiventris</i>    |      |     |      |       |     |     |     |             |
| Korochire                    |      | Lc  |      |       |     | R   |     | BG,BH,ZU    |
| <i>Turdus amaurochalinus</i> |      |     |      |       |     |     |     |             |
| Korochire                    |      | Lc  |      |       |     | R   |     | BG,BH,ZU    |
| Mimidae                      |      |     |      |       |     |     |     |             |
| <i>Mimus saturninus</i>      |      |     |      |       |     |     |     |             |
| Guyra ñe'engatu              |      | Lc  |      |       |     | R   |     | PA,PN,BX    |
| Motacilidae                  |      |     |      |       |     |     |     |             |
| <i>Anthus lutescens</i>      |      |     |      |       |     |     |     |             |
| Chi'i                        |      | Lc  |      |       |     | R   |     | PN,HU,PA    |
| Thraupidae                   |      |     |      |       |     |     |     |             |
| <i>Paroaria coronata</i>     |      |     |      |       |     |     |     |             |
| Guyra tiri                   |      | Lc  |      | II    |     | R   |     | CA,PA       |
| <i>Nemosia pileata</i>       |      |     |      |       |     |     |     |             |
| Bevyra                       |      | Lc  |      |       |     | R   |     | BG,CN,BL    |
| <i>Tachyphonus rufus</i>     |      |     |      |       |     |     |     |             |
| Sai hũ                       |      | Lc  |      |       |     | R   |     | Bg          |
| <i>Thraupis sayaca</i>       |      |     |      |       |     |     |     |             |
| Sai hovy                     |      | Lc  |      |       |     | R   |     | CN,BH,BG,ZU |
| <i>Tersina viridis</i>       |      |     |      |       |     |     |     |             |
| Piririguit                   |      | Lc  |      |       |     | R   |     | BH,BL,CA    |
| <i>Conirostrum speciosum</i> |      |     |      |       |     |     |     |             |
| Sai                          |      | Lc  |      |       |     | R   |     | BH,BL,BG    |
| <i>Sicalis flaveola</i>      |      |     |      |       |     |     |     |             |
| Tuju                         |      | Lc  |      |       |     | R   |     | CA,ZU       |

| Status                           | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat     |
|----------------------------------|------|-----|------|-------|-----|-----|-----|-------------|
| <i>Herbicola emberizoides</i>    |      |     |      |       |     |     |     |             |
| Havía kapi'i                     |      | Lc  |      |       |     | R   |     | PN,HU,PA    |
| <i>Embernagra platensis</i>      |      |     |      |       |     |     |     |             |
| There was a ester                |      | Lc  |      |       |     | R   |     | HU,PN       |
| <i>Volatinia jacarina</i>        |      |     |      |       |     |     |     |             |
| Jakarimi                         |      | Lc  |      |       |     | R   |     | HU,CA,PN,PA |
| <i>Sporophila leucoptera</i>     |      |     |      |       |     |     |     |             |
| Guyra juru tu'a morot            |      | Lc  |      |       |     | R   |     | HU,PN,BG    |
| <i>Sporophila pileata</i>        |      |     |      |       |     |     |     |             |
| Guyra juru tu'a                  |      |     |      |       |     | AN  |     | PN,CC,PA    |
| <i>Sporophila hypoxantha</i>     |      |     |      |       |     |     |     |             |
| Guyra juru tu'o pyt              |      | Lc  |      |       |     | R   |     | PN,CC,PA    |
| <i>Sporophila caerulea</i>       |      |     |      |       |     |     |     |             |
| Guyra juru tu'a                  |      | Lc  |      |       |     | R   |     | CA,PA,ZU    |
| <i>Sporophila collaris</i>       |      |     |      |       |     |     |     |             |
| Guyra juru tu'a                  |      | Lc  |      |       |     | R   |     | HU,PN,PA    |
| <i>Coryphospingus cucullatus</i> |      |     |      |       |     |     |     |             |
| Araguyra                         |      | Lc  |      |       |     | R   |     | Ca          |
| Emberizidae                      |      |     |      |       |     |     |     |             |
| <i>Ammodramus humeralis</i>      |      |     |      |       |     |     |     |             |
| Manimbe                          |      | Lc  |      |       |     | R   |     | PN,CC,PA    |
| <i>Zonotrichia capensis</i>      |      |     |      |       |     |     |     |             |
| Chesyhasy                        |      | Lc  |      |       |     | R   |     | ZU,BL,PA    |
| Parulidae                        |      |     |      |       |     |     |     |             |

| Status                           | lucn | Nac | SEAM | Cites | Cms | Est | End | Habitat  |
|----------------------------------|------|-----|------|-------|-----|-----|-----|----------|
| <i>Geothlypis aequinoctialis</i> |      |     |      |       |     |     |     |          |
| Mboropi sa'yju                   |      | Lc  |      |       |     | R   |     | HU,CA    |
| Icteridae                        |      |     |      |       |     |     |     |          |
| <i>Cacicus solitarius</i>        |      |     |      |       |     |     |     |          |
| Guayraño                         |      | Lc  |      |       |     | R   |     | BG,BL    |
| <i>Cacicus chrysopterus</i>      |      |     |      |       |     |     |     |          |
| Chapo                            |      | Lc  |      |       |     | R   |     | Bg       |
| <i>Cacicus haemorrhous</i>       |      |     |      |       |     |     |     |          |
| Chakurrai                        |      | Lc  |      |       |     | R   |     | BH,BL    |
| <i>Icterus pyrrhopterus</i>      |      |     |      |       |     |     |     |          |
| Guayraümi                        |      | Lc  |      |       |     | R   |     | BL,CA,BG |
| <i>Gnorimopsar chopi</i>         |      |     |      |       |     |     |     |          |
| Chopo                            |      | Lc  |      |       |     | R   |     | PA,CA,BL |
| <i>Amblyramphus holosericeus</i> |      |     |      |       |     |     |     |          |
| Guayraü pyto                     |      | Lc  |      |       |     | R   |     | Hu       |
| <i>Agelasticus cyanopus</i>      |      |     |      |       |     |     |     |          |
| Guayra tagua                     |      | Lc  |      |       |     | R   |     | Hu       |
| <i>Chrysomus ruficapillus</i>    |      |     |      |       |     |     |     |          |
| Guayra tagua                     |      | Lc  |      |       |     | R   |     | Hu       |
| <i>Pseudoleistes guirahuro</i>   |      |     |      |       |     |     |     |          |
| Guayraüro                        |      | Lc  |      |       |     | R   |     | PN,PA,HU |
| <i>Molothrus rufoaxillaris</i>   |      |     |      |       |     |     |     |          |
| Arumars                          |      | Lc  |      |       |     | R   |     | PA,CA    |
| <i>Molothrus bonariensis</i>     |      |     |      |       |     |     |     |          |
| Guayraü                          |      | Lc  |      |       |     | R   |     | PA,ZU,CA |



| Status                         | IUCN | Nac | SEAM | Cites | Cms | Est | End | Habitat  |
|--------------------------------|------|-----|------|-------|-----|-----|-----|----------|
| <i>Sturnella supercilialis</i> |      |     |      |       |     |     |     |          |
| Chopa tyvytá                   |      | Lc  |      |       |     | R   |     | PN,PA,HU |
| Fringilidae                    |      |     |      |       |     |     |     |          |
| <i>Spinus magellanicus</i>     |      |     |      |       |     |     |     |          |
| Parachi                        |      | Lc  |      |       |     | R   |     | PA,CA,ZU |

**Legend**

**IUCN:** The IUCN Red List of Threatened Species. Version 2015-4. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 09 January 2016. EX (Extinct), CR (Critical Danger), EN (Endangered), VU (Vulnerable), NT (Near Threatened), DD (Deficient Data), LC (Concern)

**CITES:** Appendix I species threatened with trade wholly prohibited, II species not threatened with extinction but which may be if their trade is not controlled, and III species that are aggregated at the request of an interested country that is already regulating its <http://www.cites.org/eng/app/appendices.shtml> trade.

**SEAM:** Resolution No. 524/06 Approving the list of threatened flora and fauna species in Paraguay. CR (Critical Hazard), EN (Endangered), VU (Vulnerable)

**STATUS:** According to Guyra Paraguay (2005): R: Permanent nesting resident, year-round breeder, N: Neartic Migrator, V: Holidaymaker, it does not nest but is present in its breeding season, AN: Northern Southern Migrator, Nests and Migrates North, AS: Migrant Nesting From the South, Increase in Winter, AV Winter Visitor, Non-Nidific, AT Transient Species, Non-Nidifi, I: Intratropical Migrator, Non-Nidificent, E: Wanderer, Wanderer or Wanderer, NOM: Nomadic Migrator, ?: Nomadic Migrator, ?: Nodificent

**END:** Endemisms to the Atlantic Forest

**SCIENTIFIC NAME:** according to SACC: American Ornithologist Union South American Classification Committee. Remsen, J. V., Jr., J. I. Areta, C. D. Cadena, A. Jaramillo, M. Nore, J. F. Pacheco, J. Perez-Emon, M.B. Robbins, F. G. Stiles, D. F. Stotz, and K. J. Zimmer. Version [date]. A classification of the bird species of South America. American Ornithologists' Union. <http://www.museum.lsu.edu/~Remsen/SACCBaseline.html>. January 9, 2016.

**COMMON NAME:** according to Guyra Paraguay (2005)

Table 3. Mammals

| LIST OF MAMMALS                 |                                  | Conservation |       |      | End |
|---------------------------------|----------------------------------|--------------|-------|------|-----|
|                                 |                                  | Iucn         | Cites | SEAM |     |
| SCIENTIFIC NAME                 | COMMON NAME                      |              |       |      |     |
| <i>Dasytus novemcinctus</i>     | Tatu hũ or Tatú mulita           |              |       |      |     |
| <i>Sapajus cay</i>              | Ka'i Paraguay or Capuchin        |              | II    |      |     |
| <i>Cerdocyon thous</i>          | Aguara'i or Mountain Fox         |              | II    |      |     |
| <i>Leopardus sp. (tigrinus)</i> | Tirika, Mbaracaja'i or Tigrillo  | Vu           | I     |      | Atl |
| <i>Leopardus sp. (wiedii)</i>   | Tirika, Jaguarete'i or Margay    | Nt           | I     | Vu   | Atl |
| <i>Cavia aperea</i>             | Apere'a or Cuis                  |              |       |      |     |
| <i>Dasyprocta azarae</i>        | Akuti sa'yju, Akuti poi or Aguti | Dd           |       |      |     |
| <b>Total</b>                    |                                  | 1            |       | 1    | 2   |

**Legend**

**IUCN:** The IUCN Red List of Threatened Species. Version 2015-4. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 09 January 2016. EX (Extinct), CR (Critical Danger), EN (Endangered), VU (Vulnerable), NT (Near Threatened), DD (Deficient Data), LC (Concern)

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**SEAM:** Resolution No. 524/06 Approving the list of threatened flora and fauna species in Paraguay. CR (Critical Hazard), EN (Endangered), VU (Vulnerable)

**STATUS:** According to Guyra Paraguay (2005): R: Permanent nesting resident, year-round breeder, N: Neartic Migrator, V: Holidaymaker, it does not nest but is present in its breeding season, AN: Northern Southern Migrator, Nests and Migrates North, AS: Migrant Nesting From the South, Increase in Winter, AV Winter Visitor, Non-Nidific, AT Transient Species, Non-Nidifi, I: Intratropical Migrator, Non-Nidificent, E: Wanderer, Wanderer or Wanderer, NOM: Nomadic Migrator, ?: Nomadic Migrator, ?: Nodificent

**END:** Endemisms to the Atlantic Forest

**SCIENTIFIC NAME:** according to SACC: American Ornithologist Union South American Classification Committee. Remsen, J. V., Jr., J. I. Areta, C. D. Cadena, A. Jaramillo, M. Nore, J. F. Pacheco, J. Perez-Emon, M.B. Robbins, F. G. Stiles, D. F. Stotz, and K. J. Zimmer. Version [date]. A classification of the bird species of South America. American Ornithologists' Union. <http://www.museum.lsu.edu/~Remsen/SACCBaseline.html>. January 9, 2016.

**COMMON NAME:** according to Guyra Paraguay (2005)

Table 4. Amphibians

| Amphibia                   |    |    |    |      |      |      |
|----------------------------|----|----|----|------|------|------|
| Species                    | IY | Lj | Ce | IUCN | Nac. | SEAM |
| Bufonidae                  |    |    |    |      |      |      |
| Rhinella schneideri        |    |    | Or | Lc   | Lc   |      |
| Common toad                |    |    |    |      |      |      |
| Hylidae                    |    |    |    |      |      |      |
| Dendropsophus nanus        | To | Or | To | Lc   | Lc   |      |
| Dwarf Frog                 |    |    |    |      |      |      |
| Hypsiboas punctatus        | L  |    |    | Lc   | Lc   |      |
| Dotted frog                |    |    |    |      |      |      |
| Hypsiboas raniceps         |    | Or | F  | Lc   | Lc   |      |
| Tsar Frog                  |    |    |    |      |      |      |
| Lysapsus limellum          | L  |    |    | Lc   | Lc   |      |
| Frog buoyant girl          |    |    |    |      |      |      |
| Scinax fuscovarius         | Or |    | Or | Lc   | Lc   |      |
| Latrine frog               |    |    |    |      |      |      |
| Trachycephalus typhonius   | L  |    |    | Lc   | Lc   |      |
| Milky frog                 |    |    |    |      |      |      |
| Leptodactylidae            |    |    |    |      |      |      |
| Eupemphix nattereri        | L  |    |    | Lc   | Lc   |      |
| Four-eyed frog             |    |    |    |      |      |      |
| Leptodactylus chaquensis   |    | Or | Or | Lc   | Lc   |      |
| Creole Frog                |    |    |    |      |      |      |
| Leptodactylus elenae       |    |    | F  | Lc   | Lc   |      |
| Creole Frog                |    |    |    |      |      |      |
| Leptodactylus fuscus       | L  |    |    | Lc   | Lc   |      |
| Creole Frog                |    |    |    |      |      |      |
| Leptodactylus latrans      |    |    | To | Lc   | Lc   |      |
| Creole Frog                |    |    |    |      |      |      |
| Leptodactylus podicipinus  | L  |    |    | Lc   | Lc   |      |
| Spotted belly frog         |    |    |    |      |      |      |
| Physalaemus albonotatus    | L  |    |    | Lc   | Lc   |      |
| Ju'i vacara'y              |    |    |    |      |      |      |
| Physalaemus cuvieri Ranita | L  |    |    | Lc   | Lc   |      |

| Amphibia                         |    |    |    |      |      |      |
|----------------------------------|----|----|----|------|------|------|
| Species                          | IY | Lj | Ce | IUCN | Nac. | SEAM |
| <i>Bolivian Pseudopaludicola</i> | L  |    |    | Lc   | Lc   |      |
| Frog                             |    |    |    |      |      |      |
| Microhylidae                     |    |    |    |      |      |      |
| <i>Elachistocleis bicolor</i>    | L  |    |    | Lc   | Lc   |      |
| Oval Frog                        |    |    |    |      |      |      |

Table 5. Reptiles

| Reptilia                   |    |   |  |    |    |    |
|----------------------------|----|---|--|----|----|----|
| Polychrotidae              |    |   |  |    |    |    |
| Polychrus acutirostris     | L  |   |  | Na | Lc |    |
| False chameleon            |    |   |  |    |    |    |
| Tropiduridae               |    |   |  |    |    |    |
| Stenocercus caducus        | L  |   |  | Na | Lc |    |
| Teyú tará                  |    |   |  |    |    |    |
| Tropidurus tarara          | L  |   |  | Na | Na |    |
| Teyú tará                  |    |   |  |    |    |    |
| Gymnophthalmidae           |    |   |  |    |    |    |
| Cercosaura schreibersii    | L  |   |  | Na | Lc |    |
| Lizard                     |    |   |  |    |    |    |
| Micrablepharus maximiliani | L  |   |  | Na | Lc | Vu |
| Blue-tailed lizard         |    |   |  |    |    |    |
| Teiidae                    |    |   |  |    |    |    |
| Ameiva ameiva              | L  |   |  | Na | Lc |    |
| Teyú hovy                  |    |   |  |    |    |    |
| Salvator merianae          | Or |   |  | Lc | Lc |    |
| Teyú guazú                 |    |   |  |    |    |    |
| Scincidae                  |    |   |  |    |    |    |
| Notomabuya frenata         | L  |   |  | Na | Lc |    |
| Amberé                     |    |   |  |    |    |    |
| Viperidae                  |    |   |  |    |    |    |
| Bothrops alternatus        | L  |   |  | Na | Lc |    |
| Yará                       |    |   |  |    |    |    |
| Colubridae                 |    |   |  |    |    |    |
| Chironius quadricarinatus  | L  |   |  | Na | Lc |    |
| Mboi hovy                  |    |   |  |    |    |    |
| Mastigodryas bifossatus    | L  |   |  | Na | Lc |    |
| Acaniná                    |    |   |  |    |    |    |
| Dipsadidae                 |    |   |  |    |    |    |
| Clelia clelia              | L  |   |  | Na | Lc |    |
| Acaniná hú                 |    |   |  |    |    |    |
| Mussurana bicolor          | L  |   |  | Na | Lc |    |
| Acaniná hú                 |    |   |  |    |    |    |
| Hydrops leopardinus        |    | F |  | Na | Lc |    |
| Water snake                |    |   |  |    |    |    |
| Oxyrhopus guibei           | L  |   |  | Na | Lc |    |
| False coral                |    |   |  |    |    |    |
| Philodryas patagoniensis   | L  |   |  | Na | Lc |    |



| Reptilia                            |   |  |   |    |    |  |
|-------------------------------------|---|--|---|----|----|--|
| Polychrotidae                       |   |  |   |    |    |  |
| Auasó                               |   |  |   |    |    |  |
| <i>Erythrolamprus aesculapii</i>    | L |  |   | Na | Lc |  |
| False coral                         |   |  |   |    |    |  |
| <i>Erythrolamprus poecilogyrus</i>  | L |  |   | Na | Lc |  |
| Mboi Captain                        |   |  |   |    |    |  |
| <i>Thamnodynastes strigatus</i>     |   |  | F | Na | Lc |  |
| False yar will                      |   |  |   |    |    |  |
| <i>Xenodon merremi</i>              | L |  |   | Na | Lc |  |
| Mboi pe sayju                       |   |  |   |    |    |  |
| Typhlopidae                         |   |  |   |    |    |  |
| <i>Amerotyphlops brongersmianus</i> |   |  |   |    |    |  |
| Yvvtaso                             |   |  | F | Na | Lc |  |

### Legend

**SCIENTIFIC NAME:** NOMenclature and taxonomy according to SACC: American Ornithologist Union South American Classification Committee. Remsen, J. V., Jr., J. I. Areta, C. D. Cadena, A. Jaramillo, M. Nores, J. F. Pacheco, J. Perez-Emon, M.B. Robbins, F. G. Stiles, D. F. Stotz, and K. J. Zimmer. Version [date]. A classification of the bird species of South America. American Ornithologists' Union. <http://www.museum.lsu.edu/~Remsen/SACCBaseline.html>. March 4, 2017.

**IUCN:** The IUCN Red List of Threatened Species. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 30 January 2017. EX (Extinct), CR (Critical Danger), EN (Endangered), VU (Vulnerable), NT (Near Threatened), DD (Deficient Data), LC (Minor Concern)

**NAC:** State of conservation at the national level according to the Castle and Clay 2005.

**SEAM:** Resolution 2242/06 that lists the species of native birds threatened with extinction in Paraguay and 2243/06 that lists the endangered native bird species in Paraguay.

**CITES:** Appendix I species threatened with trade wholly prohibited, II species not threatened with extinction but which may be if their trade is not controlled, and III species that are aggregated at the request of an interested country that is already regulating its <http://www.cites.org/eng/app/appendices.shtml> trade.

**CMS:** Convention of Migratory Species: Appendix I: Endangered Migratory Species (Appendix I); Appendix II: Migratory species conserved through Agreements. [http://www.cms.int/es/species?field\\_species\\_class\\_tid=421](http://www.cms.int/es/species?field_species_class_tid=421). Effective February 8, 2015.

**EST:** Residence status according to the Castle and Clay 2005: R: Permanent nesting resident, year-round breeder, N: Neartic Migrator, V: Holidaymaker, it does not nest but is present in its breeding season, AN: Northern Southern Migrator, Nests and Migrates North, AS: Migrant Nesting From the South, Increase in Winter, AV Winter Visitor, Non-Nidific, AT Transient Species, Non-Nidifi, I: Intratropical Migrator, Non-Nidificent, E: Wanderer, Wanderer or Wanderer, NOM: Nomadic Migrator, ?: Nomadic Migrator, ?: Nodificent

**END:** Endemisms to BAAPA (ATL), chaco (CHA), Cerrado (CER) according to the Castle and Clay 2004, 2005

**HABITAT:** Habitat of preference according to the Castle and Clay 2004, 2005: • BH: Wet Forest (Atlantic Forest of High Paraná) • BG: Forests in Gallery: of riachos and forest islands of the Lower Chaco and Closed • BL: Secondary forest: secondary growth; includes forests (of the Type Atlantic Forest of Alto Paraná) whose undergrowth has been clarified • CN: Cerradón: Dense closed, with abundant woody vegetation • CC: Closed fields: From grasslands without woody vegetation or scrub "clean field", to grasslands with little woody vegetation and scrub "dirty field" to open savannahs "closed field" • PN: Natural grasslands • PA: Pasture Implanted: Livestock and agricultural lands, with exotic vegetation • CA: Capuera: Areas of Atlantic Forest where the original vegetation was removed and is in regeneration • HU : Wetlands: Esters and reservoirs, with emerging vegetation, freshwater • AD: Freshwater: Beaches of rivers, lakes and lagoons, rivers, streams and freshwater streams • ZU: Urban Zones, human-populated areas

**HABITAT:** code according to Guyra Paraguay (2004) • BH: Wet Forest (High Paraná Atlantic Forest) • BX: Xerophyte Forest: Chaqueño dry mountain • BG: Forests in Gallery: such as those of riachos and forest islands of Bajo Chaco and Cerrado • BA: Bosque de Araucaria: Patches of Pino Paraná (*Araucaria angustifolia*) • PK: Palmar de Karanda'y: Sabanas de Copernicia alba • BL: Secondary forest: secondary growth; includes forests (of the Atlantic Forest type of Alto Paraná) whose undergrowth has been clarified • MA: Matorral: Prickly chaparral of the dry chaco • CN: Cerradón: Closed dense, with abundant woody vegetation • CC: Closed fields: From grasslands without woody vegetation or scrub "clean field", to grasslands with little woody vegetation and scrub "dirty field" to open savannahs "closed field" • PN: Natural grasslands • PA : Pasture Implanted: Livestock and agricultural lands, with exotic vegetation • CA: Capuera: Areas of Atlantic Forest where the original vegetation was removed and is in regeneration • HU: Wetlands: Esterosy reservoirs, with emerging vegetation, freshwater • AD: Freshwater: Beaches of rivers, lakes and lagoons, rivers, streams and freshwater streams • AS: Salt water lagoons of THE AC and MG • ZU: Urban areas, areas populated by humans