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CUMULATIVE IMPACT ASSESSMENT (CIA)

Date 31.05.2021

Reference N. 109002841-001-000000-E-1501

PARACEL

Eucalyptus Plantation, Pulp Mill, Transmission Line, Substation and River Port
Departments of Concepción and Amambay – Paraguay

Content

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b	31/07/21 – hbo	31/07/21 – bvv	31/07/21 – hfw	31/07/21 – hfw	For information
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SUMMARY

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1 INTRODUCTION

PARACEL was established by the independent entrepreneurs: Zapag (Paraguay) and Girindus Investments (Sweden).

Zapag Group is a leader in Paraguay in the importation and commercial distribution of fuels, it began the acquisition of land for afforestation and reforestation. Girindus Investments is a group of entrepreneurs based in Sweden, with long experience in investments and development of pulp mill projects and sustainable forestry projects.

Together, these companies combined their expertise and founded PARACEL, to build a high-tech pulp mill, meeting most rigorous national and international socio-environmental and sustainability standards, as well as employing efficient logistics modes for the global market.

The pulp mill, with a capacity of 1,500,000 t/year of bleached pulp, will be located in the municipality of Concepción, in the Department of Concepción. PARACEL pulp mill will also be a source of clean energy, by using forest biomass and wood liquor, which are renewable natural resources.

PARACEL's projects includes also a 220 kV Transmission Line, of which the stretch will be between the Concepción Substation and the new Estancia Zapatero Cue Substation, presenting an approximate 33 km length to get energy to the mill, a River Port on the left bank of the Paraguay River, built as an elevated platform on a structure composed of: an operating platform, an access bridge for vehicles and people, and a shed structure for the pulp transport area and accesses roads to bring wood from the forest plantation areas to the pulp mill. The port will move pulp by river barges at an average rate of 1,500,000 t/year and receive logs with volumes varying between 2 and 5 million m³ sc/year (sc unbarcked) besides other inputs for the pulp mill (liquid or bulk) up to 450,000 t/year.

During the first 6 years, the wood supply for the mill will come from eucalyptus plantations in Brazil, Argentina, and Paraguay, being transported by land and river to "Puerto Paracel". By 2029, the mill will be supplied with wood primarily from the Project's own plantations, and a number of out-growers, all of which will be FSC certified. The plantations will be planted with four Eucalyptus species (*Eucalyptus urograndis, E. grandis, E. dunnii, and E. saligna*).

So, PARACEL project comprises: pulp mill, transmission line and substation, river port, besides 19 estancias, or ranches acquired for eucalyptus plantations, with a total area of approximately 190,000 ha, as presented in the figure below.

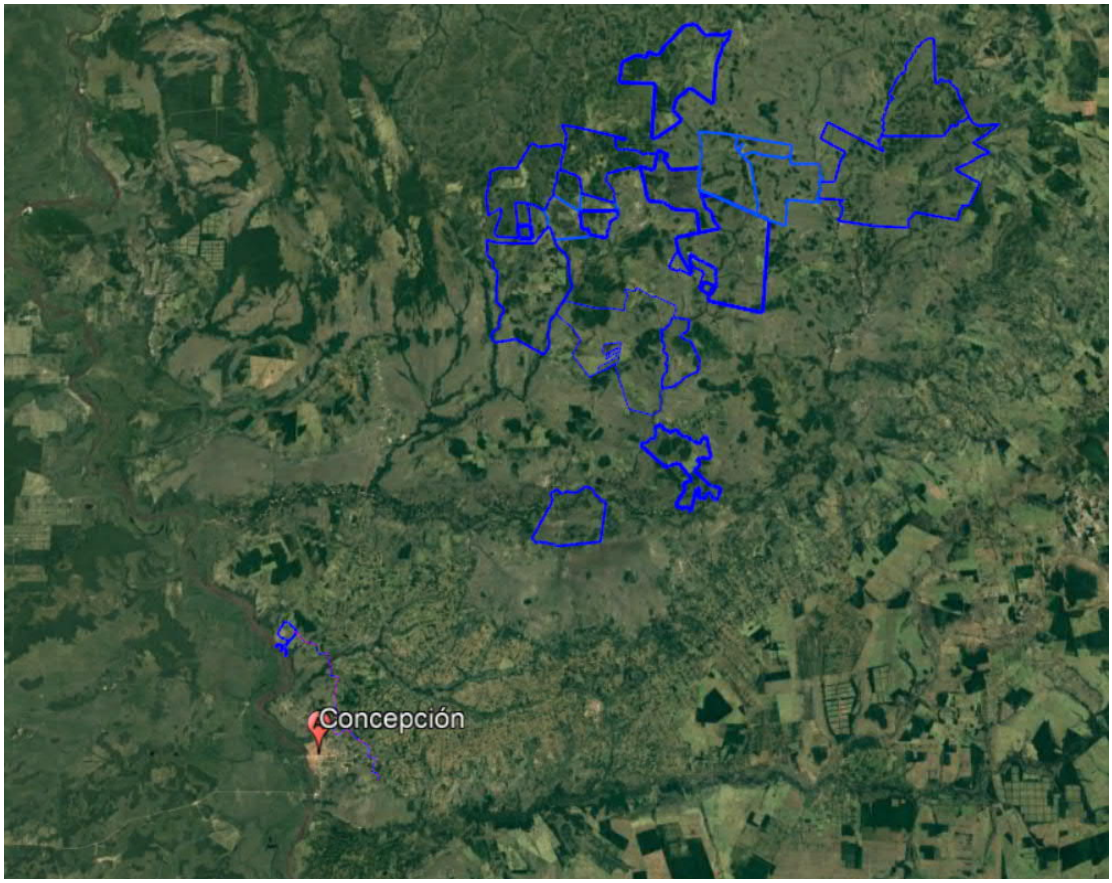


Figure 1 – Project location

Since the Project consists of an industrial component (the Mill), and a forestry component (the Plantations), two separate Environmental and Social Impact Assessments (ESIAs) were prepared by Pöyry Technology to meet the IFC Performance Standards (2012) and applicable EHS Guidelines. Highlighting that PARACEL has already received the Paraguayan authorization to install a pulp mill, a river port, a transmission line and a substation. The following approach was used for this assessment, and it took into consideration information from the two ESIAs:

- Compilation of both Environmental Impact Studies – ESIA;
- Identification of which impacts occur in which project;
- Impact analysis, with the technical-scientific basis for each evaluated aspect;
- Standardization of impacts identifying the cumulative impacts associated with each project;
- Identification of cumulative impacts, compiling the impacts on both ESIAs and other external drivers and enterprises.

Therefore this report discusses the cumulative impact assessment (CIA) conducted to evaluate the potential contribution of the Project towards the cumulative impacts on resources identified as Valued Environmental Components (VECs) by stakeholders.

2 OBJECTIVES

Specifically, Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts that, due to the growing importance of system risk, such as climate change, water availability, decline in species biodiversity, population dynamics, degradation of ecosystem services, modification of socioeconomic and environmental factors, among others, cumulative impact assessment and management (CIA) is essential for project risk management.

The overall objective of this CIA is to identify and assess the contribution by the Project to cumulative impacts. The specific objectives are:

- Identify VECs that could be impacted cumulatively in the areas potentially affected by the Project, considering input from stakeholders through consultation process;
- Identify other existing and planned projects and external environmental and social drivers that could cumulatively impact VECs;
- Undertake a high-level assessment of potential cumulative impacts on VECs, considering the Project and the other identified existing and planned projects and external drivers in the area, identifying the contribution of the Project to the cumulative impacts;
- Recommend a management framework for the integrated management of potential cumulative impacts.

3 DEFINITIONS

First of all it is important to mention some definitions:

Cumulative Impact: Impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities. For practical reasons, the identification, assessment, and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concern and/or concerns of affected communities.

CIA: Process to identify and evaluate cumulative impacts.

Other Projects: Existing, planned, or reasonably expected future developments, projects and/or activities potentially affecting VECs.

External Drivers: Sources or conditions that could affect or cause physical, biological, or social stress on VECs, such as natural environmental and social drivers, human activities, and external stressors. These can include climate change, population influx, natural disasters, or deforestation, among others. These are typically less defined and planned than Other Projects.

VEC: Environmental and social components considered as important by the scientific community and/or project-affected communities. VECs may include:

- Physical features, habitats, wildlife populations (e.g., biodiversity, water supply);
- Ecosystem services (e.g., protection from natural hazards, provision of food);

- Natural processes (e.g., water and nutrient cycles, microclimate);
- Social conditions (e.g., community health, economic conditions); and
- Cultural heritage or cultural resources aspects (e.g., archaeological, historic, or traditional sites).

VECs reflect the public and scientific community's "concern" or special interest about environmental, social, cultural, economic, or aesthetic values. VECs are considered the ultimate recipients of cumulative impacts because they tend to be at the ends of ecological pathways.

4 METHODOLOGY

The cumulative impact assessment was performed in accordance with Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets – Good Practice Handbook, published by IFC, which recognizes that because of the increasing significance of system wide risk factors such as climate change, water availability, decline of species biodiversity, degradation of ecosystem services, and modification of socioeconomic and population dynamics, among others, cumulative impact assessment and management (CIA) is an essential framework for risk management.

The CIA study for Paracel Project has been conducted following the six-step process specified by the IFC's Good Practice Handbook on the Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets. The figure bellow illustrates the Rapid Cumulative Impact Assessment (RCIA) logical framework which is suggested to be conducted by the IFC.

Steps of the RCIA process is as follows:

• Step 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries: Determine spatial and temporal boundaries and identify VECs.

• Step 2: Scoping Phase II – Other Activities and Environmental Drivers: Identify all developments and external natural and social stressors affecting the VECs.

• Step 3: Establish Information on Baseline Status of VECs: Determine present conditions of VECs.

• Step 4: Assess Cumulative Impacts on VECs

• Step 5: Assess Significance of Predicted Cumulative Impacts

• Step 6: Management of Cumulative Impacts

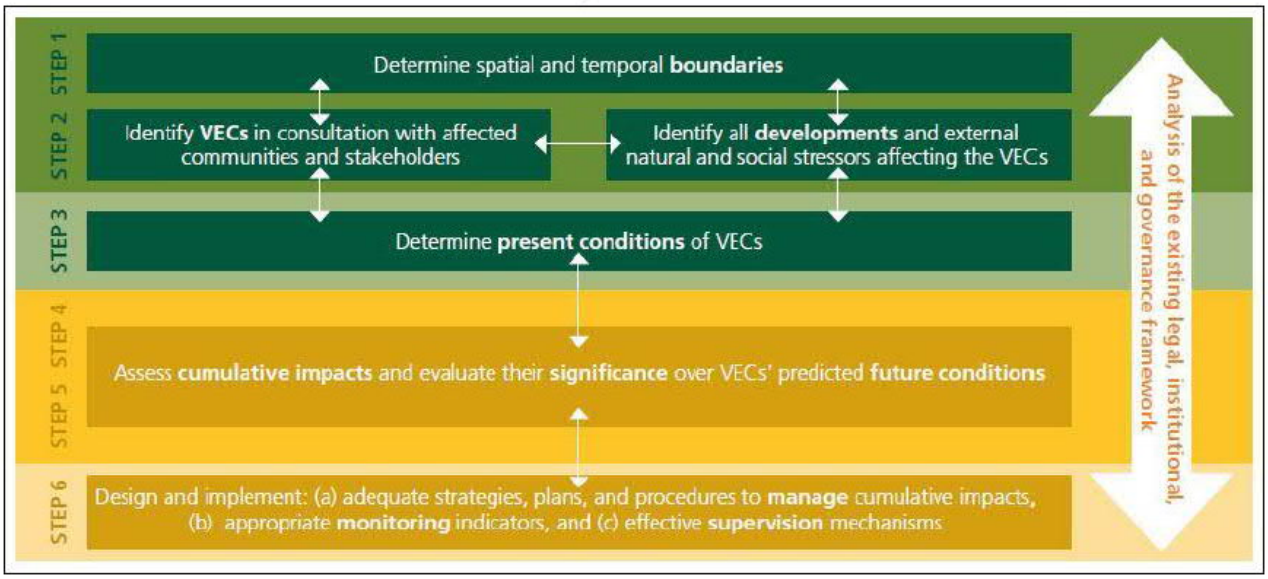
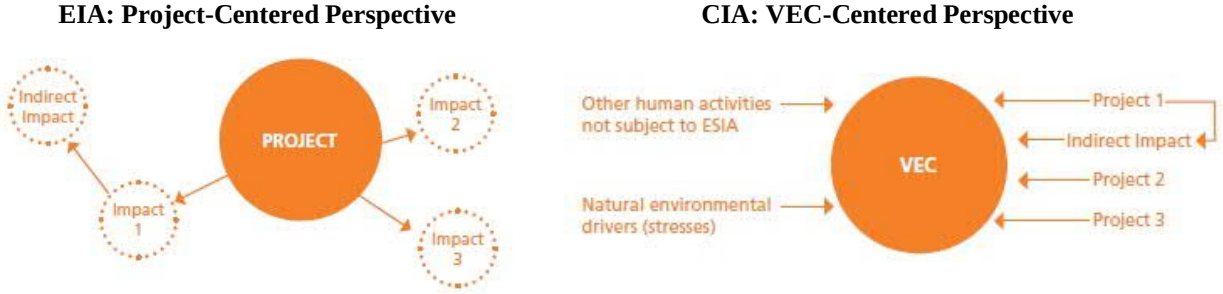


Figure 2 – RCIA Logical Framework

Unlike an EIA, which focuses on a project as a generator of impacts on various environmental and social receptors, a CIA focuses on VECs as the receptors of impacts from different projects and activities (see Figure below). In a CIA, the overall resulting condition of the VEC and its related viability are assessed.



Source: IFC 2013
CIA = cumulative impact assessment; EIA = Environmental and Social Impact Assessment; VEC = valued environmental and social component

Figure 3 – Comparing EIA and CIA

Thus, this document is a complementary study of the impacts assessment, analyzing the cumulation and synergy of PARACEL's project located in the Departments of Concepción and Amambay, Paraguay.

4.1 Spatial Boundary

For the delimitation of the spatial boundary, within the framework of physical, biotic and social researches, where the VECs are, as well as taken into account for the studies of the industrial component (including river port, transmission line and substation,

besides the camps and road access) and the forestry component, the following criteria were considered:

- IFC Performance Standard No. 1, on the delimitation of the project's area of influence,
- The phases of the project (design, construction and operation) and its components (industrial and forestry), possible impacts and,
- The social and cultural aspects studied.

The influence area includes the departments of Concepción, San Pedro and Amambay. As mentioned above, for both, the industrial component of the project; as well as for the forest component, corresponds to these three departments in indirect influence area of the project, thus integrating both components, where the water basin, ecosystem services, infrastructure, health and safety and jobs will be affected by the whole project.

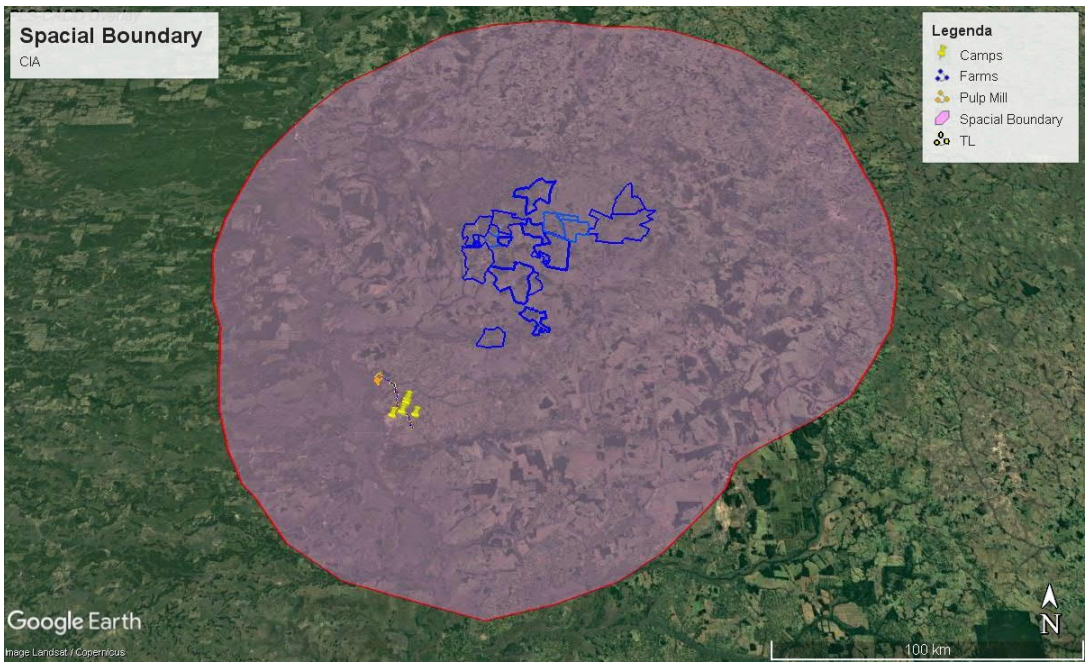


Figure 4 – Paracel project cumulative impact spatial boundary

4.2 Temporal Boundary

Regarding the temporal boundary of the study it was considered the entire period of operation of the evaluated ventures (in their different phases of planning, installation and operation). Although all ventures will have cumulative impacts by year 6 (six), due to the fact that the forestry component will be able to be analyzed only after the mill, river port, transmission line and substation will be already operating because the forestry activity has different schedule, as showed in the figure below:

28 months

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Pulp mil, transmission line, substation and river port	Engineer	Construction	Operation					
Forestry	Planting	Grouth/Mantainence				Harvesting/Operation		

4.3 Potential Valued Environmental and Social Components (VECs)

To be included in a CIA, a VEC must first be confirmed to be valued by some identifiable stakeholder group and/or the scientific community. With this objective, it was performed the survey of the social perception through interviews within the CIA influence area, which included the following stakeholders groups: local authorities such government of the department, municipalities, regional offices of ministries and national secretariats, universities, associations, social and religious organizations, educational institutions, small businesses, tourism and recreation enterprises, sanitation boards, neighborhood commissions, public and private sector companies, and community members from the Project Area of Influence. The interviews took place between January and March 2020 for Mill ESIA, and from July to September 2020 for Forestry ESIA and it was inquired about valued environmental components. The figures below show the locations where the community perception survey took place.

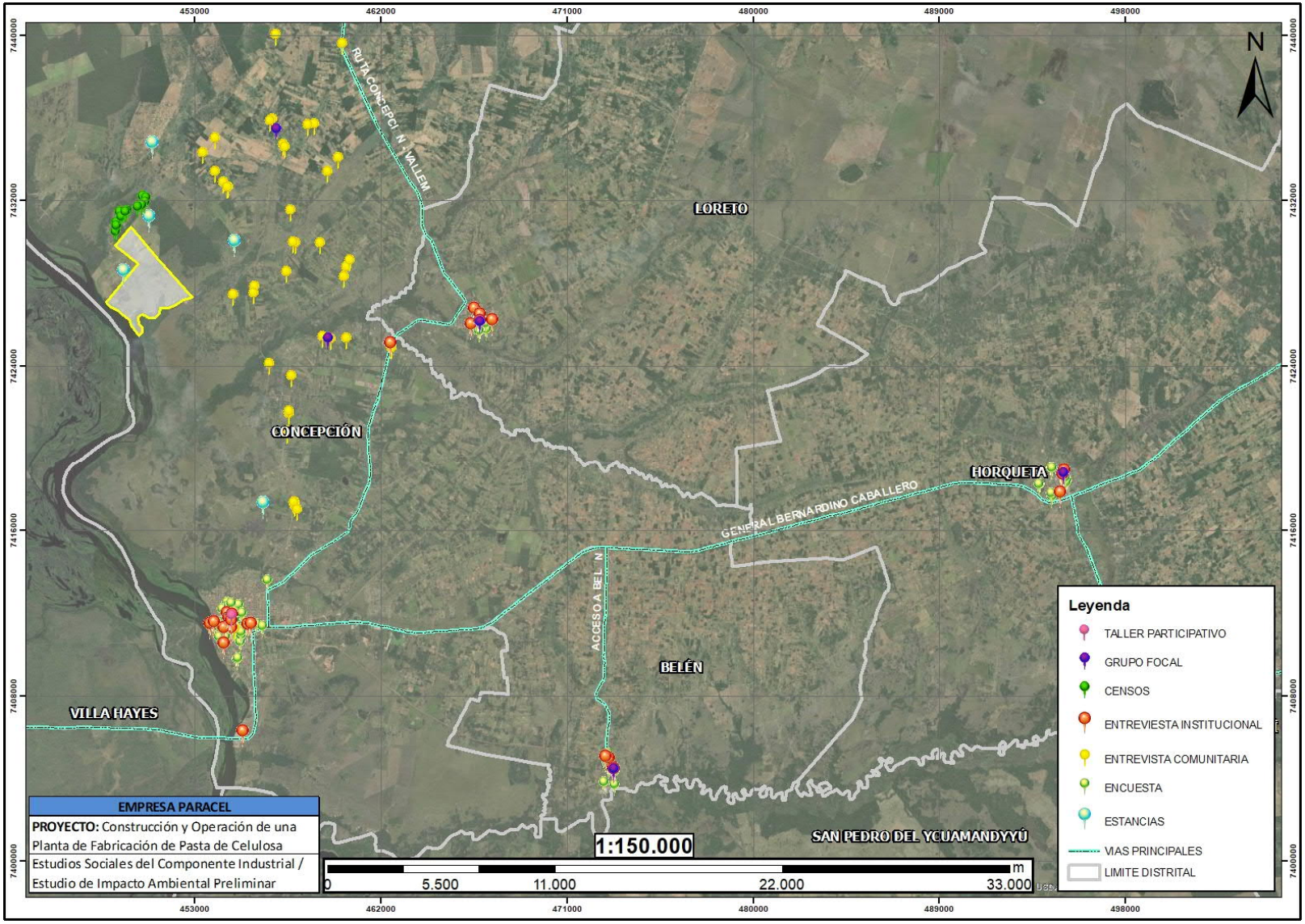


Figure 5 –Perception Survey of the Mill ESIA

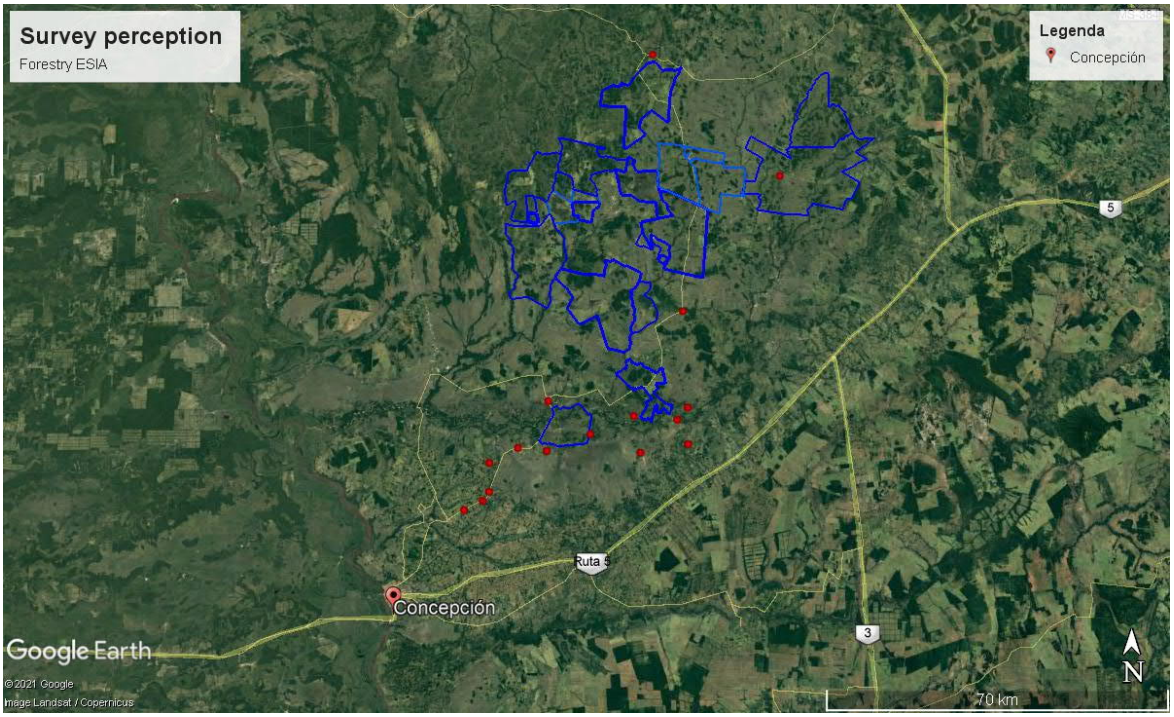


Figure 6 –Perception Survey of the Communities Forestry ESIA

Other than that, the study "Indigenous Consent and Identification of the Self-Determination Model of Indigenous Communities in the Direct Influence Area (DIA) of the Cellulose Plant Project" was prepared by the Natán Foundation Technical Team, which began in October 2020. It is consistent and complements the Social Studies carried out by PARACEL, both for the industrial component and the forest component. The Free, Prior and Informed Consultation and Consent Process that has been carried out with indigenous communities in the area of direct influence (DIA) presented in the figure below. It describes technical and regulatory aspects that have been taken into account in designing, planning and implementing the entire process of dialogue and linkage of indigenous communities with PARACEL within the framework of respect for human rights and the rights of indigenous peoples and communities.

It should be noted that 2,3% of the population within 3 Departments (Concepción, Amambay and San Pedro) is indigenous population, where the indirect influence areas are located. The Constitution of Paraguay (1992) recognizes indigenous peoples and defines them as "groups of culture prior to the formation and organization of the Paraguayan State" (art. 62). Thus, PARACEL must consider indigenous protection in its decision-making, as well as assess the social and environmental impacts that may eventually occur in indigenous communities or peoples, guaranteeing their protection and participation.

Therefore from November 2020 till January 2021, several meetings were held with the indigenous people in the influence area of the project. The dialogue and work activities done in partnership with the indigenous communities were always seeking for horizontal relationships, emphasizing the strengths and all kind of resources that families have, in order to contribute to the improvement of their living conditions and increase their level of well-being.

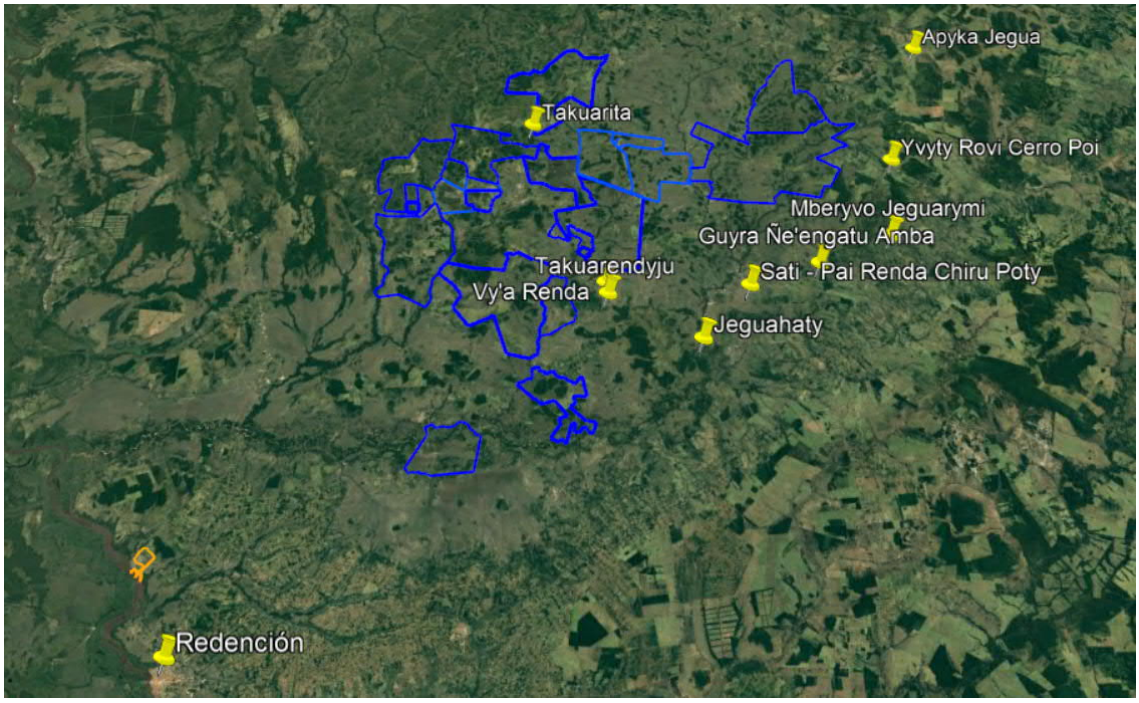


Figure 7 – Meetings with the indigenous peoples

In **ANNEX I** it is presented the list of the stakeholders, communities and others players consulted for the project, identifying the location they belong and date the meeting was held.

The table below presents the list of Social Environmental Components and whether the Stakeholders valued they to be impacted or not by the Paracel Project (Mill and Forestry). These engagements allowed Poyry to develop a list of preliminary VECs and to establish the value or importance of receptors to the interviewed stakeholders.

Stakeholders value this social environmental component	Industrial Component (pulp mill, river port, access, transmission line and substation)	Forestry Component (plantations areas)
Soil contamination (erosion and waste collection and treatment system)	yes	no
Surface water resources (watershed conservation, drainage and sanitation)	yes	yes
Groundwater resources	no	no
Air contamination	no	no
Noise	no	no

Stakeholders value this social environmental component	Industrial Component (pulp mill, river port, access, transmission line and substation)	Forestry Component (plantations areas)
Flora	no	no
Fauna	no	no
Natural Habitat	yes	yes
Infrastructure and road safety	yes	yes
Jobs	yes	yes
Local Development	yes	yes
Landscape	yes	no
Cultural Heritage	no	no

Although the VECs must be reasonably expected to be affected by the project under evaluation (i.e., Industrial and Forestry Components) there should also be some combination of other projects and external drivers. Therefore, Section 6.1 presents the VEC selection results.

4.4 Limitations

According to the IFC's Good Practice Handbook, the significance of a cumulative impact is evaluated not in terms of the amount of change, but in terms of the potential resulting impact to the vulnerability and/or risk to the sustainability of the VECs assessed. This means evaluating cumulative impacts in the context of ecological thresholds. Determining ecological thresholds for biological and social VECs has proven to be difficult. In many cases, such thresholds may not be clearly identified until they are actually crossed, at which point recovery may take a long time with considerable cost or may simply not be possible. Consequently, a precautionary approach that explicitly considers uncertainty in ecological and sociological relationships is essential when thresholds of acceptable VEC condition are being established.

An alternative is to identify the limits of acceptable change, in consultation with the scientific community and the affected community. This approach focuses on the identification of VEC conditions that are deemed acceptable to stakeholders. The advantage of this approach is that once acceptable VEC conditions have been agreed upon, the appropriate combination of levels of use and management strategies required to sustain those conditions can be determined.

Therefore, based on the approaches suggested by IFC and the CIA limitations, the significance of cumulative impacts is evaluated not in terms of the amount of change, but in terms of the potential resulting impact to the vulnerability and/or risk to the sustainability of the VECs assessed.

4.5 Other projects

Planned and ongoing initiatives have been identified in the project's influence area. These were also complemented with other projects known through official institutions of the National Government such as the MIC (Ministry of Industry and Commerce), MADES (Ministry of Environment and Sustainable Development), MOPC (Ministry of Public Works and Communications), MAG (Ministry of Agriculture and Cattle raising), the DNCP (National Directorate of Public Procurement) or the Municipality, and their websites, besides Latin America Bank of Development and other undertakings mentioned by the communities in the framework of the interviews carried out.

4.6 External drivers

Regionally present external drivers and stressors were identified through both ESIA-generated information and publicly available information. Section 5.2, External Drivers, provides a description for each one.

4.7 Assessment of Cumulative Impacts on VECs

CIAs are future-oriented and Project contributions are assessed as the difference between the expected future condition of the VEC in the context of all possible known stressors and that condition plus the Project under evaluation. This step of the CIA assesses the future conditions of the VECs, considering the impacts from the Project, other projects, and external drivers. The potential impacts to VECs were established from the results of the two Project ESIAs and other available information. If the potential impact significance on a VEC was rated as minor or higher for at least one potential impact associated with the Project (Industrial and/or Forestry) in the Project ESIAs, the VEC was identified as potentially eligible for the CIA. If no impact information was available (e.g., for other projects), it was assumed common sector-based impacts.

Based on the publicly available information and the findings of the stakeholder interviews, cumulative impacts were categorized by priority using the following definitions:

- **High Priority**: The VEC is expected to be adversely impacted by other projects and/or external drivers and the future addition of the Project could incrementally contribute to the adverse impact. Actions should be implemented in the short term to mitigate potential adverse cumulative impacts on the VEC.
- **Medium Priority:** The VEC could potentially be impacted by other projects and/or external drivers, and the Project could potentially contribute to the

adverse impact. Actions should be implemented in the medium term to mitigate potential adverse cumulative impacts on the VEC.

- **Low Priority:** The VEC could potentially be impacted by other projects and/or external drivers, but the Project would not be expected to contribute to the adverse impact or its contribution is expected to be negligible. No actions are required to mitigate potential adverse cumulative impacts on the VEC, due to all mitigation measures presented at both ESIAs are adequate to mitigate any potential adverse cumulative impacts on the VEC.

4.8 Cumulative Impact Management

Internationally recognized good practices for managing cumulative impacts include:

- Effective application of the mitigation hierarchy (avoid, reduce, and remedy) in the environmental and social management of the specific contributions of a project to expected cumulative impacts; and
- Undertaking best efforts to engage, leverage, and/or contribute in multi-stakeholder collaborative initiatives or discussion groups to implement management measures that are beyond the capacity and responsibility of any individual project developer. (IFC 2013)

Therefore, besides controls and management measures included in both ESIAs (Industrial and Forestry) provided a means to mitigate the specific contributions of the Project to effects on VECs, the CIA will provide recommendations in the context of the Project to manage potential cumulative impacts on these VECs.

5 OTHER PROJECTS AND EXTERNAL DRIVERS

5.1 Other Projects

The range of programs and projects identified during the social studies development process is presented below.

The records of the previous stage were taken into account; Industrial component, although programs and projects that are closely related to the districts included in the DIA of the forestry component are presented as well, it was considered important to update (where possible) the information regarding said initiatives.

Table 1 – Projects identified for the elaboration of the cumulative impacts assessment

No.	Project/Program	Institution	Summary description	Location	Execution dates	Situation
1	Sanitary sewerage system and wastewater treatment plant for the city of Horqueta	Ministry of Public Works and Communications	Financing from the Inter-American Development Bank (IDB). It provides for the construction of the sanitary sewerage system for the urban area of the city of Horqueta; In addition, the construction of the wastewater treatment plant is contemplated, which will be located on the northern edge of the city, on a municipal property of approximately 10 hectares.	Distrito de Horqueta		Planned project
2	Environmental adaptation of the sanitary sewerage system of Concepción – ESSAP S.A.	Paraguayan Sanitary Services Company	Administered by ESSAP S.A., being the only concessionaire of drinking water and sanitary sewerage services nationwide, and operates in the city of Concepción since the late 1970s.	Distrito de Concepción	Running	Planned project
3	Improvement of neighborhood roads in Concepción	Ministry of Public Works and Communications	The MOPC promotes the project to improve neighborhood roads in the department of Concepción, planned to be executed in the period 2020-2025, and includes the improvement of the Loreto – Paso Barreto section, equivalent to 37 km.	Distrito de Loreto/Distrito de Paso Barreto	2020- 2025	Planned project
4	Improvements in the physical connectivity of the department of	Fondo de Convergencia del Mercosur (FOCEM)	It is part of the improvement project of San Pedro – Belén – Concepción, and aims to improve the passability of the section San Pedro del	San Pedro/Belén /Concepción	Expected completion June 22	Planned project

	San Pedro – Punta Riel – Belén section		Ycuamandiyú (Junction Route PY11) – Piri Pucu – Potrero Naranjo – Punta Riel – Belén, Belén – Concepción (Old trace of National Route No. 5) and access to Puerto Ybapovó. According to the project's RIMA data, the works will be financed by the Mercosur Convergence Fund (FOCEM).			
5	Habilitation and Maintenance of the Pozo Colorado – Concepción section	Ministry of Public Works and Communications	Promoted by the MOPC, it aims to rehabilitate 146 km of the Pozo Colorado – Concepción section, to recover its project service levels through the outsourcing of services, which will develop civil works, such as the rehabilitation and maintenance of paved roads. It has the RIMA of the project. The works will be financed by the Development Bank of Latin America (CAF), and the works have begun at the end of 2019.	146 km del tramo Pozo Colorado – Concepción	2019	Planned project
6	Improvement of the electrical system of Concepción (Section SE Horqueta – SE Concepción)		The works carried out for the commissioning of the 30 MVA Mobile Substation consisted of connecting the Mobile Substation to the Vallemí II – Horqueta Transmission Line, with the potential method, that is, without interrupting the supply of electrical energy in the area of influence of the Substation. To raise the reliability and quality of the electricity supply in the Northern Region, we recently commissioned			Current

			the 220/23 kV Mobile Substation in the Horqueta Substation, department of Concepción, in such a way as to make the necessary adjustments for the commissioning of the new and modern facilities of the aforementioned substation, without the interruption of the electricity supply in the area.			
7	Improvement of the dredging of the Paraguay – Paraná Waterway		According to the data of the social characterization, MOPC performs maintenance dredging in the Paraguay River, as well as in the Apa River. Additionally, according to data from the MOPC and the Technical Secretariat of Planning, a major dredging project of the Waterway is being promoted under private initiative, within the framework of the Law on Public-Private Partnership (Law No. 5102/13 “On the Promotion of Investment in Public Infrastructure and Expansion and Improvement of Goods and Services by the State”).			In process
8	Improvement of the Drinking Water System for Regional Development in the Republic of Paraguay – ESSAP S.A Ciudad de Concepción	Paraguayan Sanitary Services Company and Ministry of Public Works and Communications	The project “Improvement of the drinking water system” was jointly promoted by ESSAP S.A. and the MOPC It was executed and concluded in mid-2013, and consisted of the modernization and expansion of the drinking water treatment plant in Concepción. It is currently in operation.	Distrito de Concepción	2013	Proyecto en operación

9	Frigorífico Concepción S.A.	Frigorífico Concepción S.A.	It is an industrial enterprise that has been operating since 1977 and in recent years has become an important refrigeration industrial park, investing in state-of-the-art technology and human resources with extensive experience in the field5. Its main activity is the production of meat and by-products of bovine origin, to then market them mainly in international markets and, on a smaller scale, in the domestic market.	Distrito de Concepción	1977	Project in operation
10	JBS – Belén	JBS Frigorífico Belén	It is a refrigeration project that was mentioned in interviews with local actors, especially in the area of the city of Belén where the venture is developed. It is highlighted that it is one of the main industries in the area, after the Concepción refrigerator	Distrito de Belén	2017	Project in operation

Table 2 – Potential Impacts from Other Projects by Sector

Sector / Status	Other Projects	Main Sector-Specific Impacts
Sanitation	- Sanitary sewerage system and wastewater treatment plant for the city of Horqueta - Environmental adaptation of the sanitary sewerage system of Concepción – ESSAP S.A. - Improvement of the Drinking Water System for Regional Development in the Republic of Paraguay – ESSAP S.A Ciudad de Concepción	**Environmental** Air Emissions – Increased movement of vehicles on access roads and the operation of machinery and equipment generate atmospheric emissions and dust resuspension. Noise – The movement and operation of machinery, equipment and vehicles will contribute to the increase in noise and vibration emissions. Erosion process and silting – The removal of organic soil, the execution of the earthworks near water bodies may induce erosive processes and silting. Water quality – The implementation of earthworks and civil works could lead to changes in water quality, such as increased turbidity. Interference on aquatic fauna and flora – The implementation of earthworks and civil works could lead to changes in water quality, such as increased turbidity, affecting aquatic fauna and flora. **Social** Jobs – Generation of jobs to operate and maintain the sanitary sewerage system and the drinking water treatment system. Improving sanitation rates – An improvement in the quality of life of the population is expected; as well as a well-informed population about the benefits of the sewage treatment system and the drinking water treatment system, prepared to disseminate knowledge to others about the environment preservation and, consequently, it is expected that there will be a reduction in diffuse pollution.
Infrastructure – access roads	- Improvement of neighborhood roads in Concepción - Improvements in the physical connectivity of the department of San	**Environmental** Air Emissions – Increased movement of vehicles on access roads and the operation of machinery and equipment generate atmospheric emissions. Noise – The movement and operation of machinery, equipment and vehicles will contribute to the increase in noise and vibration emissions.

	Pedro – Punta Riel – Belén section - Habilitation and Maintenance of the Pozo Colorado – Concepción section	Erosion process – The removal of organic soil, the execution of the earthworks may induce erosive processes. Risk of running over animals and traffic accidents – The traffic increase on paved roads may increase the risk of running over animals and vehicles accidents. **Social** Jobs – Generation of jobs to maintain the roads access safe.
Infrastructure – waterway	- Improvement of the dredging of the Paraguay – Paraná Waterway	**Environmental** Change in water quality by fuel and oil spill from boats. Change in water quality by resuspension of material in dredging activities. Change in water quality by contaminated dredged material. Change in currents and dynamics. Suppression of the benthic community due to bathometric alteration. **Social** Generation of jobs. Increase vessel traffic and decrease of vehicles traffic.
Infrastructure – electrical system	- Improvement of the electrical system of Concepción (Section SE Horqueta – SE Concepción)	**Environmental** Increase in accidents with birds. **Social** Generation of jobs. Risk of electrical accident. Increased of electricity supply in the region. Effects of electric and magnetic fields on the quality of the environment and the life of the population. Disturbance to the population due to noises and radio interference.

Industry – meat	- Frigorífico Concepción S.A. - JBS Frigorífico Belén	**Environmental** Air – Control the emission of particulate matter by daily monitoring of the degree of blackening of boiler chimney smoke. Soil/subsoil contamination by sanitary effluents: handling, transport and storage of chemicals will be adopted operational procedures in accordance with all legal requirements and recommendations. Properly treat the sanitary effluent. Soil/subsoil contamination by fuels, oils, lubricants, heavy metals and other chemicals. Store chemical inputs in waterproofed areas following the standards and use containment structure in case of possible leakage. Attraction and proliferation of sinanthropic fauna: Use of ecological traps for flies. In the case of the presence of venomous animals, carry out the removal of the site by an employee trained for such action. Risk of running over animals and traffic accidents – Vehicles are used to transport inputs to the factory and transport the products to the costumers. The traffic on paved roads may increase the risk of running over animals and vehicles accidents. **Social** Generation of jobs.

Source: Social Studies information, 2020

5.2 External Drivers

5.2.1 Climate Change

Nowadays, climate change attributed to the effects of anthropogenic-originated greenhouse gases (GHG), currently represents the greatest environmental, social, and economic threat on the planet. The accumulated level of GHGs in the atmosphere is constantly growing with population and economic activities. If measures are not taken today, it will be increasingly difficult and costly for countries to adapt themselves to the effects of climate change in the present and in the future. Therefore climate change is an external driver for the project.

Taking urgent measures to combat climate change and its effects is one of the current sustainable development objectives of the United Nations. In that way, the knowledge of the individual contribution of GHG to climate change through the quantification of emissions, which is known as “carbon footprint”, is important to apply measures that reduce it and thus combat climate change.

From the above mentioned, a growing number of social, business, and political groups are becoming increasingly interested and convinced about the importance of incorporating in their activities measures, which aim to a sustainable development. Thus, GHG emissions quantification and reduction has become a common pattern for companies and institutions as an essential part of their corporate social and environmental responsibility programs.

According to the latest GHG Inventory of Paraguay (2015), the Agriculture and Livestock sector is responsible for the 59.89 % of total emissions (27,132 Kt CO_2eq), land use, land use change and forestry for the 30.72 % (15,755 Kt CO_2eq), and for IPPU (industry processes, product use), 1.82% is reported (931 Kt CO_2 eq).

PARACEL is committed to managing and developing its business with the highest international standards of environmental, social and economic sustainability. There is an awareness that this is not only achieved by providing products that satisfy customers, but that production must be done by operating in a socially friendly way, without endangering the environment.

Thus, Master Environmental Engineer Claudia Gómez and Forest Engineer Lourdes González Soria, performed greenhouse gases emissions and capture balance report for PARACEL project, including forestry and industrial component.

The Forestry component considered the following emissions sources:

– Planting and maintenance of clonal plantations of E. urograndis: consumption of fossil fuels and application of nitrogen fertilizers;

– Harvesting and debarking: use of fossil fuels by harvesters;

– Forwarding: consumption of fossil fuels for wood cargo;

– Trucking: use of fossil fuels to transport the debarked wood to the industrial plant.

The Industrial component considered the following emissions sources:

– Biomass boiler: boiler that uses bark remains, undersized chips and fine chips discarded from the process, where they are burned to generate steam, which is used to produce electrical energy, in the turbogenerators;

– Recovery boiler: steam boiler and chemical reactor of the recovery system of the kraft process, where the black liquor is burned at high temperature generating steam and later energy in the turbogenerators;

– Lime kilns: equipment used to convert the by-product calcium carbonate into calcium oxide reusable in the kraft process;

– Mobile machinery that uses fossil fuels: internal transport of raw materials, products and waste;

– Treatment of solid and liquid waste: emissions from the treatment of solid waste and effluents;

– Transportation of pulp: dry pulp will be transported by river to the overseas port of Uruguay;

– Electricity generation: since the company projects the generation of its own electric energy through turbogenerators supplied with steam from biomass and recovery boilers, the emissions corresponding to the use of electric energy are included in scope 1. This energy cogeneration will have a surplus that will be exported to the national electricity grid; therefore, the emissions corresponding to the export of this surplus will be estimated.

The fundamental formula for estimating the amount of GHG emissions can be expressed as the multiplication of the activity data (AD) by the emission factor (EF), as follows:

Emissions GHG = AD x EF

In the case of fossil fuels, its equivalent in energy used (in gigajoules, GJ) is considered as activity data, this energy is calculated from the amount of heat, a value that depends on each type of fuel.

Apart from carbon dioxide (CO2), other greenhouse gases such as methane (CH4) and nitrous oxide (N2O) are also emitted during the burning of fuels. Each of these gases has a different emission factor depending on the type of fuel.

Additionally, for gases different from CO2, global warming potential (GWP) values are used. In the case of the forestry component, apart from the use of fossil fuels, another 109001759-003-0000-E-1501 100 source of N2O emission is the application of synthetic fertilizers. Therefore, the activity data corresponded to the dose, amount of application and nitrogen content of the fertilizers to be applied. With this data the amount of N2O that will be emitted, and its equivalent in CO2, was calculated.

The term emission is also used to sequestration/capture, since by convention the capture of carbon or CO2 is understood as negative emissions, and is calculated according to expression above.

The estimation of carbon sequestration satisfies a very simple rule. In the case of forest plantations, as well as in forests, the level of activity corresponds to the area (hectares) of the species (or forest type) that exists in a year, and the emission factor corresponds to the capture rate (measured in tCO2 ha-1 year-1) of each surface unit.

The annual plantation area, of the company’s plantation plan, was assumed as the activity data component; and the capture rate (tCO2 ha-1 year-1), which constitutes the emission factor component, was estimated.

Industrial component

The sources of GHG emissions corresponding to the industrial sector by combustion of fossil fuels are:

– Biomass boiler: although this equipment will be fueled by biomass (waste from wood handling and the removal of brown pulp), fuel oil will be used as starting fuel, to stabilize the production process and eventually to oxidize noncondensable gases when deviated to the biomass boiler;

– Recovery boiler: in the same way, although the main fuel for this equipment is of biogenic origin (black liquor), the fuel oil will also be used as initial fuel, and for stabilizing the production process;

– Lime kiln: at first time it will use fuel oil to achieve the necessary temperature (biomass gasification is projected);

– Internal transport of materials and waste: diesel and / or LPG will be used.

Industrial operations will include the fossil fuel consumption in the operations and encompass the following yearly fuel consumption, according to the EIA report (2020) and the GHG balance report:

- Fuel oil = 69,000 tonnes.year-1 resulting in 220,110 tonnes CO2.year-1;
- Diesel oil = 800 tonnes.year-1 resulting in 2,552 tonnes CO2.year-1;
- Diesel oil for transportation = 18,216 tonnes.year-1 resulting in 58,109 tonnes CO2.year-1;
- LPG = 1,500 tonnes.year-1 resulting in 3,850 tonnes CO2.year-1;
- Total fossil emissions = 284,621 tonnes CO2.year-1;
- Total fossil emissions including waste water treatment1 = 285,474 tonnes CO2e.year-1;

The Paracel plant will use biomass residues and renewable biomass as fuel for many of its industrial operations. That is a major contribution to reduce the footprint of its products and to mitigate the GHG emissions from pulp production as is commonly implemented by the pulp and paper industry. Heat and power will be produced using residues from the process. According to the GHG balance report, heat and then power will be produced from biomass residues and black liquor resulting in biogenic GHG emissions of approximately 4.47 Mtonne CO2e.year-1.

The lime recovery process (CaO production) will also release CO2 from biogenic origin resulting in 220,625 tonne CO2e.year-1. Therefore, total emissions from biogenic sources in the industrial operations would result in 4.7 Mtonne CO2e.year-1.

In summary, industrial operations plus transport of the product would account for the following emissions under steady state operational conditions:

- Scope 1 emissions: 285,621 tonnes CO2e.year-1;
- Biogenic emissions due to industrial processes: 4.7 Mtonne CO2e.year-1; and
- Biogenic emissions associated to the harvested wood products4: 0.6 Mtonne CO2e.year-1

Forestry component

There is an evolution of emissions from afforestation for each year of plantation plan, caused by the variation in the amount of fuel (diesel) that will be used each year. This is due to the fact that the plantations are carried out progressively year after year until reaching the 130 thousand hectares required to supply the demand for eucalyptus wood to the pulp mill, and while this required surface is reached, the raw material is imported, which it means longer trips (more fossil fuel consumption). However, in fact, the total plantation area will be 190 thousand hectares.

Therefore, the forestry component, due to silviculture, harvesting, debarking, forwarding, and transport activities, 114,825 tCO2eq will be emitted annually. This value corresponds to the self-sufficient stage of the company in terms of provision of debarked wood, that is, from the moment when raw material is no longer imported.

The steady state operation of the whole production activity will start from 2029 on when it is forecasted that the whole project area will be occupied and the production regime will be stable in time. According to the GHG balance report (based on information from the Paracel's Forestry Department) the emissions due to diesel consumption related to forestry management will be approximately 114,825 tonne CO2e.year-1. This value does not account for emissions from fertilizers (N2O and CO2) and therefore, may be an underestimation:

- Scope 1 emissions: 114,825 tonnes CO2e.year-1;

- Biogenic removals due to forest growth (should compensate the harvested trees): 5.3 Mtonne CO2e.year-1;

As for the biomass, the forestry activity will reach a balance between removals and emissions after all the area is planted. While the former will create a carbon stock proportional to the planted area, the latter will deplete this same carbon stock due to harvesting that will be either transferred to the product (and then emitted back in the atmosphere within a limited timeframe) or emitted due to its use as fuel source for the industrial operations. This carbon balance will lead to a neutral condition neither representing net emissions nor net removals. The carbon stock established in the plantation process is estimated5 to be approximately 56.58 Mtonne CO2. This is an asset of Paracel that must be protected across the years. Nevertheless, due to the nonpermanence nature of the removals associated to the harvested wood products and the forest, they cannot compensate for the fossil emissions under current international guidelines.

Summary of scope 1 and biogenic annual emissions and removals and carbon stocks

The steady state operation of the whole production activity will start from 2029 on when it is forecasted that the whole project area will be occupied and the production regime will be stable in time. The total annual emissions and removals calculated according to the international guidelines mentioned in this report are:

- Scope 1 emissions: 400,446 tonnes CO2e.year-1;

- Biogenic net removals equivalent to the net emissions from harvested trees converted in pulp: 5.3 Mtonne CO2e.year-1;

• Carbon stocks from forests after the stabilization of the operations6: 56.58 Mtonne CO2

Carbon footprint of the pulp produced by Paracel

The limited carbon footprint cradle to grave of the pulp produced by Paracel will be expressed by the following value:

CFPpulp= 0.27 (tonne CO2e).(tonne pulp)-1

This value still requires incorporation of some upstream emissions (scope 3 categories 1 to 8) and some of the downstream emissions (scope 3 categories 9 to 15) that were not available at this point. However, their impact on the final value will be limited and the result above may be a first representation of the CFP.

The value obtained above may be substantially reduced in case biomass is used in the kiln furnace instead of fuel oil. That would eliminate emissions of fuel oil that are estimated to be 220,110 tonnes CO2.year-1. The new value of the CFP would be equal to:

CFPpulp= 0.12 (tonne CO2e).(tonne pulp)-1

It's estimated that the additional plantation area required to supply biomass to the kiln on a 6 years rotation period would be approximately 5,000 ha.

5.2.2 Livestock Farming

In 2019, approximately 15% of the total cattle grazing in the country is concentrated in the departments of Concepción and Amambay, with the highest production in the department of Concepción. Therefore, Livestock Farming activities could be an external driver for the project.

Although the main economic activity historically was agriculture and extensive livestock, in recent years, large companies such as refrigerators and cement plants have been installed, with cutting-edge technology. Likewise, important service provider companies have developed; and, in the district of Azotey there is a milk processing plant (Lácteos Norte) that has developed the milk basin in the districts of Azotey, Tacuati, Yby Yaú and Horqueta. These companies generated new sources of work for qualified and unskilled people, and fueled economic growth in the department.

Other than that, although the Municipal Development Plan of Concepción states that "despite the fact that it has a port, river traffic has declined compared to its beginnings", a good part of the production of calcareous products and grains of the region is mobilized through the ports. Another company that bet on the waterway is Frigorífico Concepción, which invested in private ports to facilitate and reduce the costs of transporting livestock.

Another source of consultation highlights that, although there are high percentages of beef production in the areas involved in the DIA, this has not consequently meant a decrease in poverty levels that still remain high.

In order to obtain greater autonomy in the wood demand, PARACEL has purchased 190,000 hectares (ha) of former cattle ranch lands in the Departments of Concepción

and Amambay that will be converted to eucalyptus plantations to supply the mill in future years.

But these lands were converted from a company named EUCATEC S.A from which Paracel acquired some plantations areas. Therefore, Paracel project was born with already some forest lands acquired. In total 20 estancias were acquired, being 19 for eucalyptus plantation and 1 for the pulp mill site.

It should be noted that within Forestry Master Plan, Paracel counts with the land module which aims to allow the control of land acquisitions and leases made by the company. This includes stakeholders (broker, attorney, buyer, and sellers), payment control made individually for each of the sellers or lessees, and the control of the properties purchased or leased in each acquisition always prioritizing none people displacement.

By 2029, the mill will be supplied with wood primarily from the Project's own plantations, which will be FSC certified, and a number of out-growers. As mentioned above, PARACEL's purchased plantation lands, approximately 190,000 ha in area, which are former cattle ranches (estancias). PARACEL will develop eucalyptus plantations on the former ranch lands in a phased planting program; 6 years of growth is required to reach suitable size for harvest. Hence, during early operation from 2023 to 2028, PARACEL will obtain early wood supply from existing eucalyptus plantations in Brazil, Argentina, and to a lesser extent Paraguay. PARACEL is in the process of identifying potential early supplier sources and recognizes that not all candidates for early wood supply will be fully FSC certified. As a result, PARACEL plans to produce pulp under the FSC Mix label in the early years.

According to project data, nowadays the establishments have livestock as their main activity. For the present study, contact was made with administrators or other referents of said establishments, who provided information to have an approach to the following characteristics:

- They have permanent contract workers who work as foremen, laborers, tractor drivers, beach workers, people who perform jobs related to cleaning and cooking; in addition to administrators and veterinarians; most of them come from nearby towns and the department in general.

- Due to the work system that is implemented, rotating shifts are established as necessary and other workers are hired (per shift), in some cases using contractors, with their cleaning equipment, wiring work, maintenance, among others.

- Regarding the perception of the implementation of the project and the change of category in the area. On the one hand, it is seen as a positive change due to the promotion of other productions apart from livestock, which "will give a lot of work", which "will work on the reforestation of the area." On the other hand, it was pointed out that beyond the change of category, some people want to continue exercising their current economic activities (related to livestock), they stated that "people are used to working in livestock and it is very difficult for them to change their category, even if the payment is better, they will remain in the area".

In the impact assessment developed, there would be an important change in land use in the area, although highlighting that the land is already intervened by agricultural and livestock activities; and in the medium term, it would move to a purely forestry activity (analyzing the Paracel plantations). Therefore, the impact on the following social factors, resulting from the evaluation of the impact of the enterprise, could generate cumulative impacts on the following social factors or VECs: Ecosystem services, local

and regional economy, quality of life and customs; primarily due to the change in land use and possible effects that could occur in the area's water resources. The VEC linked to the health and safety of third parties is also related to possible conditions derived from the increase in traffic, which to the extent that all forest fields are developed or are even expanded over time, could generate cumulative impacts related to road safety and the safety of the people who live in the communities settled in the localities located on the access/exit roads to/from the forest fields.

6 VEC SELECTION AND DESCRIPTION

6.1 Selection of VECs

All potentially eligible VECs were analyzed against the following criteria: (1) confirmed to be valued by an identifiable stakeholder group; (2) reasonably expected to be impacted by the Project (i.e., at least one potential impact significance rating of Minor or Above); and (3) reasonably expected to be potentially impacted by some combination of other projects and external drivers. To be included in the CIA, the VEC had to meet all three criteria. Table below presents the results of this analysis, and highlights the VECs that are selected in the CIA.

Table 3 – Selection of VECs

Social Environmental Components	Valued by Stakeholders	Industrial Component (pulp mill, river port, access, transmission line and substation)	Forestry Component (plantations areas)	Other projects in Sanitation Sector	Other projects in Infrastructure – access roads Sector	Other projects in Infrastructure – waterway Sector	Other projects in Infrastructure – electrical system Sector	Other projects in Industry – meat Sector	External Drivers (climate change and livestock farming)
Soil contamination (erosion and waste collection and treatment system)	yes	yes	yes	yes	yes	no	no	yes	yes
Surface water resources (watershed conservation, drainage and sanitation)	yes	yes	yes	yes	no	yes	no	yes	yes
Infrastructure and road safety	yes	yes	yes	no	yes	yes	no	yes	no
Jobs	yes	yes	yes	yes	yes	yes	yes	yes	yes
Local Development	yes	yes	yes	yes	yes	yes	yes	yes	no
VECs not Selected for CIA									
Natural Habitat	yes	yes	yes	no	no	no	no	no	yes
Groundwater resources	No	yes	yes	yes	no	no	no	yes	no

Social Environmental Components	Valued by Stakeholders	Industrial Component (pulp mill, river port, access, transmission line and substation)	Forestry Component (plantations areas)	Other projects in Sanitation Sector	Other projects in Infrastructure – access roads Sector	Other projects in Infrastructure – waterway Sector	Other projects in Infrastructure – electrical system Sector	Other projects in Industry – meat Sector	External Drivers (climate change and livestock farming)
Air contamination	No	yes	no	no	yes	no	no	yes	yes
Noise	No	yes	yes	yes	yes	yes	no	yes	no
Flora	No	yes	yes	yes	yes	yes	no	no	yes
Fauna	No	yes	yes	yes	yes	yes	no	no	yes
Landscape	No	yes	no	no	yes	no	yes	yes	yes
Cultural Heritage	no	no	no	no	no	no	no	no	no

Several environmental and social receptors or components were not selected as potentially eligible for the CIA, in all cases because they were either not reasonably expected to be significantly impacted by the Project, or they will be performed by law in force, or not valued by the stakeholders.

Natural Habitat, although valued by stakeholders and potentially impacted by the Paracel project (Mill and Forestry) and external drivers, was not selected for this assessment. To support this, the following paragraphs briefly present the current situation of this VEC, expected Project impacts and proposed mitigation measures.

The implementation of Paracel pulp mill will require the conversion of approximately 3.99 ha of remaining vegetation of the Semideciduous Forest and 0.31 ha of remaining vegetation of the Savannah at riparian area for the implantation of the water intake system, the terrestrial emissary of treated effluents and the river port. This area currently contains some 150 ha of native forest remnants, and only 2,7% of the existing native forest will be converted. Paracel has committed to compensate this impact by increasing the native vegetation cover area in relation to the current situation to achieve net gains. To accomplish this, Paracel proposed enlarging the riparian areas, with approximately 250 ha, so that the net increase will represent approximately 400 ha. The implementation of the project and the proposed compensation measures will result in a native forest coverage of 30% at the mill site, compared to the 12% native forest coverage before the project. This compensation measure thus determines an increase in the native forest cover area of approximately 150% in relation to the current situation.

The 30% native forest coverage includes regeneration of the riparian forest, now highly fragmented, and also connect the native areas of the neighbouring properties to the NW and SE acting as a biological corridor, now non-existent. Therefore, **it can be said that the positive impact on habitat cover would be well over 150% in relation to the current situation**.

Regarding the transmission line easement, surveys of the area identified about 84,3% of the area is modified habitat and 15,3% is natural forest and 0,4% is watercourse.

Regarding the vegetation cover in the Forestry component, the surveys conducted for the impact assessment identified that approximately 78% is natural habitat and 22% modified habitat. This approximation will be refined in post-ESIA supplementary studies focusing on the extent of modification in the non-forest habitats as per IFC PS6 definitions; it is likely that the 22% modified estimate figure will increase.

Therefore, Paracel is developing an integrated land use development management plan for the large plantation area that commits to maintaining all forested areas (so no existing natural forest areas will be affected by the Project's plantations), restoration of natural forest areas degraded by logging, protection of all riparian corridors and wetlands, and incorporating ecological corridors to connect forest areas with riparian corridors for wildlife transit. In addition, the project will establish 1 km wide buffers to the national parks Paso Bravo and Bella Vista and the plantations within the Cerrado del Rio Apa biosphere reserve will have a differentiate Land Use to increase the conservation areas. The buffers, riparian corridors, and ecological corridors will contain a mosaic of the different biomes, and preserve Cerrado habitat as well as implement management plans to control invasive African grasses that were introduced during cattle ranching. Overall, Paracel expects to dedicate over 90,000 hectares, or up to 47% of its total land holdings exclusively to conservation. Furthermore, Paracel is exploring REDD+ and other programs to assure the set aside areas would be preserved in perpetuity. Once Natural and potentially Critical Habitat distributions have been better

defined (as per IFC PS6 definitions), a residual biodiversity impact assessment will be conducted to evaluate net impacts of the forestry project on these habitats and their biodiversity values. Biodiversity offsets will be implemented to improve the protection of and/or expand the protected areas to the north and west of the Paracel project properties. Offsets will be implemented to achieve a No Net Loss or Net Gain for biodiversity values subject to residual impacts within a reasonable timeframe.

Given the above, the Paracel project, particularly the Forestry component, is expected to result in net gains for this VEC (Natural Habitat).

6.2 Baseline Status of VEC

Information on the baseline status of the VECs is mainly based on the environmental and social baseline information presented in both Project ESIAs (Mill and Forestry).

6.2.1 Soil contamination (erosion and waste collection and treatment system)

Industry component

The areas of influence of the PARACEL pulp mill have basically two types of soil: sandy and clay.

The sandy soils are suitable for forestry. Normally, this type of soil has little capacity to retain water, although it can improve depending on the concentration of organic matter it possesses. Water erosion has devastating effects on sandy soil.

Clay soils are harder and heavier, dark red in color, and when wet they become extremely slippery precisely because of their ability to retain water. Clayey soils are excellent for agricultural production, as they are less prone to erosion. Likewise, loamy soils – a mixture of sand and clay – are also suitable for agriculture. The most outstanding feature of this type of soil is the accumulation of sandy sediments and of white and granular marl. The igneous rocks come from the depths of the earth and have melted to the surface. The sedimentary rocks were formed from clay by pressure from the earth’s layers.

Specifically on the riverbanks of the Paraguay in the eastern region and the Pilcomayo in the western region, periodic contributions and depositions of alluvial materials transported by these watercourses are formed, which is reflected in the variety of successive layers of soil that accumulate. The content of organic matter is also very variable from one layer to the next. These soils are not stable for agricultural use, due to the constant danger of flooding, and are covered with grass vegetation and species from humid places. They are used in extensive cattle raising.

In May 2020, the Paraguayan company GEOSTAN GEO-ENGINEERING carried out 25 surveys in the area of the PARACEL (DAA) pulp mill.

In general, studies at depths of 15 to 20 meters show a constant stratigraphy composed of layers of sand and sandstone in different degrees of alteration.

In the first 4 meters, the profile often presents a layer of silty sands in gray, yellow or brown, with low resistance and SPT (Standard Penetration Test) values between 6 and 11 meters.

In the sequence, new layers of silty clay sand are found, with significantly higher strengths (16 ≤ SPT ≤ 72) or, still, sandstone layers with thicknesses greater than 4 meters interposed to the main layer or continuous up to the drilling limit.

The water level was not reached in 20 of the 25 wells, up to the drilling limit. It should be noted that, in order to obtain more information on the water level, mechanized excavations will be carried out in the project area.

Earthworks are being planned, preferably in non-rainy periods, to reduce the possibility of erosion processes due to the susceptibility of the soil.

Waste collection and treatment system

In terms of solid waste disposal, the vast majority of households use burning system in Concepción and San Pedro, and public/private collection services in Amambay. It is worth mentioning that one third of the population of Concepción has access to garbage collection services.

Similarly, for the disposal of wastewater (sewage), only 6.55% of households have access to the sanitary sewerage network (cloaca) in Concepción (1.03% in San Pedro and 4.14% in Amambay).

Almost 30% of households use a cesspit with a septic chamber, and a similar percentage use a cesspit without a septic chamber in Concepción and San Pedro, while in Amambay these percentages rise to more than 40% in both cases. In addition, a very important percentage of households (35.47% in Concepción, 37.38% in San Pedro) still use common latrines with or without a roof or door, ventilated dry pit latrines or surface soil, stream, river and others. While in Amambay this percentage drops to 8.23%.

Forestry component

The topography of the areas of influence of the PARACEL Eucalyptus Plantation has plateaus and valleys, which are flat to almost flat lands that receive the drainage water from the high places, which are the hills and mountains.

The valley is flanked by higher places and is narrower than it is long, while the plain, also called the “llanura”, is a large area both wide and long (flatlands), further away from the high places.

According to the Geology of Paraguay site, in the Departments of Concepción and Amambay, you can see Cerro Memby, Vallemi, Aceite, Akangue, Alambique, Guazu, Muralla and Sarambi.which geomorphologically, according to its characteristics, would be assigned the name of Butte (isolated hills with cliffs). It is constituted essentially by red sandstones of the Triassic – Jurassic known as the sandstones of the Misiones Formation. To acquire this form, an intense material removal (erosion) had to have occurred in the course of geological time.

Currently, in the preparation of soil for the purposes of forest plantations, uses the minimum cultivation practice associated with other conservation practices for erosion control. The activities are carried out in the blocks where eucalyptus seedlings will be planted.

With minimal cultivation practice there is soil revolving in the planting line. The planting line is subsolated until the recommended depth, which varies according to the clay content in the soil and the occurrence of soil densification and compaction.

A preventive approach to soil conservation work since the beginning of the farm implementation prevents erosions.

Waste collection and treatment system

Regarding the disposal of solid waste, according to data from the San Alfredo Local Health Plan, the San Pedro Municipality lacks a landfill for the disposal and treatment of solid waste. The means of elimination frequently used by the population are burning and bury.

Regarding the disposal of solid waste, the Sargento José Félix López Municipality has arranged a place to deposit it, but the collection service is not yet available. Villagers currently burn or bury their household waste.

According to data extracted from the Municipal Development Plan, the inhabitants of the Bella Vista district have access to basic services such as; garbage disposal system; sewage waste (absorbing cesspools), access to running water in rural areas is done through sanitation boards and in urban areas through ESSAP.

Along these lines, according to district indicators from the DEGEEC 2012 census, in the Bella Vista district, 78.62% of the population has access to electricity; 61.76% of the population has access to running water; 20.34% access to solid waste disposal.

Regarding solid waste management, data from the Paso Barreto Local Health Plan show that the Municipality does not have a landfill for their disposal and treatment and the most common practice is burning. Regarding basic sanitation, the majority of the population uses common latrines; to a lesser extent, there are homes that have modern bathrooms.

In the District of Loreto, according to the data provided by the DGEEC, regarding electrical energy, it can be observed that 91.3% of the homes have this service; 72.2% of the homes have running water; only 25.8% of homes with improved sanitation; 9.2% have a garbage collection service.

Regarding waste disposal, some homes in the urban area have access to the collection service that is provided by the Loreto Municipality, while in rural areas the predominant practice to eliminate solid waste is burning.

In relation to access to basic services, in the District of Arroyito**,** the data provided by the DGEEC, in which it can be observed that in most of the homes there is electricity service (94.6 %); followed by homes that have running water (58.2%); and to a lesser extent, homes with improved sanitation. Only 0.1% have a garbage collection service.

Regarding the disposal of solid waste, the Horqueta Local Health Plan indicates that the district has a municipal landfill for the disposal and treatment of garbage. However, only a part of the urban area accesses the collection service, in the rural area the means of waste disposal commonly practiced by the population are burning and burial.

6.2.2 Surface water resources (watershed conservation, drainage and sanitation)

Industry component

Paraguay has a very important and extensive hydrographic network throughout its territory. In fact, the Paraguay River separates and limits two natural regions with very different natural and socioeconomic characteristics (MADES, 2020).

The hydrography of the River Plate Basin is made up of three large water systems: the Paraná, Paraguay and Uruguay, in addition to the River Plate itself, into which some smaller rivers flow. Paraguay is a tributary of the Paraná, while the latter joins with Uruguay to form the Plata River. The drainage areas of each of them form the main sub-basins of the system (CIC, 2020).

The Paraguay River Basin has an area of 1,095,000 km², which covers about 35% of the entire area of the Plata Basin, which is 3,100,000 km².

The Paraguay River rises in the Chapada de Parecís (Brazil) and, after 2,550 km, flows into the Paraná River, at the height of the city of Resistencia (Argentina) (CIC, 2020). The city of Asunción, the capital of Paraguay, is located along the main course of the river (CIC, 2017).

The Paraguay River and all Paraguay's surface water resources are classified as a Class 2 river, according to SEAM Resolution n. 255/2006.

Its left bank tributaries are the Aquidabán, Jejui, Aguaray, and Tebicuary rivers and its right bank tributaries are the Pilcomayo and Bermejo rivers (CIC, 2017).

The floodplains on the banks, the enormous volume of solid material carried by the Bermejo River and the backwaters produced by the waters of the Paraná River, which cause irregularities in the river's regime and changes in its year-on-year variation, are its main characteristics (CIC, 2020).

The flood plain of the Paraguay river and its continuation in the Paraná river determine a hydrological continuum of wetlands and a biological corridor that extends from north to south from the great Pantanal in the Upper Paraguay, through the wetlands (CIC, 2017).

For Paraguay, the waterways of the Paraguay and Paraná rivers represent a fundamental factor in its foreign trade, given its status as a Mediterranean country, since they have provided access to the sea since colonial times (CIC, 2014).

In the regional context, these routes are now a fundamental pillar of integration of the regions of the Plata Basin, and have become an important means of transporting cargo, due to the advantages of river transport (CIC, 2014).

The Paraguay River, the most important waterway in the country, has the characteristics of a plain river, where, due to the natural process of the river, subject to erosion, transport and sedimentation, morphological changes occur in the bed, which changes the navigation channel during time (CIC, 2014).

The variable levels of the river, subject to the precipitation regime in its basin, determine a hydrological cycle of the Paraguay river that we can classify into Low Waters (November, December, January, February), High Waters (May, June, July, August), and Medium Waters (March, April, September, October) (CIC, 2014).

In periods of low-level water there are usually difficulties in navigation, because the low levels of the river produce the appearance of the critical crossings. It should be noted that the Paraguay River does not have any artificial flow regulation system but due to anomalies its hydrological cycle is sometimes altered (CIC, 2014).

Navigation in the Plata Basin is done in a complex system on the Paraguay River. Based on this, there is a program called waterway Paraguay-Paraná (CIC, 2014).

This waterway is the main route that connects the countries of the La Plata Basin, being an important route because of its capacity to transport large loads (CIC, 2017).

The Paraguay-Paraná Waterway is a regional agreement between Argentina, Bolivia, Brazil, Paraguay and Uruguay to facilitate navigation and foreign and domestic trade. It is made up of the Paraguay, Paraná and Uruguay Rivers. It is one of the longest natural waterways in the world: 3,442 km, and extends from Puerto Cáceres (Brazil) to Nueva Palmira (Uruguay). It is one of the most significant transport routes for the integration of Mercosur (MAGYP. 2020).

Water resource uses can lead to conflicts when there is no balance between availability and demand for consumptive uses or when non-consumptive uses alter the conditions of the water system, with its variability in time and space (CCC, 2017).

It is worth mentioning that Paraguay River has a minimum flow ($Q_{7.10}$) of 1,093 m^3/s and an average flow of 2,179 m^3/s.

Special consideration should be given to mining activity in the upper basin of the Paraguay River in Bolivia and Brazil. There are tin deposits in the form of cassiterite and acid drainage, a consequence of mining activity and its environmental liabilities, which contaminate rivers and groundwater (CIC, 2017).

Downstream, in Paraguay, the greatest loads of pollutants come from agricultural activity (crops and pastures) and, mainly, from discharges of domestic and industrial effluents in areas near large urban centers such as Concepción (CIC, 2017).

Surface and groundwater monitoring quality

For the Mill ESIA, three water quality monitoring campaigns were carried out on the Paraguay River at two points, one upstream and the other downstream from the raw water intake and treated effluent discharge locations of the future pulp mill, respectively.

Surface water and sediment sampling was performed at two (2) points and three (3) campaigns, covering the region's dry and rainy periods. The campaigns were carried out on the following dates:

- 1st Campaign, October 25, 2019, dry season
- 2nd Campaign, December 15, 2019, rainy season;
- 3rd Campaign, February 17, 2020, rainy season.

It is worth mentioning that a total of 6 campaigns have been planned, yet, due to the coronavirus pandemic, it was not possible to execute the collection of water and sediment samples.

The sampling of surface water and sediments was verified according to the rules and procedures of the Standard Methods for the Examination for Water and Wastewater of the EPA/USA. The type of sampling was simple (exact), i.e., sampling surface water or sediment in sufficient quantity for analysis.

The results of the surface waters were compared with the standards established for class 2 water bodies by SEAM Resolution n. 222/2002. With regard to sediments, it should be noted that there is no legal reference for comparing the results.

It should be noted that most of the parameters analyzed presented concentrations below the limits established by SEAM Resolution n. 222/2002. In the following, only the results of the parameters in disagreement with the legislation will be commented.

In point FW01, of the physicochemical parameters, total phosphorus showed a concentration of 0.0160 mg/L in the third campaign and 0.09 mg/L in the second, results

above the limit of 0.05 mg/L. In the first campaign, the value obtained was 0.021 mg/L, below the limit allowed by legislation. Total Kjeldahl nitrogen showed a concentration above the value permitted by legislation in all three campaigns (limit of 0.06 mg/L): 1.01 mg/L in the third campaign, 1.18 mg/L in the second and 0.84 mg/L in the first.

Also in the third campaign, the recorded color value was 82 uPtCo, above the established limit (≤ 75 uPtCo). In the first two campaigns, the values obtained did not exceed the limit established in SEAM Resolution n. 222/2002.

With regard to metals, the concentration of aluminum obtained was 3.00 mg/L, the lowest recorded in the three campaigns at that time, but still above the limit of 0.2 mg/L. Soluble iron had the highest concentration of the three campaigns, 0.55 mg/L (limit of 0.3 mg/L). Bacteriological and pesticide parameters did not show values higher than those allowed by SEAM Resolution n. 222/2002 in the three campaigns.

In point FW02, of the physicochemical parameters analyzed, in the first campaign, total phosphorus and total Kjeldahl nitrogen showed values higher than those permitted. Unlike the second campaign, the results of the color parameter were kept within the established limit.

With regard to total phosphorus, a concentration of 0.135 mg/L (limit of 0.05 mg/L) was obtained, the highest value recorded in the three campaigns already carried out. For total Kjeldahl nitrogen a concentration of 1.03 mg/L (limit 0.6 mg/L) was obtained, the lowest value recorded in the three campaigns.

For metals, aluminum had a concentration of 4.00 mg/L (limit of 0.2 mg/L), the lowest value recorded in the three campaigns. Soluble iron had the highest concentration in all three campaigns: 0.79 mg/L, above the limit of 0.3 mg/L. It should be noted that a concentration of 0.61 mg/L (above the limit) was obtained in the first campaign and 0.18 mg/L in the second (below the limit).

Bacteriological and pesticide parameters do not exceed the values allowed by SEAM Resolution n. 222/2002.

As was observed in the 3 campaigns, when comparing the results obtained at Point FW01, located upstream of the effluent discharge points of the future PARACEL pulp mill; and at Point FW02, located downstream of the raw water intake point, it is observed that Point FW02 presents higher concentrations, mainly when the parameters that exceeded the limits of SEAM Resolution n. 222/2002 are observed. It should be noted that there are no sources of contribution that justify the increase in concentrations between the two points. Therefore, it is believed that this fact may be associated with sampling or discharge matters from Arroyo Seco, which should be better explained in the future through the analysis of the results of subsequent campaigns.

Phosphorus and nitrogen are nutrients naturally derived from the dissolution of compounds present in the soil and the decomposition of organic matter, which can contribute to the results found. As this is a region where agricultural activities take place, nutrient concentrations above the permitted limit may also be associated with the use of fertilizers.

As for the values of aluminum and iron in disagreement with the legislation, these can be related to the substrate layer of the soils of the region and therefore can be considered as natural from the surface waters.

Regarding the color parameter at point FW01, it is believed that such non-conformity is associated with the time of harvesting, the rainy period of the region, because there

may be an increase in dissolved and suspended solids, mainly material in organic and inorganic colloidal state, thus corroborating the alteration of this parameter.

It should also be noted that, in the third campaign, carried out in February/2020, the Paraguay River showed a higher concentration of dissolved and suspended substances than in the first and second campaigns, held in October and December/2019, respectively. This is due to the severe drought in October, November and December. The increase in precipitation in the region contributed to the alteration of the concentrations of the parameters analyzed, reducing electrical conductivity and all cations and anions.

To protect the environment, the project will be governed by national regulations (water and effluent quality standards, zero deforestation, among others). With the highest international standards, which require permanent monitoring of environmental impacts, and public dissemination of the results.

The high dissolved oxygen concentrations along the Paraguay River will maintain aquatic life and the ammonia, nitrate and total phosphorus concentrations do not have potential to change trophic state in the watercourse.

In April 2021, PARACEL hired TECNOAMBIENTAL (2021) to perform more surface and groundwater analysis and again phosphorus and nitrogen parameters presented above the standard limit in the surface water.

According to the hydrogeological map, the areas of direct influence and directly affected by the PARACEL pulp mill are located in the Aquidauana – Aquidaban Aquifer System.

According to PMCIC[1] (2015), the Aquidauana-Aquidaban Transboundary Aquifer System is located in the Paraná River Basin, with an area of approximately 27,000 km2, of which 14,600 km2 are in Brazil and 12,300 km2 in Paraguay extending in a NE-SW direction, being used for human and animal supply both in Brazil and Paraguay.

The aquifer is of the semi-confined type, made up of glassy-marine sediments with intense variations in facies, presenting flows that are also quite dispersed, with average values oscillating between 10-20 m3/h/well.

From the chemical point of view, it also presents waters with quite variable characteristics. Its use in the short term has become essential for human supply and to allow the economic development of the region, with agricultural and livestock characteristics.

Due to the coronavirus pandemic, it was not possible to execute the collection of groundwater samples in the ESIA preparation, but within 6 points at TECNOAMBIENTAL on April 2021 campaign it could be observed deviation on conductivity, total dissolved solids, chloride, sulphate and magnesium standards that should be better studied.

Sanitation and drinking water

When it comes to communities access to services, it was possible to reveal that with respect to:

Clean/drinking water network: Although the majority of the department's population, according to the permanent household survey, has accessed drinking water supply

[1] PROGRAMA MARCO PARA LA GESTIÓN SOSTENIBLE DE LOS RECURSOS HÍDRICOS DE LA CUENCA DEL PLATA

services via SENASA and/or the local sanitation board between 2017 and 2018 [2], in the case of Piquete Cue's houses, none of them has a drinking water network and the main source of water that the members of the household drink is the well. Practically no family carries out any treatment, except for one of them (applies product – bleach after the rains). The distance from where it is drawn is less than 10 blocks in all cases.

The water that the members of the household drink arrives, in 25% (3 of 12) by pipe inside the house, 50% (6 of 12) has pipes outside the house, but inside the land. 8.33% (1 of 12) have a well inside the land and 16.67% (2 of 12) through the neighbor.

The water that results from this source is used, in 100% of the cases, for drinking, food preparation, laundry, personal hygiene and cleaning of the house.

In the DAA stakeholders interviews, a prioritization was requested regarding the aspects that people consider important to increase the development of their community. In view of this, the factor mentioned most often within the highest range by the people registered corresponds to "work", then the factor "Access to basic services (mainly water)".

From the Baseline work, it is clear that some rural indigenous communities do not have access to drinking water, which directly affects their quality of life and the quality of their production.

In the document "Uses and governance of water in Paraguay", prepared by UNDP (2016), it is mentioned that the department of Concepción is located on the Quaternary aquifer, using 60% of it to cover the needs of its inhabitants. The other 40% is through surface water.

With regard to domestic water use, according to the Environmental Statistical Compendium (2017), Concepción has an ESSAP (Sanitary Services of Paraguay Company) provider and 837 from SENASA (National Service of Environmental Sanitation) at the departmental level. ESSAP has 7,572 connections; while SENASA has 19,624. There are also 6,689 connections corresponding to other providers. ESSAP takes water from the Paraguay River to supply its users.

With regard to sanitary sewerage, ESSAP is the only one providing this service in the capital of the department with 3,691 connections, which constitutes approximately 7% of the total population of the department and 20% of the district of Concepción. The rest of the department does not have this service. The population supplied with drinking water is 37,860 through ESSAP, 83,937 through SENASA and 34,114 others. On the other hand, the population sanitized by ESSAP is 18,455, which covers approximately 10% of the total of the department.

The evolution of drinking water connections has been from 5,246 in 2008 to 7,572 in 2017, an increase of more than 44% in less than ten years. This meant that the number of people with a drinking water supply rose from 26,230 to 37,860 during the aforementioned period. Connection to the sewerage network increased from 2,104 in 2008 to 3,691 in 2017, a 75% increase. The population benefited rose from 10,520 to 18,455 people.

The waters of the Paraguay River are also used for the operation of local industries that are supplied by the river. This is the case of Frigorífico Concepción, both in the meat industry and in the tannery. This industry takes water from the river, makes it drinkable in its own treatment plant, uses it, reconditions it through a decontamination process

and returns it to the river. The Belén meat packing plant uses the waters of the Ypané to carry out its operations.

Similarly, fishermen use the river as a livelihood. There are two fishermen's associations in the city, one of which is inactive. The Nanawa Professional Fishermen's Association has 25 members and sells its fish at the roundabout at the entrance to the city.

Regarding the recreational use of water resources, there are currently 18 spas, 5 of which are authorized by MADES (Ministry of Environment and Sustainable Development). Taking into account the high temperatures in the country, an increase in the number of spas in the area can be observed annually. In some cases, these spas do not meet the optimal conditions for those who use them and, as mentioned, they do not have the corresponding authorization from the MADES either.

Forestry component

The influence areas of the PARACEL Eucalyptus Plantation encompass the Aquidabán Hydrographic Basin. This is the same basin of PARACEL Pulp Mill is located, therefore it will not be mentioned now.

Although in order to monitor TECNOAMBIENTAL (April, 2021), performed water analysis in 18 points are existing watercourses located in the so-called "Farm Zone", being:

- One point, corresponds to the Hermosa stream, a tributary of the Apa River;
- One point corresponds to the Napegue stream, a tributary of the Negla steam;
- One point is on the Negla steam, a tributary of the Aquidaban River;
- Ten points are on the Trementina steam, a tributary of the Aquidaban River;
- One point is on an unnamed stream, a tributary of the Aquidaban River;
- Two point are on the Aquidaban River;
- One point corresponds to the Laguna Penayo stream; and
- One point corresponds to the Pitanohaga steam;

Based in the document prepared by TECNOAMBIENTAL (2021), the main findings for surface water were:

- Of the 26 physicochemical and bacteriological parameters evaluated, 20 have limits established in the current regulations, and 6 do not have defined limits;
- Of the 20 parameters with defined limits, 11 (55%) do not show and deviation from the current regulations and 9 parameters (45%) show values above the maximum allowed at least one monitoring point;
- The parameters that do not show any deviation are pH, floating materials, Total Dissolved Solids (TDS), oils and fats, nitrites, hardness, sulphate, cyanides, sodium and copper;
- The parameters that show some degree of deviation are total phosphorus, total nitrogen, dissolved oxygen turbidity, BOD5, ammonia, soluble iron, faecal coliforms and total coliforms;

- The parameters that most frequently present deviations in the 19 point sampled are total phosphorus (52% of the points sampled), total coliforms (73%), faecal coliforms (84%), soluble iron (100%) and ammonia (100%).

Paraguay not only has extensive natural surface water resources, but also a wealth of groundwater. Groundwater is the most important water resource in Paraguay, because of its easy access and availability in terms of quality and quantity (PMCIC, 2014).

Paraguay has great potential in terms of groundwater, which is contained in aquifers that are strategic for the country's socioeconomic development and for the social well-being of its inhabitants (PMCIC, 2014).

Paraguay's main aquifers are located in the subsoil of the country's two regions, the Eastern Region and the Western Region. Some of these aquifers are locally distributed and are restricted to the national territory, as is the case with the following aquifers: Patiño, Caacupé, Arroyos and Esteros, Itacurubí, while others, such as the Guaraní (Misiones aquifer), Yrendá, Independencia, Col. Oviedo, Alto Paraná, Pantanal and Acaray, are shared with neighbouring countries and have been classified as transboundary aquifers (PMCIC, 2014).

The Plata Basin is also rich in groundwater resources. It largely coincides with the Guarani Aquifer System (SAG in Spanish), one of the largest groundwater reservoirs in the world, with an area of 1,190,000 km². To the west of the Basin is the Yrendá-Toba-Tarijeño Aquifer System (SAYTT), which in the majority is located in the semi-arid zone of the Basin, the Gran Chaco American Biome, with an area of 410,000 km² (CIC, 2017).

The aquifers present in the influence areas of PARACEL Eucalyptus Plantation are: Aquifer System Yrendá-Toba-Tarijeño (SAYTT in Spanish) and Guaraní Aquifer System (SAG in Spanish).

The SAYTT is an aquifer system of great regional importance due to the existing expectations in a region with water shortage, semi-arid climate and with other aquifers where its supply is brackish or salt water, not suitable for human consumption or agricultural production. Its knowledge and subsequent sustainable management would favor a correct management of the soil, which, undeniably, the services provided by both natural resources are integrated for the development of the region.

This SAG aquifer system is of great importance at the regional and transnational level, representing a fundamental resource for socioeconomic development and in the operation and maintenance of associated ecosystems.

In order to establish a baseline of the groundwater quality, TECNOAMBIENTAL (April, 2021), performed groundwaters monitoring in Fourteen points are deep tubular wells located in the "Farm Zone", these wells are currently in service. Their waters are extracted with submersible pumps and are used to supply drinking water to the area´s human populations.

Based in the document prepared by TECNOAMBIENTAL (2021), the main findings for groundwater were:

- Of the 23 physicochemical and bacteriological parameters evaluated, 18 have limits established in the current regulations, and 5 do not have defined limits;

- Of the 18 parameters with defined limits, 11 (61%) do not show and deviation regarding current regulations and 7 parameters (39%) show values above the maximum permitted in at least one monitoring point;
- The 11 parameters that do not show any deviation in the 14 wells evaluated are electrical conductivity, total dissolved solids, hardness, total nitrogen, chlorides, sulphates, sodium, potassium, calcium, magnesium, fluoride and E. coli;
- The parameters that show some degree of deviation are pH, total phosphorus, nitrates, alkalinity, fecal coliforms and total coliforms;
- The parameters that most frequently present deviations in the 14 sampled wells are Nitrates (42%), total phosphorus (71%), fecal coliforms (92%) and total coliforms (100%).

Floods

Floods are the most common natural disasters that occur in the Project´s Eucalyptus Plantation area of influence.

Fluvial floods are natural phenomena due to the natural flooding of a river that conditions the formation of alluvial plains, close to periodically flooded water courses.

Rain floods are those that are produced by the accumulation of rainwater, snow or hail in areas of flat topography, which are normally dry, but which have reached their maximum degree of infiltration.

According to DOMECQ et al (2016), the two types of floods occur in Paraguay, mainly due to the seasonal and extraordinary floods of the Paraná and Paraguay rivers.

The origin of these floods due to the Paraguay River are actually presented as a consequence of the seasonal rainfall that accumulates in the Pantanal and that, due to the geographical characteristics of the area, acts as a natural reservoir. As a result, water from the floods accumulates slowly and progressively, and then delivers them regularly to the Paraguay riverbed for six months (April to September); becoming a regulator of its hydraulic regime.

Floods of pluvial origin (urban) arise as a result of intense rainfall (severe storms) in cities and the alteration of the basin as a result of uncontrolled urbanization.

Ordinary floods occur in the summer months (February-March) and the dry season is centered in winter (July-August). However, extraordinary floods can occur at any time of the year, with all-time highs being recorded between May and July.

The hydrological region of the Paraguay River is characterized by a module of 3000m^3/s, with maximum flows of the order of 12,000 m^3/s and minimums of the order of 800m^3/s. The annual cycle presents extreme flood wave peaks between June and July, with minimums from December to February. The flows are associated with the variability of rainfall, increasing strongly with the occurrence of “El Niño”.

River Floods and Urban Drainage

Floods in Paraguay acquired relevance in urban areas from the 70s, when the processes of land occupation related to the natural flood plains of rivers and banks of urban streams intensified. In the years 1982/83 this occupation of territory worsened in the country, associated with the climatic event “El Niño” when the Paraguay River reached extraordinary levels, with little recorded history to date. Considering this event, the riverside population occupies higher spaces almost always linked to water courses, with

an impact on the entire city due to the occupation of public spaces, improvised shelters on public and private lands and the environmental and sanitary effects that this situation brings with it. .

The floods that occur in urban areas are not only consequences of the overflowing of rivers and streams, but are also linked to severe storms that normally occur in the months of October and April, this together with the concentration of population in the centers. Urban areas and the weak rainwater evacuation infrastructure. The effects of this event are translated into the deterioration of the pavement that is systematically worn by the absence of rain drainage, absenteeism from work and school, stagnant waters that generate deterioration in the environment and in the health of people, among others. In this case, the streams become rainwater evacuators, which overflows from its natural channel dragging all kinds of solid waste that is finally deposited on the banks of the Paraguay River, causing an environmental impact on the body of water.

In Paraguay, to date, the construction of urban drainage infrastructures is insufficient and in some cases they are reduced to specific solutions in the main cities of the country. These refer to sanitary drainage (sewer network and storm drainage), which are conceived as independent systems.

Urban drainage coverage in Paraguay has a deficit. The storm drain system in Asunción is installed in the downtown area and along a few other roads, which are connected to streams, this implies that rainwater runs through most of the road surfaces and obstructs the flow of traffic when Rains.

Rainwater runs off within 1 to 2 hours due to topographic undulations, however it tends to erode base course materials, an action that damages the pavement.

Regarding the sanitary sewer system, it is observed that 100% of the discharges are conducted to water channels, be they streams or the Paraguay River. As for the pluvial drainage in other cities, on the Paraguay River, the only cities on this river that have sanitary sewers are: Villeta and Pilar. On the Paraná River, Ciudad del Este and Encarnación lack storm sewers. Encarnación also has sanitary sewer lines.

Sanitation and drinking water

Regarding access to basic services for the Districts of Concepción linked to PARACEL Plantation DIA, it can be observed that access to electricity predominates, being the second service to which the population has the most access is running water although there no homes have sewage drainage and 10% or less homes have garbage collection. Although in districts linked to the DIA there is no access to the sewage service, according to information obtained; in the city of Horqueta, works are being carried out for the construction of a sanitary sewer system and a wastewater treatment plant. Likewise, in the Paso Barreto district, the construction of the canalization system and the storm drainage canal is being carried out, according to local residents.

From the information collected in the field regarding access to drinking water, the following is summarized:

- The communities of Puentesiño, Virgen del Camino, Hugua Po'I, Jhugua Guazú, Paso Barreto, Isla Hermosa and Colonia Jorge Sebastián Miranda: They have a water supply network managed through SENASA.
- Virgen del Camino: It has three wells, one of them is used for irrigation and consumption of animals due to its color (red).

- Puentesiño: It has at least 10 wells managed through the Sanitation Board. The Calle 7 settlement does not have a water supply network; and it has about 47 families that are supplied by the Kora stream, which has the peculiarity of being muddy. In general, it can be said that they have water systems through SENASA, tajamares and some common wells. Those who have a water problem have cutwaters and use the streams; but they are not suitable for consumption because the water is salty, it has a lot of salt. In Norte Pyahu and Calle 3 there are areas from which water cannot be extracted, where attempts were made to excavate more than 100 meters deep.
- Hugua Po'i: Has a well through the Sanitation Board.
- Jhugua Guazú: They have two wells built for an irrigation system for agricultural production and they also built one for community distribution managed with SENASA.
- Colonia Jorge Sebastián Miranda: It has 5 tanks that serve as supply to the community; some of which were managed through SENASA and the Government.
- Paso Barreto: It has a drinking water network organized through Sanitation Boards.
- Isla Hermosa: It has a water supply network managed through SENASA.

Among the communities that have artesian wells installed in a self-managed way, are Laguna Cristo Rey, Santísima Trinidad, Islería and Domínguez Nigó, Ayala Cue. For their part, the indigenous communities in the Paso Barreto area have tanks and, in some cases carry water from the Aquidabán River.

Four are the communities identified in the territory that do not have water supply systems.

In Estribo de Plata, most of the houses have wells, but they are unable to manage an artesian well for the entire community because there are few residents; and both installation and maintenance have a cost. In total there are 2 people who do not have wells and are supplied by the closest neighbors.

Anderi: It is another of the towns that does not have a drinking water supply network. The houses have private wells or cutwaters. During the dry season they have access problems since the wells tend to dry up.

Paso Mbutu: There is no running water in the area. Most use wells for irrigation and everyday use, because the water is salty and is not used for human consumption. To drink they carry water from a source on the left bank of the Aquidabán river, called Chorro or Yvu, and it is not treated for consumption. They are also supplied with accumulated rainwater in drums of 100 or 200 liters; in certain cases, they pay 20 thousand guaranies per drum.

Calle 15: They are supplied from private wells that in some cases are shared with the nearest houses. There are families that use the water from the cutwater daily.

Tourist attractions linked to water resources

As indicated in the ESIA Forestry Social Baseline, there are numerous tourist attractions in the area, particularly those related to water resources such as rivers and streams; these

make it possible to carry out sports activities in the open air, walks, navigation, fishing, among others.

Wetlands

Still in the context of water resources, wetlands are important ecosystems, protected by the Ramsar Convention, a Convention on Wetlands of International Importance, which is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and sustainable use of wetlands and their resources (WCRP, 2014).The characteristics of the natural resources of the Río de la Plata Basin indicate that the wetlands represent the main ecosystems of the region (WCPIC, 2014).

These wetland areas are recognized as highly productive ecosystems and one of the most obvious indicators of their wealth and diversity are the wetland birds; these birds constitute a natural resource of great intrinsic human and ecological value, throughout history they have appeared prominently in human culture, as a source of food or ornamentation as well as in the folkloric sense (PMCIC, 2014).

These ecosystems perform extremely important functions such as: water reserve and purification, flood buffering, carbon sinks, sediment, organic matter and nutrient storage and/or export sites. In addition, they play a critical role in the life cycle of numerous species of fauna and flora and support trophic chains of adjacent ecosystems (WCPI, 2014).

Other than that, hunting and fishing are some of the main sources food for the families of the indigenous communities, being an important ecosystem services provisioning and cultural use for livelihoods. Some of indigenous communities use self-made tools, such as bows, arrows, and spears, while other families use firearms. Some families use trained domestic dogs for hunting, which warn their owners where the prey is located and the possible dangers that may exist.

The frequency of which hunting activities are carried out depends on the indigenous families; most of the people consulted stated that they hunt once or up to three times a week. It is important to mention that the animals they hunt and fish are used for their own consumption.

Hunting and fishing activities are one of the main sources of food for some indigenous families. 92.12% of the country’s indigenous communities declare that they practice these activities. It is recognized that since the pre-colonial period, the indigenous people of the region lived in egalitarian societies and did not produce surpluses, the forest provided them with everything they needed for their subsistence. They traveled large areas to collect, hunt and fish, in addition to meeting their needs for clothing and tools. Hence the importance of these activities for people of indigenous communities.

In relation to hunting and fishing, the knowledge and practice of these activities are directly related to food. The communities hunt only edible animals and in the amount that is indispensable for feeding the community and family, avoiding indiscriminate hunting and respecting the fauna’s breeding season. The main animals available for hunting within the IIA are armadillo, pig, fish, deer, coati, lizard, bird, turtle, anteater, monkey, capybara, and ostrich.

The forests are important because they provide ecosystem services also for the whole community in the influence area, providing them with timber (used for house

construction), fauna (for subsistence hunting), flora (for food and traditional medicine), and harvested foods such as honey and fruit.

Seven mammal species of hunting interest can be included in this category. *D. novemcinctus* is considered, together with the limpet, the most tasty and appreciated wild animal meat by hunters (Sigrist, 2012). Similarly, *Dasyprocta sp.; H. hydrochaeris and M. gouazoubira* are usually hunted for sport or as a source of food.

C. thous; L. pardalis and L. tigrinus are under hunting pressure to obtain and market their skins.

From the 64 sampled fish species, ten species are used as subsistence fishing, while nine are used in commercial fishing and 23 are used for ornamental purposes.

The activities of gathering wild fruits are also carried out by the indigenous families of the communities to provide themselves with food sources at different times of the year to complement their diet. In the country, 88.6% of indigenous communities declare that they practice gathering food from the forest, field or other places. The main sources of collection in the area are wild honey, coconut, guavira, yvaviju, pakuri and beans.

The manufacture of handicrafts is a cultural and economic activity for many communities. In the country, 75.2% of indigenous communities declare that they dedicate themselves to this activity, with a greater participation of women, which represent 68.2% of indigenous artisans. Although the manufacture of handicrafts is considered as underdeveloped compared to the activities of agriculture, livestock, gathering, hunting and fishing in the area, it is an activity of interest to artisans that not only provides them with income, but is also a source of leisure that contributes to their overall well-being. The raw materials that are usually used for the manufacture of indigenous crafts in the departments of Concepción, San Pedro and Amambay are karaguata, takuara, seeds, wool, guembepi, karanday, feathers and soft woods.

Most of the population alternates agriculture and livestock with the production of handicrafts; These populations have always lived in conditions of extreme poverty with little support from the government and from organizations that channel their productive work towards the achievement of their needs and interests. Many of the artisan trades and their products have disappeared and consumption has drastically decreased as a result of the processes of migration and rural depopulation.

Traditional medicine activities are a constitutive element of the identity of indigenous communities, as it is linked, on the one hand, to the relation between health and disease and, on the other hand, to their worldview and magical, religious and empirical knowledge. For the practice of traditional medicine, indigenous people collect medicinal plants from their environment, known as pohã ñana, and perform prayers, songs and dances. In most cases tobacco is used as a primary plant for healing rituals carried out by spiritual leaders.

6.2.3 Infrastructure and road safety

Industry component

For more than 50 years, the road network of Paraguay was composed of 12 national routes, the departmental and municipal. In May 2019, the Ministry of Public Works and Communications (MOPC) has classified and restructured the conformation of the National Road Network, increasing the number of national routes to a total of 22.

According to information published by the MOPC[3], the road network in the department of Concepción totals 3,213 km of national, departmental and local roads and routes, 19% of which are paved. In San Pedro, the road network reaches 5,806 km, of which 18% are paved, and in Amambay, there are 2,666 km of road network, of which 12% are paved.

The following three national routes pass through the Project IIA:

Route PY05: From EAST to WEST, with a length of 577 km It begins in the city of Pedro Juan Caballero (Amambay), located on the border with Brazil; it crosses the department of Concepción via the city of Concepción; it crosses the Paraguay River via the Nanawa Bridge and continues in the department of Villa Hayes until it reaches Fortín Pilcomayo, on the border with Argentina.

Route PY22: From South to North, with a length of 424 km. It starts in San Estanislao (San Pedro) in the junction with Route PY03; passes through the cities General Aquino, Villa del Rosario, San Pedro del Ykuamandiyú; enters the department of Concepción by the city of Belén, passes through Concepción, Loreto, San Alfredo and ends in San Lázaro.

Route PY08: From South to North, with a length of 588 km. It starts in Coronel Bogado (Itapua), at the junction with Route PY01, passes through the departments of Caazapá, Guairá, Caaguazú, enters San Pedro through San Estanislao: continues to Yby Yaú in Concepción and then to Bella Vista Norte in Amambay.

Several routes and local roads link the locations of the Project's IIA, some of which are currently undergoing improvements in the framework of the National Program of Local Roads and Bridges, executed by the MOPC in most of the country's departments. In the IIA, this program proposes interventions to improve bridges and roads.

With the execution of these works on access roads in the department, it is possible to perceive an increase in road connectivity in the intervention areas, especially in the areas where gravel roads were transformed into asphalt roads. This allows for an increase in traffic, including cargo trucks, and a reduction in transfer times.

With respect to the Project's DIA, more specifically in Concepción, the MOPC is carrying out construction, improvement and maintenance activities of the access roads; in addition to building bridges and water systems in support of the communities. According to information provided by the MOPC's Road Planning Directorate, the main works in progress in the Project's Area of Direct Influence are those detailed.

Terrestrial transport

The city of Concepción is relatively well connected by land with other major cities in the northern region of the country, and with Asunción. In general, transport companies only provide services to towns and cities located on national routes, without entering communities far from them.

Transportation

The transport companies that provide services on the route to Vallemí also ensure the transport of passengers between Concepción and Loreto. While the companies that go to Asunción (by Route PY05) and Pedro Juan Caballero provide services to the

[3] Available at: https://www.mopc.gov.py/mopcweb/index.php?cID=769 examined on January 23th 2020.

inhabitants of Horqueta. With regard to the connection with the city of Belen, a local company called Puerto Ybapobo provides services to that city through Belen.

The city of Concepción has not had any urban public transport services (buses) for several years now. According to local digital media "motorcycles have displaced the company that was dedicated to this area a decade ago"[4].

In fact, most of the people who live in the Department of Concepción travel by motorcycle. This can be verified by simple observation on a tour of the city of Concepción and the surrounding districts. This preference for motorcycles is also evident in the number of vehicles available.

Social survey

According to institutional and community stakeholders interviewed: Infrastructure and road safety is considering the importance of improving the condition of roads and local roads, as many communities are isolated in the rainy season.

Forestry component

Direct Influence Area (DIA): Includes 7 districts in which the areas of the forest plantations of the project and the main access roads to them are located, including 16 neighboring communities. These territories are the following:

- Districts: Sargento José Félix López, Paso Barreto, Loreto, San Alfredo, Horqueta and Arroyito from the department of Concepción; District of Bella Vista Norte from the department of Amambay and their;
- Communities/localities: Isla Hermosa (Isla Tuyú), town of Paso Barreto, Colonia Jorge Sebastián Miranda (Jhugua Ñandu), Estribo del Plata, Puentesiño, Laguna Cristo Rey, Anderi, Islería, Virgen del Camino, Jhugua Guasu, Jhugua Po'I, Santísima Trinidad, Paso Mbutu, Calle 15, Dominguez Nigó, and Ayala Cué.

Road network

The PARACEL Plantation road network are the same as the industry component being: 3 national routes that connect the department of Concepción with other departments (Route 5 "General Bernardino Caballero", National Route Paraguay 22 and National Route 8 "Doctor Blas Garay", of which 2 (N° 5 and N° 22)) which are directly linked to the project.

Means of transport in PARACEL Plantation DIA

The means of transport used in the areas involved in AID are motorcycles, cars, vans and trucks, according to data from municipal plans and local health plans consulted. Such is the case of the Sargento José Félix López district where these means are used and there are various companies that offer transportation services for passengers and cargo, covering the destinations of Concepción, Pedro Juan Caballero and Bella Vista. The roads that lead to the colonies are precarious, in times of rain it is almost impossible to enter and exit them, leaving the communities isolated and the population facing many deficiencies.

[4] Concepción Noticias. http://www.concepcion-py.com/2016/05/concepcion-esta-sin-transporte-urbano.html

In the same line, the results obtained during the information survey carried out in the field, it can be affirmed that there are interurban and long-distance passenger transport companies. The companies that make the interurban connections circulate through the cities of Paso Barreto and Loreto to Concepción. This service includes stops in the towns of Isla Hermosa (Paso Barreto) and Laguna Cristo Rey (Loreto). The other communities such as Islería, Jhugua Guazú, Jhugua Po'I, Santísima Trinidad and Virgen del Camino have access to the same service because they are close to these roads.

Long-distance transportation companies connect the cities of Vallemí with Asunción, circulating through the cities of San Alfredo, Loreto and Concepción, on national route 22, to continue through the Chaco (routes 5 and 9).

The following diagram describes the national and internal interdistrict connection routes:

Nationals Routes	
National Route PY 05	Horqueta and Arroyito
National Route PY 22	Loreto, San Alfredo, Vallemí
Internal Routes	
Calle 15	This road links the towns of Horqueta, Paso Mbutú, Hugua Ñandu reaching the district of Sargento José Félix López (Puentesiño)
Calle Loreto -Paso Barreto	It links the towns of Loreto, passing through Paso Barreto, Hugua Ñandu reaching Sargento José Félix López (Puentesiño)
Cruce X	Through this road Paso Barreto and San Alfredo are connected; it is currently undergoing repair work as an all-weather road.

Social perception

It should be noted that the "limited access to local roads" is one of the problems pointed out by the consulted populations of PARACEL Plantation DIA communities, with consequences for local development. Along these lines, although in a lower percentage, the interviewees stated "that the improvement of the road be guaranteed" as one of the expectations in relation to the project in its forestry component. It should be remembered that "infrastructure and road safety" was the aspect most mentioned by the representatives of institutions and communities of the DIA of the industrial component (districts of Concepción, Loreto, Horqueta and Belén), in relation to the aspects necessary for a greater development of their communities/districts. In this sense, they have highlighted the need to improve the state of roads and neighborhood roads. As Loreto and Horqueta are also part of the DIA of the forestry component of the project; and the situation of the inadequate state of some roads is reproduced in the other DIA districts of the forestry component; in addition to the already existing perception regarding these in the DIA and the loading of the project vehicles, it is estimated that the impact of the project will be important on the road infrastructure from a social perspective.

6.2.4 Jobs

Industry component

In Concepción, there is a Working Age Population (WAP-EAP in Spanish) of 186,627 people (53.53% are women), of which 58.33% are Economically Active (108,860 people, of which 41.33% are women). The department's activity rate is 58.33%, a figure

lower than the national activity rate (63.09%)38 . For women, an activity rate of 45.04% was registered, while for men this figure reached 73.64%, in line with the rates registered at the national level of 50.91% and 75.24% respectively.

In 2017, Concepción's open unemployment rate was 6.66% and Amambay's was 5.48%. In other words, some 7,247 people from Concepción and another 4,490 from Amambay were unemployed. The country's unemployment rate was 5.20%, a figure lower than any of those mentioned.

The Permanent Household Survey also measures the number of "people who worked less than 30 hours in the week and want to work more hours and are available to do so", that is, underemployment due to insufficient working time (or visible underemployment). In Concepción, the visible underemployment rate reached 8.25% (13.55% of women), while in San Pedro it was 6.41% (10.8% of women) and in Amambay it was 5.63% (10.27% of women). It is worth mentioning that the country's visible underemployment rate stands at 5.43%, below those registered in the three departments.

With regard to occupation by economic sectors, 47% of the economically active population of Concepción is engaged in tertiary sector activities (commerce and services), a sector that absorbs two thirds of the female workforce and one third of the male; while the primary sector occupies 36.2% of the EAP and the Secondary Sector 16.63%. A similar situation occurs in Amambay where 70% of the EAP works in the tertiary sector, which occupies 88% of the female EAP and 57% of the male. In San Pedro; however, the vast majority of the EAP is working in the primary sector (56.35%), which occupies 60% of the male population and 49% of the female population.

In the three departments, the highest proportion of people who work do so in MSMEs/Establishments (Program to improve the competitiveness in Paraguay) is 1 to 5 employees (Concepción: 70.54%; San Pedro: 81.34%; Amambay: 45.14%). On the other hand, analyzing the data provided by occupation category, it is possible to conclude that, both in Concepción and San Pedro, the population works mainly independently (Concepción: 57.02%; San Pedro: 72.46%) while that in Amambay most of the population works as an employee of private companies (43.93%) compared to 39.12% of independent workers.

One of the main criteria to define the formality or informality in the employment of salaried persons is constituted by the registration and contributions to a retirement system. In Paraguay, although there are various types of retirement depending on the business union, the main mandatory retirement system for salaried workers who work in a situation of dependency is the Social Security Institute.

In 2017, a little more than a third of the employed salaried population of the three departments was registered and made contributions to a retirement system: 13,969 people from the department of Concepción made contributions to a retirement system, this is 38.41% of the employed salaried population; in San Pedro, there were 19,171 contributors (38.24%) while in Amambay there were 14,167 people (35.36%).

Additionally, taking into account that, in general, people who were able to carry out higher education levels have better access to better paid jobs with a higher degree of formality, an indicator to consider is the salaried employed population according to years of studies.

Current Legal Minimum Salary

In recent years, the legal minimum wage has been gradually increasing. From March 2014 to November 2016 it was Gs. 1,824,055; on that date it increased to Gs. 1,964,507 and in July 2017 it increased to 2,041,123. Finally, in July 2018, it was increased to Gs. 2,112,562, to date.

Average Earned Income

In the data from the Permanent Household Survey, until 2016, the department with the lowest general average of labor income was San Pedro. While the one with the best average income was Amambay, in correspondence with the number of years of studies of the population. In 2017, the average labor income fell by almost 14% in Concepción, placing this department in last place. It is worth mentioning that, in 2017, the average labor income was higher than the legal minimum wage in force only in the department of Amambay.

The average income is significantly higher in Amambay, when we compare data from the three departments. On the other hand, in all three departments, there is a significant pay gap between women and men. In Concepción, women have 25% lower incomes than men, on average, while the gap is 15% in San Pedro and 22% in Amambay

Poverty

In Paraguay, the method used to measure poverty is the Poverty Line method. Among other indicators, the DGEEC (General Directorate of Statistics, Surveys and Censuses) carries out calculations to estimate the incidence of total poverty and extreme poverty (percentage of poor and extremely poor), defined as “Proportion of the population with an income below the total poverty and poverty lines extreme”. That is, it measures the percentage of people in a situation of Total Poverty and in a situation of Extreme Poverty. Considering the cultural and consumption characteristics of the population in urban and rural areas, Total Poverty Line and Extreme Poverty Line values are calculated for urban and rural areas.

43.97% of the population of Concepción is in a situation of poverty, that is, around 107,097 people have per capita income lower than the cost of a basic consumption basket (LPT). Of these people, 15,911 (6.53%) have per capita monthly income below a minimum food consumption basket, that is, they cannot cover the cost of the minimum amount of food. In San Pedro, the percentage of total poverty is similar to that of Concepción; however, the percentage of people living in extreme poverty is higher. Amambay is the department with the lowest poverty rates in the IIA, and this result is aligned with the other indicators contained in other sections of this report.

Income Distribution

According to available data, in 2017, the average per capita income in Concepción reached approximately Gs. 896,02630, which represents 8.7% less than that of San Pedro and is 41.47% less than that of Amambay. In the three departments of the IIA, the richest quintile is more than 50% of the population. There is a marked inequality both between per capita income in each department and between quintiles. By way of illustration, in Concepción, the poorest 20% earn 11.74% of what the richest 20% earn, a relationship similar to that of Amambay (11.50); while, in San Pedro, the ratio drops to 8.55%. However, when comparing the absolute values in the same quintile, the average income in Concepción is almost 40% lower than in Amambay and 7.45% higher than in San Pedro.

Micro territories information (DIA Pulp Mill)

21% refer that a large fraction of the population engages in trades or wage work or piecework consisting of remuneration for activity or service rendered that is generally linked to an occupation system based on the economy informal. The average daily income is between 65,000 and 75,000 guaraníes. In many cases they face precarious working conditions that are accepted so as not to stop generating income. Among these, it is mentioned that they work more than eight hours, they must carry out other work in addition to what was agreed, they do not charge the entire amount established; among others for what they are part of a doubly vulnerable sector.

Under this logic the works in the neighboring and/or Chaco ranches are grouped. Which consist of the development of tasks for a defined period of time of one day or even months; which does not necessarily translate into a permanent change of residence. Among the activities they carry out are: wiring, painting, cleaning the grounds, caring for animals, carp, planting, among others. This item is characterized by being an activity predominantly of adult and young men.

Although the men are employed in the ranches, the women are the ones who are left to take care of the home and are in charge of raising the children. In addition, they are those that are dedicated to raising small livestock, selling the production of their orchards and farms and others that are usually offered in the fairs organized in squares or the market of the urban area of Concepción or they are sold home for house to neighbors in the area.

Other items that are grouped under this category are: collectors, those who are dedicated to the sale of coal, trocillo (wood for firewood) and macatería.

Most of these businesses are family-owned; in which household members (boys, girls, adolescents and adults), both women and men have some degree of participation in the development of specific tasks such as: customer service, purchase of supplies and merchandise to restock the premises, collection and cleaning of the place, among others.

As it is a family type, what is collected is part of the daily sustenance so that although income is generated, the people who collaborate in the tasks do not receive remuneration.

Forestry component

Salaries for direct jobs generated by the project's forestry component are expected to be higher compared to current average salaries in DIA and IIA. However, this impact may be limited considering that the amount of direct labor (hired by PARACEL, without third parties as intermediaries) is between 5.55% (basic engineering stage), and 1.64% (operation stage) of the estimated total of jobs to be generated in the substages of the installation and operation stages. Most of the jobs will be outsourced (contract workers); likewise, PARACEL will guarantee compliance with current labor regulations, and in accordance with IFC's Performance Standard 2, to all personnel linked to the project.

In terms of direct jobs, the project could provide higher salaries than the current average per capita income in the IIA departments, taking into account the related national regulations and the profiles or qualifications demanded. The average per capita income is Gs 896,026 in Concepción, Gs 981,516 in San Pedro and Gs 1,530,906 in Amambay, all below the current legal minimum wage of Gs 2,192,839. Although the quintiles with the highest incomes make up more than 50% of the population, they are around the minimum wage in force in Concepción and a little more than the minimum wage in

force in San Pedro. Furthermore, according to the economic characterization of the IIA, the total poverty level by income in Concepción and San Pedro is above 40%.

Most of the population of the three IIA departments is rural (Concepción 57%, San Pedro 80%, Amambay 33%); being agriculture and extensive livestock an important sector of employment of the population, although behind the tertiary sector (commerce and services). As for the population of the DIA districts, the majority is dedicated to activities in the primary sector, both for sale and for self-consumption, followed by the tertiary sector. Compared to these productive sectors, especially the primary one, the project is expected to offer better paid jobs.

It is considered a positive impact because of the increase in the level of income; a priori means an increase in the purchasing power and debt capacity of employed persons and their dependents, contributing to a greater consumption of goods and services and, therefore, to a greater development of the local economy and quality of life. Thus, a decrease in the level of poverty is expected, not only due to income, but also structural, which is high in the DIA districts, where between 49.1% (San Alfredo) and 89.4% (Sergeant José Félix López) of the population have at least one Unsatisfied Basic Need (UBN).

The possible loss of sources of employment and/or income would take place due to the change in land use, which will produce the implantation of forest plantations on sites that are currently dedicated to livestock production. This change in production will affect employees currently working in the establishments planned for the project, all linked to stays. The owners of the establishments are not considered, since they will have the freedom of decision and negotiation for the sale/lease of their land.

The development of the project is expected to have multiplier effects, in the long term, on the development of other similar projects and on the economy in general of the area of influence, even beyond the DIA; and attract new investment. For this scenario, the installed capacity in the area would be key, and it is estimated that the items related to construction, nurseries and forest plantations, among others, could have a rapid labor insertion.

PARACEL fully support the principles of the United Nations Global Compact, basing our fundamental values on respect for human rights, labor rights, the environment and the fight against corruption. The project plans to employ 90% of women in forest nurseries, thus contributing to reducing the existing gender gap in employment opportunities. The jobs related to the nurseries will be around 150, including more than 80% of unskilled profiles that will be trained by the project. In this sense, it is expected that most of the jobs may be held by local women, considering that the technical/professional qualification of labor in the area is low, with the additional advantage that the nurseries operate throughout the cycle of the project.

Other than that, in the rural indigenous population there is a population of 446 people of working age, between 18 and 65 years of age, who could mostly be considered as unskilled labor. 45% of this population has not received any type of education, 45% attended or completed basic education, 5% completed or completed secondary education and less than 1% have received some type of instruction in higher education. Of the 446 people of working age living in rural indigenous communities studied in this report, 50% cannot read or write. The majority of people of working age, in addition to the tasks they carry out in their own family productions, work on ranches carrying out agricultural peonage and domestic cleaning activities.

6.2.5 Local Development

Industry component

The economic-productive activity in the department of Concepción, in general, has been increasing in the last 50 years.

There are no available and detailed time series to perform a consistent and evolutionary analysis in a timely manner, however, it is possible to analyze aggregate data such as those shown in chart below, including macro trends at the regional level.

In the Chart, the decrease in the EAP (Economically Active Population) can be observed, which is due to the interdepartmental migration that occurs towards the Chaco, as well as towards the capital Asunción and the Metropolitan Area. This also affects the EAP of the primary sector as can be seen in the corresponding section in the same chart.

The data from the EPH (Permanent Household Survey) for 2015 show an unemployment rate for Concepción of about 16%, which is inconsistent with the results of the chart, which has the same institution as a source. This is mainly due to the modification of methodologies in determining the occupancy percentages that occurred in the same year.

Years	1962	1972	1982	1992	2002	2012	2017
Concepción's Population	85,690	108,130	133,977	167,289	179,450	226,585	244,070
Economically Inactive Population	61,397	77,783	95,191	121,058	121,843	129,833	135,210
Economically Active Population (PEA)	24,293	30,347	38,786	46,231	57,607	96,752	108,86
Active Economic Population (%)	28	28	29	28	32	43	45
Employment Rate	87	97	96	98	98	99	93
PEA per sectors							
Primary	14,456	18,467	24,675	27,189	25,805	38,984	39,19
Secondary	3,873	4,419	4,901	6,477	9,195	17,442	17,418
Tertiary	5,18	5,986	6,791	11,046	21,932	40,325	51,164
Other	784	1,475	2,419	1,519	675	s.d.	1,089

Thus, the local economy tends to benefit from the emergence of this demand, linked both directly to the activity of the company's execution and indirectly, through the consumption made by the labor linked to the implantation.

The greater dynamism of the local economy has as positive effects the increase in household income associated with the provision of goods and services, the possibility of accessing goods and services that are currently nonexistent, limited, insufficient or inaccessible.

In the tertiary sector, it is observed that commercial and/or service activities are carried out in the department that could be required to a greater or lesser extent during the construction of the Project and that could be enhanced with this: trade, maintenance and repair of vehicles (including motorcycles) and its parts and accessories; food and beverage trade; fuel trade; trade in cultural and recreational goods; land transportation service; temporary accommodation service; restaurants, bars and the like; telecommunications; financial services; real estate services for sale and lease;

administrative support services for businesses; amusement and entertainment services. Regarding the AID, according to data collected in the field, it is observed that commerce is the activity that has expanded the most in recent years, including gastronomic businesses, supermarkets and pantries, beverage warehouses, places for the sale of household items, among others. All of these may benefit from the increase in population in the AID associated with and/or induced by the construction of the mill.

Finally, the temporary and definitive increase in the population, both during work at the Mill and during daily life in the homes, will generate volumes of municipal solid waste that could create an opportunity for collection and sale activities for recycling waste. This activity may, in turn, contribute to reducing the pressure of the waste generated on the collection services and on the existing final disposal sites.

Greater dynamism in the local economy will be very beneficial for local communities, since the total poverty rate by income in the department of Concepción is above 40%.

Forestry component

Information regarding AII economic data is presented, specifically related to the different existing sectors.

- Regarding the primary sector, in the three departments, 68,047 farms are registered with a total area of 4,575,72519 hectares dedicated to the sector. The area dedicated to livestock reaches 2,935,287 hectares (65.2% of the total), while that used for agriculture is 527,512 hectares (11.5%), and the area with cultivated natural and forested forests is 734,741 hectares (16.1%).

Approximately 25% of the country’s cattle heads are concentrated in the AII, with the highest production in San Pedro.

- The department of Concepción is the one that dedicates a notorious higher percentage of its surface to livestock activity in relation to agriculture, compared to the other departments of the AII.

- The cultivated area reaches 464,267 ha, the composition of the labor force is dominated by the national with 16,512 national producers and the international labor is dominated by the Brazilian with 261, and only 36 from other nationalities.

Regarding the existing forest plantations in the three departments, it is also possible to see a clear leadership of the department of San Pedro in number of trees. However, Amambay has fewer farms containing more trees per unit area. The department of Concepción presents a lower efficiency among the three, per unit area. This could be due to less efficient or less aggressive planting and management techniques.

According to the 2011 Economic Census, in Concepción, there are 5,242 economic units that occupy 13,682 people (44.55% are women) and generate income of Gs. 1,444,284,575,000. San Pedro presents data of high similarity with Concepción, while there is less coincidence with Amambay, where all the registered data are of greater magnitude; for example, income that reaches Gs. 5,112,545,870,000. This is due to the exposure situation of the Amambay department to Brazil, where trade with the neighboring country is one of the highest in the country after Alto Paraná.

In fact, the Commerce subsector is the most developed, of the three subsectors in the AII, it is the one that occupies the largest number of Economic Units and people, and generates the most income.

The dominance of a single producer is verified in all the farm management strata, this gives indications of the degree of efficiency in the use of family labor and hired as day laborers.

The most relevant crops in the department of Concepción are corn, sesame and soybeans. Sesame and soybeans are income items for small producers and business agriculture, while corn is produced by both large producers and small producers with less than 20 hectares of land. Other historical crops of family farming are cotton, manioc and beans.

Favorable or unfavorable effects on the economic development, direct and indirect, of the populations in the area of direct influence, in the region and at the country level. It includes topics related to economic activities related to the forest production area, as well as the use of natural resources, such as water, soil. Additionally, those effects on employment/economic income derived from the indirect actions of the enterprise in the area of influence are identified (increase in businesses, increase in demand for goods and services, generation of new jobs).

Social perception

Of the 58 people who have expressed their agreement with the undertaking, some have mentioned more than one answer, thus having a total of 73; of that total, it is highlighted that the majority considers it positive due to the possible generation of jobs with 43.84%, local development with 24.66%, and movement of the economy with 8.22%, agreeing with the 3 most mentioned positive aspects in stage 1 of the industrial component81, only varying the order of these aspects.

The majority responded that “the project represents new sources of work/hiring of local labor for the people”, this as well as the main expectation surveyed during the first stage, in the areas of influence of the project in its industrial component. Second, by the amount of response obtained, it was expressed as an expectation that the project will “Link local producers/secure purchase and sale system”, “Generate local development” (growth of investors and population); which again coincides with one of the expectations considered important in the Industrial component. Other expectations mentioned were (to a lesser extent) “Progress and development”; “Link/support/strengthen other productive initiatives” among others.

7 ASSESSMENT OF CUMULATIVE IMPACTS

The table below summarizes the results of the assessment of cumulative impacts identified for the selected VECs. For the CIA, the potential impacts from the two components of the Project (Industry and Forestry) are discussed separately given their differences in geography and potential impacts. The potential impacts from other projects that are within the same sector are discussed together. Based on the potential cumulative impacts, a priority ranking is established for each VEC (as for priority definitions in section 4.7).

Table 4 – Summary of Cumulative Impact Assessment

VEC	Potential Impacts from the Industry Component of the Project	Potential Impacts from the Forestry Component of the Project	Potential Impacts from Other Projects	Potential Impacts from External Drivers	Cumulative Impact	Priority Ranking
Soil contamination (erosion and waste collection and treatment system)	In the construction phase of the project, several types of solid waste will be generated such as: construction debris (block, concrete, brick, wood), scrap metal, paper/cardboard, plastics, rubber/tires, glass, fluorescent lamps, batteries, health services waste, maintenance equipment waste (lubricating oil) and organic waste (leftover food). In earthmoving activities, earthmoving of approximately 8,000,000 m3 is forecast. Solid waste generated in the construction phase will have an environmentally appropriate final destination, i.e. it will be destined for reuse, recycling, incineration, co-processing, etc. There will be a system of selective collection that aims to pre-separate materials with similar characteristics at the source. During the operation phase, industrial and non-industrial solid waste will be generated at the pulp mill. The solid industrial waste generated by the pulp production process will come from the wood handling, causticizing, boiler, and water and effluent treatment plant areas. The management of solid waste generated during the operation of the pulp mill will include best practices.	During the implantation and operation of the eucalyptus forest, many solid wastes will be generated. One source of solid waste generation is from worker accommodations areas, another is from equipment maintenance workshop and another is from pesticide packages. The use of pesticides is an important tool for the good management of forests, but requires differentiated control attention. In the selection of products used by PARACEL there will be always consideration on the legal aspects related to the use of pesticides and the safety of employees and the environment. Priority is given, whenever possible to the use of toxicological green grade products (practically non-toxic to humans). Employees will be always qualified for application of those products and be protected through the use of personal protective equipment (PPE) suitable for maximum safety. PARACEL will follow the Forest *Stewardship Council (FSC)* chemical use policy, which certifies its forest plantations.	The removal of organic soil, the execution of the earthworks near water bodies may induce erosive processes and silting. In meat industry soil/subsoil contamination by sanitary effluents: handling, transport and storage of chemicals may occur. It will be adopted operational procedures in accordance with all legal requirements and recommendations to properly treat the sanitary effluent. Other than that, soil/subsoil contamination by fuels, oils, lubricants, heavy metals and other chemicals may also occur. Store chemical inputs in waterproofed areas following the standards and use containment structure in case of possible leakage will mitigate de impact.	The crop in planted forests (eucalyptus plantation) induces greater soil protection against erosion, compared to the pastures (livestock farming) due to the: - Suppression of cattle trampled; - Rooting of planted forest; - Increased soil cover with increased amount of organic matter; - Possibility of establishing native vegetation in the understory, depending on the previous use conditions of the area.	The Project, other projects, and external drivers could contribute to the potential negative impacts on this VEC by increasing soil contamination. However, according to mitigation measures for both ESIAs, the Project´s embedded controls and programs proposed would appropriately mitigate the negative impacts and contribution (Minor effect). In sum, the Project could potentially contribute to soil contamination, but with the measures proposed, it is not likely to occur, or the Project´s contribution would be expected to be negligible.	Low
Surface water resources (watershed conservation, drainage and sanitation)	At the beginning of the construction, chemical baths will be used, and their effluents will be collected, transported, and disposed by accredited companies in authorized landfills. After the infrastructure is installed, the	Eucalyptus plantation needs water for its development. Irrigation can be done in the hottest periods of the year, intermittently and occasionally, especially if prolonged drought occurs during the execution of the planting	The implementation of earthworks and civil works of the projects could lead to changes in water quality, such as increased turbidity, and the dredging activity may also cause resuspension of material.	Due to suppression of cattle trampled, the impact of runoff water is high and may increase erosion processes. The livestock farming activities contribute to coliforms parameter increase in the water bodies	Wetlands are important ecosystems, protected by the Ramsar Convention[5], and according to the ESIA, the characteristics of the natural resources of the Río de la Plata Basin indicate that the wetlands	Medium

[5] Ramsar Convention: An intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and sustainable use of wetlands and their resources (WCRP, 2014).

VEC	Potential Impacts from the Industry Component of the Project	Potential Impacts from the Forestry Component of the Project	Potential Impacts from Other Projects	Potential Impacts from External Drivers	Cumulative Impact	Priority Ranking
	sewage will be collected and treated in a system of air pool, sand stabilizers, prior to its discharge into the Paraguay River. The effluents generated during operation, resulting from the pulp production process and other activities, will be treated at the Effluent Treatment Plant (ETP), which will have the biological treatment system with activated sludge, followed by tertiary treatment. PARACELwill adopt the best available techniques (BAT), Water intake for Mill operation is estimated at 0.09% of the average river flow, and about 80% of this volume (effluent) will return to the Paraguay River.	program. However, due to the economic impacts and the importance of reducing water consumption, irrigation is carried out only eventually, in drought periods, since the plantations should be carried out in the most favorable period of rain and humidity. On average, 2 to 3 liters per plant per irrigation are used. In general, after the planting stage, the rainwater is sufficient to ensure the development of the trees, not needing irrigation. It is worth mentioning that the water consumption by eucalyptus plants is lower than some traditional crops and similar to cerrado's.	There could be change in water quality by fuel and oil spill as well, due accidents. The water is also an important way of transportation. An improvement in the quality of life of the population is expected; as well as a well-informed population about the benefits of the sewage treatment system and the drinking water treatment system, prepared to disseminate knowledge to others about the environment preservation and, consequently, it is expected that there will be a reduction in diffuse pollution. All projects will consume water for their employees at some time of the projects life-time.	nearby. Mainly because cattle grazing activities don't respect or preserve riparian areas.	represent the main ecosystems of the region (WCPIC, 2014). These ecosystems perform extremely important functions such as: water reserve and purification, flood buffering, carbon sinks, sediment, organic matter and nutrient storage and/or export sites. In addition, they play a critical role in the life cycle of numerous species of fauna and flora and support trophic chains of adjacent ecosystems (WCPI, 2014). Hunting and fishing activities are one of the main sources of food for some indigenous families. The activities of gathering wild fruits are carried out by the indigenous families of the communities to provide themselves with food sources at different times of the year to complement their diet. The Project, other projects, and external drivers could contribute to the potential negative impacts on this VEC. A number of the other projects in the AoI could have negative impacts on surface water quality and therefore aquatic habitats and ecosystem services that depend on this resource. These effects are compounded by livestock farming activities, particularly cattle grazing that negatively impacts riparian areas, further affecting sensitive habitats and water quality. Given that the location of the proposed Mill and Forestry components are in highly intervened areas, the Project could potentially contribute incrementally to the adverse impacts that already exist, and some degree of VEC conversion and/or further degradation is likely to occur. Actions should be implemented in the medium term to mitigate potential adverse cumulative impacts on the VEC.	
Infrastructure and road safety	It is expected that during the construction of the project, heavy	The forest road access comprises the activities of planning and	Vehicles are used to transport inputs to the meat factory and	The livestock farming activities don't use as much vehicles as	The Project, other projects, and external drivers could contribute to	Low

VEC	Potential Impacts from the Industry Component of the Project	Potential Impacts from the Forestry Component of the Project	Potential Impacts from Other Projects	Potential Impacts from External Drivers	Cumulative Impact	Priority Ranking
	vehicle traffic, such as machinery and trucks, will increase significantly on the access routes to the site, as the work will require a quantity of material, equipment, machinery and various inputs. In the operation phase, it is estimated that several truck journeys are required daily to transport eucalyptus logs to the pulp mill. The logistics for wood transportation to the pulp mill, will consider river transportation for wood coming from Argentina, and both river and road transportation for wood coming from Paraguay and Brazil. Thus, prioritizing river transportation is a measure that will prevent accidents and fauna runover due to road transportation.	opening accesses, constructing and maintaining dirt and/or gravel roads, to manage the best harvesting process, including protecting forest resources from fires and inputs and harvested wood transportation. It should be noted that the area surrounding the company's areas is dominated by agricultural and livestock activities, not expecting to cause any impacts to communities due to dust generation. By planning carefully, with location diagnosis the access paths on the farms and in the surroundings, carried out on a detailed scale, to propose actions on the stablished route, the opening of roads and their respective drainage systems, will prevent the road system from functioning as the preferred path of the flood. Besides the opening accesses and roads the Formation of the eucalyptus forest may also impact the runoff water in the region. On the opening roads activities it should be considered a wildlife rescue program. Because the increase in vehicle traffic increases the risk of animals being run over on the access roads. Due to increased access to the roads in the region, to the areas of farms by third parties and surrounding population, can induce the activities of hunting and capturing animals in this region. PARACEL should avoid fragmentation by roads in the cerrado areas because, in addition to facilitate the displacement and entry of hunters, it also increases the risk of animals run over, as well as may influence some small species that considers this road a barrier to displacement. In order to	transport the products to the costumers. The traffic on paved roads may increase the risk of running over animals and vehicles accidents.	planted forest area, due to harvesting process machinery including harvested wood transportation.	the potential negative impacts on this VEC by affecting roads safety. However, according to mitigation measures for both ESIAs, the Project´s embedded controls and programs proposed would appropriately mitigate the negative impacts and contribution (Minor effect). In sum, the Project could potentially contribute to affect road safety, but with the measures proposed, such as the Road Safety Program, it is not likely to occur, or the Project´s contribution would be expected to be negligible.	

VEC	Potential Impacts from the Industry Component of the Project	Potential Impacts from the Forestry Component of the Project	Potential Impacts from Other Projects	Potential Impacts from External Drivers	Cumulative Impact	Priority Ranking
		avoid animals hunting PARACEL should consider to carry out inspection on farms mainly on weekends and holidays and perform an education work to make population aware of this fact.				
Jobs	It is estimated that the Project will directly employ some 8,000 people at the peak of the construction phase, of which 10% will be professionals, 30% technicians and 60% suitable. The total labor force, considering own employees and third parties, necessary for the operation of the mill will be approximately 1,200 people. The operation of the plant will require skilled and unskilled labor for the production of pulp, for maintenance of equipment and machinery, for administrative tasks, cleaning, transportation, security, and other related services. It is estimated that 20% of those hired will be professionals, 70% technicians and 10% suitable.	It is estimated that the project will progressively employ a growing number of staff, so the flow of workers will also increase, directly and outsourced (hired, through intermediaries), from around 270, through 1,335, 2,545, 2,750 to 3,050 people in the different sub-stages of the installation phases – in a period of approximately6 54 months – and operation – henceforth. Most of the jobs will be outsourced, between 94.44% and 98.36% as one moves from planning to operation. The project will comply with the principles of IFC PS 2 on “Labor and working conditions”, clearly defining the labor links, depending on whether the employees are direct workers, contracted (outsourced), or workers in the supply chain, as the case may be. Likewise, FSC Principle 4 on “Community relations and workers’ rights” will be considered. PARACEL fully support the principles of the United Nations Global Compact, basing our fundamental values on respect for human rights, labor rights, the environment and the fight against corruption. The project plans to employ 90% of women in forest nurseries, thus contributing to reducing the existing gender gap in employment opportunities. PARACEL will promote the labor inclusion of indigenous people in project and the ventures of its value chain, through the identification of positions adjusted to the training levels of indigenous	There will be jobs generation though all projects. Being the enterprise responsibility to create policies of hiring people respecting the human rights as well as inclusion of vulnerable people.	Most of the population of the three IIA departments is rural (Concepción 57%, San Pedro 80%, Amambay 33%); being agriculture and extensive livestock an important sector of employment of the population, although behind the tertiary sector (commerce and services). As for the population of the DIA districts, the majority is dedicated to activities in the primary sector, both for sale and for self-consumption, followed by the tertiary sector. Compared to these productive sectors, especially the primary one, the project is expected to offer better paid jobs. It is considered a positive impact because of the increase in the level of income; a priori means an increase in the purchasing power and debt capacity of employed persons and their dependents, contributing to a greater consumption of goods and services and, therefore, to a greater development of the local economy and quality of life. Thus, a decrease in the level of poverty is expected, not only due to income, but also structural, which is high in the DIA districts, where between 49.1% (San Alfredo) and 89.4% (Sergeant José Félix López) of the population have at least one Unsatisfied Basic Need (UBN). Salaries for direct jobs generated by the project’s forestry component are expected to be higher compared to current average salaries in DIA and IIA. However, this impact may be limited considering that the	The Project, other projects, and external drivers could contribute to the jobs generation on this VEC. However, according to mitigation measures for both ESIAs, the Project´s embedded controls and programs proposed would appropriately contribute to jobs generation. In sum, the Project will increase jobs generation, but with the measures proposed, such as Program for Development and Linkage with Local Workforce, Women’s Empowerment Program, Local Supplier Development and Promotion Program, besides Recruitment and Selection Policy and Equal Opportunity and Nondiscrimination Policy depend on each sector.	Low

6 PARACEL, Mampower, 2020.

VEC	Potential Impacts from the Industry Component of the Project	Potential Impacts from the Forestry Component of the Project	Potential Impacts from Other Projects	Potential Impacts from External Drivers	Cumulative Impact	Priority Ranking
		people of working age and the needs of the companies. Ensuring also that indigenous wages are leveled at the same wages as non-indigenous workers who perform the same tasks.		amount of direct labor (hired by PARACEL, without third parties as intermediaries) is between 5.55% (basic engineering stage), and 1.64% (operation stage) of the estimated total of jobs to be generated in the substages of the installation and operation stages. Most of the jobs will be outsourced (contract workers); likewise, PARACEL will guarantee compliance with current labor regulations, and in accordance with IFC's Performance Standard 2, to all personnel linked to the project.		
Local Development	In the construction phase, there is a growth trend in the tertiary sector in the region, possibly generating the installation of new commercial units (workshops, service units, transport unit, food and other activities). Thus, the local economy tends to benefit from the emergence of this demand, linked both directly to the activity of the company's execution and indirectly, through the consumption made by the labor linked to the implantation. Therefore, there will be dynamism in the local economy from the implementation phase and will remain during the operation phase of the mill, with the government having the responsibility to monitor informal activities and reinvest the taxes collected in improvements to the municipality.	Both implantation and operation stages of the forestry component of the project will create direct formal jobs (hired by PARACEL, without third parties as intermediaries); that is, in compliance with current national legislation. Regarding the jobs generated that will be outsourced, these will be monitored by the company in order to comply with national legal requirements, in compliance with the principles of IFC PS 2 on "Work and working conditions", which defines requirements applied to workers. Contracted (outsourced). Access to formal employment conditions is beneficial for workers and their dependents, since the system of pension contributions and social security is now integrated. Other labor rights and guarantees are accessed, contributing all this to a better quality of life for the worker (greater peace of mind regarding the future, etc.) and the dependents of him.	There will be jobs generation though all projects. Being the enterprise responsibility to create policies of hiring people respecting the human rights as well as inclusion of vulnerable people. The jobs generation will cause local development.	The possible loss of sources of employment and/or income would take place due to the change in land use, which will produce the implantation of forest plantations on sites that are currently dedicated to livestock production. This change in production will affect employees currently working in the establishments planned for the project, all linked to stays. The owners of the establishments are not considered, since they will have the freedom of decision and negotiation for the sale/lease of their land. As indicated before, it is possible that the change in land use produces the geographical migration of workers accustomed to the livestock sector who would not/could not reconvert to the forestry sector. However, some workers are also likely to be unemployed, if they are unable to migrate to other establishments.	It is considered a positive impact because of the increase in the level of income; a priori means an increase in the purchasing power and debt capacity of employed persons and their dependents, contributing to a greater consumption of goods and services and, therefore, to a greater development of the local economy and quality of life. Thus, a decrease in the level of poverty is expected, not only due to income, but also structural, which is high in the DIA districts, where between 49.1% (San Alfredo) and 89.4% (Sergeant José Félix López) of the population have at least one Unsatisfied Basic Need (UBN). The Project, other projects, and external drivers could contribute to the local development on this VEC. However, according to mitigation measures for both ESIAs, the Project´s embedded controls and programs proposed would appropriately contribute to local development.	Low

8 MANAGEMENT OF CUMULATIVE IMPACTS

The management measures needed to prevent or minimize cumulative impacts on Medium priority VECs will depend on both the context in which PARACEL Project´s impacts occur (i.e. the impacts from other projects and natural drivers affect the VECs) and the characteristics of PARACEL Project's impacts. The assessment of cumulative impacts presented in Section 7 concludes that only the VEC Surface Water Resources would be considered Medium Priority. This means that the Project could potentially contribute to the adverse impacts on this VEC, and that actions should be implemented in the medium term to mitigate potential adverse cumulative impacts on the VEC.

Since cumulative impacts typically result from the actions of multiple stakeholders, the responsibility for their management is collective, requiring individual actions to eliminate or minimize individual project contributions. Ultimately, the management of cumulative impacts is the responsibility of government and regional planners. However, it is considered best international practice that project developers make best efforts to engage relevant stakeholders and promote management of cumulative impacts in their project areas (IFC, 2013; Franks et al., 2010). Therefore, it should be noted that there is limited information on other developments at the time of conducting this CIA.

The following is a list of the measures already recommended to minimize, eliminate, or compensate impacts on water resources as stated in both ESIAs. PARACEL has committed to implement these measures through its environmental management programs, as follows:

- Take measures to certify that the company hired to collect the wastewater from the chemical baths is properly regulated, and that the wastewater is disposed of in an environmentally sound manner.
- Adapt the management plantation to the crop rotation period.
- Adopt forest management with water-saving strategies.
- Plan plantations in the Aquidaban and Apa River basins, and their sub-basins (Arroyo Pytanohaga, Arroyo Trementina, Arroyo Negla, Arroyo Paso Bravo) with economically viable mosaics.
- Develop a water availability-demand study in the sub-basins aiming to define and propose measures to reduce conflicts between water uses and users.
- Develop micro basins monitoring, involving ecosystems formed by planted and native forests.
- Consolidate the monitoring of surface water, water use in its farms and surroundings, especially with regard to water quality.
- Study the best spacing of the eucalyptus plantation in certain areas with greater water and soil restriction and the increase of native vegetation areas.
- Equate the best proportion between eucalyptus plantation areas and areas with native vegetation.
- Protect riparian areas in properties, especially upstream of water intake for human demand.
- Develop a water availability-demand study to estimate water usage before and after planting of Eucalyptus on grassland, and potential impacts to water supply on surrounding wetlands.

- Perform Biodiversity Management Program which the biodiversity monitoring program demonstrates to result in No Net Loss or a Net Gain to significant biodiversity values with residual impacts from the project, water management program, surface and ground water quality monitoring program – forestry;
- Meet IFC EHS Guidelines for Perennial Crop Production.
- Use the best available technologies (BAT) in the production process to minimize the generation of liquid effluents (flow and organic load).
- Implement an effluent treatment plant based on the best available practical technology (modern and safe), the activated sludge system and tertiary treatment.
- To properly operate the effluent treatment plant so that the discharge of treated liquid effluents complies with current legislation.
- Carry out a periodic inspection of the emissary system and its diffusers.
- Carry out the Effluent Treatment Plant (ETP) Monitoring Program.
- To carry out the Surface Water Quality Monitoring Program.
- Prevent impacting other waterway users activities during dredging works through the correct communication provided.

In addition, Paracel's environmental sustainability strategy considers national as well as international regulations, such as the ISO 14000 standard, the Performance Standards of the International Finance Corporation (IFC), the principles of the Forest Stewardship Council (FSC), the Development Goals. Sustainable United Nations (UN) and B-company standards.

According to the Stakeholder Engagement Plan, Paracel will annually develop or support events as a means of public relations in order to link its brand with other organizations that pursue the same goals as Paracel. The events must be linked to education, sustainability, human rights, environment or others of interest to the organization. Therefore, as part of the mitigation measures to address cumulative impacts on the VEC Surface Water Resources, Paracel proposes "water" as one of the main topics.

In addition, on World Water Day, held on 22 March every year since 1993, Paracel will plan events in order to create awareness amongst its employees. Paracel will also implement an awards program for its employees that propose the best water consumption reduction measures or ideas (e.g., water close circuits), from industry and forestry components.

Paracel will also perform meetings with the community and other stakeholders to show the monitoring results for both Industry and Forestry components to be communicated through a document that systematizes all the information. According to the DISSEMINATION AND COMMUNICATION PROGRAM, Paracel will hold annual meetings for the dissemination of the Paracel Sustainability Report. The Program aims to provide clear and pertinent information about the project to the general population, with a focus on indigenous communities and resident communities in the project's areas of influence, in order to maintain and guarantee constant and timely communication with them.

ANNEX I

List of the stakeholders, communities and others players consulted for the project

Registry of Activities developed for the mill social component

CONSTRUCTION AND OPERATION PROJECT FOR A PULP MILL AT THE DEPARTMENT CONCEPCIÓN					
Activities summary - Social Component – Field Work					
Activity	**Objectives**	**Institutions/ Organization/ District/ Microterritory**	**Date**	**Assistants/ Responsibles**	**Central aspects**
Inicial tour.	Know the studied terrain from the propected area.	District: Concepción.	21/11/2019 to 22/11/2019.	Caren Kremer – Social specialist. Frederique Gerard-Social Economist. Fátima Enciso-Social specialist. Ana Segovia- Social Technician.	It identified access and communities near the prospected area. Piquete Cue, Callejón San Ramón, Saladillo. It was observed that the access routes are used to exit the paved road that connects Concepción-Vallemí.
Photographic record of referential activity.	 Callejón San Luis.		 Reference Projects in the area .		 Acces Saladillo/ Road Vallemi-Concepción.

	  Referencia Projects in the area.			 Callejón San Ramón.	 Acces Piquete Cue.
First approach with local government referents.	1- Present the enterprise and the works to be carried out in the preparation of the Environmental Impact Preliminary Assessment (EIAp); to build and operate the pulp mill in Concepción Department. 2-Present the Staff in charge of the studies of the Social component. 3-Request the designation of institutes technicians references.	**Loreto** **Municipality**	**11/12/2019.**	Rodolfo Insaurralde- Municipal Mayor. Joel Miskinich-General Secretary. Cyro Croce Launy- Sustainability Environmental and Social Manager- PARACEL. Christian Rasmussen- Heritage Manager – PARACEL. Caren Kremer- Social Specialist. Ana Segovia- Social Technician.	The Mayor expresses openness and willingness to accompany the actions carried out within the framework of the preparation of the EIAp. In turn, it refers to the area of possible installation of the Plant. PARACEL representatives explain that preliminary studies are currently being carried out within the department of Concepción, to define said area. The mayor appoints Mr. Joel Miskinich as the local technical liaison.

First approach with local government referents.	1- Present the enterprise and the works to be carried out in the preparation of the Environmental Impact Preliminary Assessment (EIAp); to build and operate the pulp mill in Concepción Department. 2-Present the Staff in charge of the studies of the Social component. 3-Request the designation of institutes technicians references.	**Concepción Municipality.**	**11/12/2019.**	Cyro Croce Launy- Sustainability Environmental and Social Manager- PARACEL. Christian Rasmussen- Heritage Manager- PARACEL. Caren Kremer- Social Specialist. Ana Segovia- Social Technician.	It is not possible to talk with the Mayor, Mr. Alejandro Urbieta. A next visit will be scheduled with representatives of the institution.

First approach with local government referents.	1- Present the enterprise and the works to be carried out in the preparation of the Environmental Impact Preliminary Assessment (EIAp); to build and operate the pulp mill in Concepción Department. 2-Present the Staff in charge of the studies of the Social component. 3-Request the designation of institutes technicians references.	**Concepción Government**	**12/12/2019.**	Attorney. Ignacio Romero Quevedo - General Secretary/ Investments Director. Cyro Croce Launy- Sustainability Environmental and Social Manager- PARACEL. Christian Rasmussen- Heritage Manager- PARACEL. Caren Kremer- Social Specialist. Ana Segovia- Social Technician.	The meeting is held with the Secretary General. It is recommended to request specific information on the districts from referents of the municipalities; since the Government only has general data. In this way he also expresses his interest and openness in the project; highlighting the importance of the private sector to boost the local economy. The network of contacts with key actors of the department (private sector, universities, associations, and others according to interest) is made available. On the other hand, it invites you to participate in a meeting to present the project for the installation of a hydroelectric power plant on the Ypané River for the year 2020 (currently in the prequalification stage of signatures). Mr. Ignacio Romero presents himself as a technical liaison from the governor's office for future contacts.
First approach with local government referents	1- Present the enterprise and the works to be carried out in the	**Horqueta Municipality.**	**13/12/2019.**	Pabla Luján- General Secretary. Cyro Croce Launy-	The municipal mayor, Mr. Jorge Urbieta, is not at the institution due to other commitments; the meeting is held with the Secretary General, Mrs. Pabla Luján.

	preparation of the Environmental Impact Preliminary Assessment (EIAp); to build and operate the pulp mill in Concepción Department. 2-Present the Staff in charge of the studies of the Social component. 3-Request the designation of institutes technicians references.			Sustainability Environmental and Social Manager- PARACEL. Caren Kremer- Social Specialist. Ana Segovia- Social Technician.	The same manifests openness to initiatives that can benefit the Department, highlighting that there is a lot of qualified young workforce. Eng. Rubén Ramírez Secretary of Agriculture and Environment.
First approach with local government referents	1- - Present the enterprise and the works to be carried out in the preparation of the Environmental Impact	**Belén Municipality .**	**13/12/2019.**	Víctor Sanabria- Municipal Mayor. Cyro Croce Launy- Sustainability Environmental and Social Manager- PARACEL Caren Kremer-	At the municipal level they celebrate and promote private initiatives as generators of local employment, since it constitutes one of the greatest needs of the district as well as the Department. Currently there are private enterprises and initiatives that absorb local labor but are insufficient due

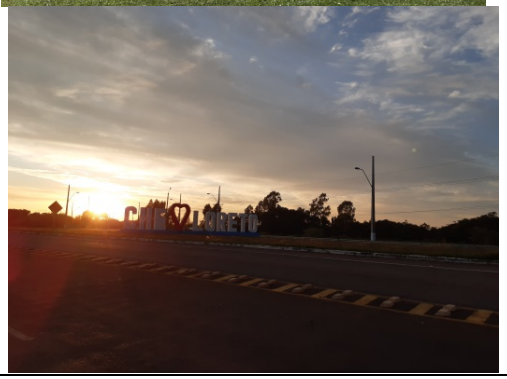
	Preliminary Assessment (EIAp); to build and operate the pulp mill in Concepción Department. 2-Present the Staff in charge of the studies of the Social component. 3-Request the designation of institutes technicians references.			Social Specialist. Ana Segovia- Social Technician.	to the high number of population of working age that is unemployed. The mayor refers to investment projects such as the Heparina factory, a refrigerator and a rice cooker. It stands out that to encourage them to operate in the area, the municipality has offered a tax reduction or exemption for a certain period. The mayor designates Prof. Vicente Velázquez as a local reference.
Interview with key players.	Conduct interviews with designated focal points and references from the private sector and civil society.	**District: Concepción, Horqueta, Loreto, Belén.**	**16/12/2019al 18/12/ 2019.**	Fátima Enciso- Social specialist.	Eight interviews were conducted with key actors in the districts of Concepción, Loreto, Belén and Horqueta.
First record of communities near the surveyed area	Identify communities from the entrances. Identify		**17/12/2019**	Yrene Díaz- Social Technician. Ana Segovia- Social Technician.	Communities identified during the tour: Saladillo, Co'ê Porâ, Callejón San Ramón, Laguna Plato, Mbocajaty, Piquete Cue, Colonia Roberto L. Pettit, Cnel. Mongelós, Jhugua Zarzo, Curuzu Ñu, Costa Pucu, Callejón San Luis, Callejón San

	geographic coordinates of neighboring communities to [illegible]				Antonio, Colonia Primavera.
Referential photographic record of activity.	 Acceso Saladillo.  Comisaría Laguna Plato.  Callejón San Ramón.  Arroyo Saladillo  Balneario Vy'a Renda  Cruce Colonia Primavera-Jhugua Rivas				
Close up with government referents local.	1- Present the entrepreneurship and the works to take place in the	**Concepción Municipality**	**13/01/2020.**	Teresa Díaz-Communication Responsible. Caren	The head of the communication department points out that the initiative is essential for the development of the area. If the undertaking is

	framework of the elaboration of the Study of Impact Preliminary Environmental (EIAp); for the construction and operation of the Pulp Mill in the Department of Concepción. 2-Presentation of the team in charge of the studies of the Social component. 3-Request the appointment of referents institutional technicians.			Kremer- Social Specialist. Fabiola Melgarejo – Social Team. Ana Segovia- Social Technician.	materialized, answers could be given to the scarce labor supply and the high demand for labor in the area. Names and contact details of key actors of the institution and the municipality are mentioned; in order to obtain relevant information regarding: • Works, services and infrastructure - Alternative roads (Arsenio Domínguez Chávez). • Education (Silvia Torales de Duarte). • Cadastre-Land Use (Edgar Zeballos). • Citizen participation (Hedelio Pérez). Faced with the request for plans or maps at the level of localities and existing companies in the rural areas of the municipality, it indicates that precise data is only available for the urban part; For more information, you could contact Mrs. Ada Rodríguez.
Socioeconomic census.	**Apply census records.**	**Place: Piquete Cue.**	14/01/2020 to 15/01/2020.	Caren Kremer-Social specialist. Yrene Díaz- Social Technician. Oscar Maidana-Social Technician. Ana Segovia- Social Technician.	Twelve census cards were applied to resident families at a distance of 1km around the plant's property area. 1 resident is traveling for work reasons; reason for which the census record is not applied.

<table>
<tr><td>Referential photographic record of activity.</td><td colspan="5">   
Referencia: Viviendas.
   
Aplicación de fichas censales</td></tr>
<tr><td>Surveys.</td><td>Application of 28 surveys in the District of Belén.</td><td>District: Belén.</td><td>16/01/2020</td><td>Elena Díaz- Social Technician.
Oscar Maidana- Social Technician.</td><td>28 surveys were applied in the urban area of the District of Belén, taking into account identified interest groups. Among those who are: 5 merchants, 4 health leaders, 4 hotel and tourism leaders, 5 business users, 4 religious, recreational or organizational leaders, 4 university students, 2 teachers or directors of educational institutions.</td></tr>
<tr><td>Surveys .</td><td>Application of 30 surveys in the</td><td>District: Horqueta.</td><td>17/01/2020</td><td>Elena Díaz- Social Technician.</td><td>30 surveys were applied in the urban area of the District of Horqueta, taking into account</td></tr>
</table>

	District Horqueta.			Oscar Maidana- Social Technician.	identified interest group. Among those that are: 6 merchants, 4 health leaders, 4 hotel and tourism leaders, 5 business users, 4 religious, recreational or organizational leaders, 4 university students, 3 teachers or directors of educational institutions.
Surveys	**Application of 30 surveys in the District of Horqueta.**	**District: Loreto.**	20/01/2020	Elena Díaz- Social Technician Oscar Maidana- Social Technician.	30 surveys were applied in the urban area of the Loreto District, taking into account identified interest groups. Among those that are: 6 merchants, 4 health referents, 2 hotel and tourism references, 4 business users, 4 religious, recreational or organizational references, 4 university students, 6 teachers or directors of educational institutions.
Surveys	**Application of 62 surveys in the District of Concepción.**	**District: Concepción.**	21/01/2020 24/01/2020 25/01/2020 27/01/2020	Elena Díaz- Social Technician Oscar Maidana- Social Technician	62 surveys were applied in the urban area of the Concepción District by interest groups. Among those who are: 10 merchants, 10 health references, 10 hospitality and tourism references, 8 business users, 8 religious, recreational or organizational references, 8 university students, 8 teachers or directors of educational institutions.

Referential photographic record of activity.	     				
Community interviews	**Apply community interviews to key references in the DIA area.**	**Microterritories.**	Week 1: from 20/01/2020 to 24/01/2020 Week 2: from 27/01/2020 to 30/01/2020.	Yrene Díaz - Social Tecnician Ana Segovia- Social Technician.	44 community interviews were conducted: 1 in Horqueta, 1 in Concepción, 3 in Callejón San Ramón, 2 in Callejón San Luis, 1 in Callejón San Antonio, 1 in Colonia Primavera, 3 in Costa Pucu, 1 in Jhugua González, 2 in Jhugua Zarzo, 5 in Co'ê Porâ, 3 in Curuzu Ñu, 5 in Laguna Plato, 2 in Mbocayaty, 1 Pirity Mongelós, 1 Colonia Cnel. Mongelós, 1 in Paso Itá, 7 in Colonia Roberto L. Petit and 4 in Saladillo.

Referential photographic record	 				
Institutional Interviews.	**Apply interviews to institutional referents in the DIA area.**	**Districts: Horqueta, Loreto, Belén and Concepción.**	From 22/01/2020 to 24/01/2020. From 29/01/2020 to 30/01/2020. And 06/03/2020.	Caren Kremer-Social specialist. Romain Crochet-Social Technician. Yrene Diaz- Social Technician. Ana Segovia- Social Technician.	On the specified dates, 20 interviews with institutional referents at the district level. Adding to these those carried out in the month of December, a final total of 28 institutional interviews is obtained, distributed as follows. 5 in Horqueta, 5 in Loreto, 5 in Belén and 13 in Concepción. A facilitating element constituted the openness and predisposition of the people consulted at the time of providing information, knowledge and time for the development of the data collection process.

Referential photographic record					
Participatory workshop	**To celebrate information about the project to key actors of institutions of the zone.** **To collect information in relation to the socioeconomic perception and the entrepreneurship**	**Headquarters: Association of Merchants and Industrialists of Concepción** (ACIC). **- District: Concepción.**	23/01/2020.	**Responsible:** Caren Kremer- Social specialist.	Through this space it was possible to provide information about the project, to reveal the perception in relation to socioeconomic aspects of the area and those related to the plant in particular. 11 representatives of institutions, institutions and organizations that are indicated below participated in the workshop: National Police, ESSAP, Judicial Power, National University of Concepción, SNPP, Municipality, ACIC, IRS, ORMIC. In addition, representatives of the company PARACEL and Consultants of the Social Component were present.

Referential photographic record .	  				
Community Focal Group	**To celebrate information about the project to** key **actors of institutions of the zone.** **To collect information in relation to the socioeconomic perception and the entrepreneurship**	**Sede: Colonia Roberto L. Petit**	25/01/2020.	**Responsibles:** Yrene Díaz- Social Technician Ana Segovia- Social	The focus group takes place in the house of the referent of the neighborhood commission of Colonia Cnel. Mongelós; on January 25 from 2:00 p.m. to 4:45 p.m. 23 residents participated, some members of Neighborhood Commissions from the towns of Colonia Coronel Mongelós, Mongelós Pirity, Laguna Plato, Jhugua Zarzo, Jhugua González and Callejón San Luis. As a methodology, in order to collect information according to the criteria established for conducting focus groups and given the number of participants, it was resolved: to make a general presentation to later subdivide the group in two with a moderator per round of work

Referential photographic record .	  				
Community Focal Group	**To celebrate information about the project to** key **actors of institutions of the** **To collect information in relation to the socioeconomic perception and the entrepreneurship**	**Sede: Oratorio** **Santo Domingo Sabio** **Costa Pucu.**	25/01/2020.	**Responsible:** Yrene Díaz- Social Technician. Ana Segovia- Social Technician.	The meeting took place on January 25 from 5:00 p.m. to 7:30 p.m. A total of 10 participants were registered, members of Neighborhood Commissions, Sanitation Boards, Community Field and residents belonging to the towns of Callejón San Antonio, Co'ê Porâ, Costa Pucu, Paso Ita and Curuzu Ñu.

Referential photographic record .	 				
Community Focal Group	**Celebrate information about the project to** key **actors of institutions of the** **To collect information in relation to the socioeconomic perception and the entrepreneurship**	**Sede: Municipalidad de Belén.**	6/02/2020.	**Responsibles:** Yrene Díaz- Social Technician. Ana Segovia- Social technician.	It was held on February 6, from 8:00 a.m. to 10:00 a.m., in the Meeting Room of the Municipality, with the participation of women leaders and the president of the coordinator of Neighborhood Commissions. In total, 14 participants were registered from the towns of: Paso Urundey, Santa Lucía, Barrio Fátima, Requejo, Santo Tomás, San Rafael, Santa Elena, San Miguel, Santa Rosa, Santa Cruz and Belén Zona Urbana.

Referential photographic record.					
Community Focal Group	**Celebrate information about the project to key actors of institutions of the** **To collect information in relation to the socioeconomic perception and the entrepreneurship**	**Sede: Municipalidad de Loreto.**	8/02/2020.	**Responsibles:** Yrene Díaz- Social Technician. Ana Segovia- Social Technician.	On February 8 from 8:00 a.m. to 10:30 a.m. the focus group takes place in the city of Loreto. A total of 12 people participated; referents of the Church Commission, Merchants Association, Radio Tekopyahu, Urban Development Commissions and Neighborhood Commissions in the towns of: Loreto (urban area), San Marco, Virgen del Carmen, Virgen del Camino and Perpetuo Socorro.

Referential photographic record.	 				
Community Focal Group	**Celebrate information about the project to key actors of institutions of the zone. To collect information in relation to the socioeconomic perception and the entrepreneurship.**	**Sede: Municipalidad de Horqueta.**	8/02/2020.		The focus group took place on February 8 from 2:00 p.m. to 4:00 p.m., with the participation of 9 people, among which were: peasant leaders, farmers, radio announcer, neighborhood commission. Productive committee and representatives of the municipality.

Referential photographic record.	  

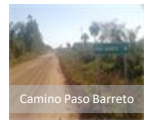
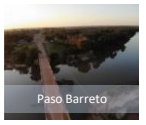
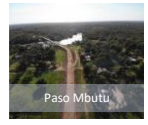
Summary of activities - Social Component - Survey of Secondary Sources

Activity	**Objectives**	**Institutions/ Organization/ District/ Microterritory**	**Date**	**Assistents/ Responsible**	**Central aspects**
Visit.	Collect data	DGEEC – Asunción.	09/12/2019.	Frederique Gerard. Gloria González. Marco Almirón.	Statistical and census information.
Visit to ORMIC.	Request documents about the department.	Oficina Regional Ministerio de Industria y Comercio.	8/01/2020.	Fabiola Melgarejo Valiente. César Benítez. Amanda Insfrán.	Request for institutional documents with data on Concepción.
Visit SENASA.	Request data about artesians wells.	SENASA.	13/01/2020.	Fabiola Melgarejo Valiente. Justino Blanco.	Request for data on existing artesian wells in the department.
Visit to First Sanitaria Region.	Request data about the region	Primera Región Sanitaria.	13/01/2020.	Fabiola Melgarejo Valiente. Hugo Cabrera. Carlos Blanco.	Request for health data from the First Region. Note delivery.
Visit to INDERT.	Solicitar datos sobre compañías y comunidades	INDERT.	14/01/2020.	Fabiola Melgarejo Valiente. Jenny Maidana.	Request for data on companies and rural communities.

	rurales.				
Telephone conversation.	Collect information.	MIC – Vice Ministerio de Mipymes.	15/01/2020.	Frederique Gerard. Carlos Osorio – Director de Programas y Proyectos.	Ongoing activities, organizations assisted.
Visit.	Collect info i	DGEEC – Asunción.	16/01/2020.	Frederique Gerard. Marco Almirón. Juana Cuevas.	Additional specific information.
Visit Dirección Departamental de Educación.	Request data about education.	MEC	16/01/2020.	Fabiola Melgarejo Valiente.	Request data about education at departament.
Visit to Gobernación de Concepción.	Request tourist data.	Gobernación de Concepción.	16/01/2020.	Fabiola Melgarejo Valiente. Jimena Jiménez.	Request tourist information from the office in charge.
Visit to Municipalidad de Concepción.	Request data about the district.	Municipalidad de Concepción.	16/01/2020.	Fabiola Melgarejo Valiente. Ada Benítez.	Request data at the Municipal Land Registry Office.
Visit Primera Región Sanitaria.	Withdraw data on the health region.	Primera Región Sanitaria.	17/01/2020.	Fabiola Melgarejo Valiente. Carlos Blanco.	Withdrawal of health data from the Primera Región.
Visit INDERT.	Withdraw data on companies and rural communities.	INDERT.	17/01/2020.	Fabiola Melgarejo Valiente. Jenny Maidana.	Withdraw data requested from the institution.
Visit to DEAg.	Request for data on jobs in the department	MAG.	20/01/2020.	Fabiola Melgarejo Valiente. Rubén Figueredo.	Request data on work carried out in the department.
Visit ESSAP.	Request data about service.	ESSAP.	20/01/2020.	Fabiola Melgarejo Valiente. Heriberto Ruiz	Request data on the service offered by the institution in the city.

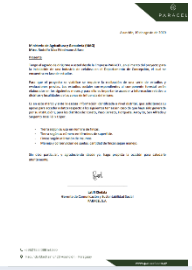
Visit to SNPP.	Request data on work in the department.	SNPP.	20/01/2020.	Fabiola Melgarejo Valiente. Celso Cañete.	Request for data on courses offered next year and those planned for 2020.
Visit.	Collect info	MOPC – Dirección de Proyectos Viales.	22/01/2020.	Frederique Gerard Javier Recalde.	Ongoing and planned MOPC activities in departments and districts.
Visit. i	Collect info	MOPC – Dirección de Planificación Vial.	22/01/2020.	Frederique Gerard. Luis Ruiz Diaz.	Ongoing and planned MOPC activities in departments and districts.
Conversación Telefónica / mails.	Collect information.	SENATUR.	24/01/2020.	Frederique Gerard. Suny Francia.	Providers of tourist services of the Department of Concepción. Number of beds in accommodation establishments.
Visit. i	Collect info	DGEEC – Asunción.	04/02/2020.	Frederique Gerard. Gloria Gonzále . Marco Almirón.	Special report on rural and urban areas.

ANEXO : Register of main activities for social studies - forestry component

Date/ Activity	Responsible/ Assistants	Districts/ Location involved	Objective of the Activity	Main results	Photographic register for reference / Source of verification
Martes 22 al viernes 24 de Julio 2020 "Primer recorrido en terreno"	Equipo Social: Caren Kremer, Yrene Díaz, Ana Segovia.	-Horqueta -Loreto -Paso Barreto -Sargento José Félix López	-Realizar un recorrido en las zonas donde se encuentran prospectados los campos forestales del proyecto. -Identificar principales vías de acceso a las plantaciones forestales prospectadas y las comunidades existentes en las zonas.	Se han identificado tres accesos principales y 16 comunidades. Acceso Loreto, Paso Barreto: Por esta vía se encuentran las comuidades de Virgen del Camino, Santísima Trinidad Hugua Po'i, Jhugua Guasu, Islería, Laguna Cristo Rey, Anderi, Paso Barreto e Isla Hermosa. Acceso San Alfredo, Paso Barreto: Hasta llegar al cruce se identifican estancias a ambos lados del camino. Acceso Calle 15, Sargento José Félix López: Esta vía conecta con las comunidades de Calle 15 Norte, Domínguez Nigó, Paso Mbutu, Estribo de Plata, Colonia Jorge Sebastián Miranda, Ayala Cue, Sargento José Félix López (Puentesiño).	         
Viernes 24 de Julio 2020 "Reunión con representantes Primera Región Sanitaria".	Representantes Primera Región Sanitaria: Cristian Cabrera, Claudia Araujo. Equipo social: Caren Kremer, Ana Segovia.	Primera Región Sanitaria, Concepción	-Presentación del emprendimiento, los trabajos a realizarse en el marco de la elaboración de los estudios sociales correspondientes al componente forestal y el equipo responsable de campo.	Las personas de la institución solicitaron el envío de una nota de pedido dirigida al Director de la Primera Región Sanitaria; especificando la información requerida	 -Registro de Reunión.

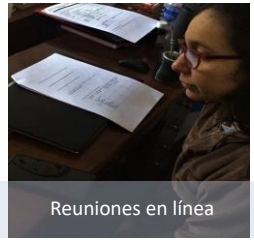
Fecha/ Actividad	Responsables/ Asistentes	Distritos/ Localidad involucradas	Objetivos de la Actividad	Principales resultados	Registro fotográfico referencial / Fuente de verificación
Viernes 31 de Julio Solicitud de información: Primera Región Sanitaria (2)	Equipo Social: Caren Kremer		Solicitud de información estadística y nómina de referentes de USF existentes en los distritos de Loreto, Horqueta, Paso Barreto, Arroyito, y de las localidades de Virgen del Camino, Jhugua Po'i, Jhugua Guazu, Laguna Cristo rey, Anderi, Isla Hermosa, Colonia Jorge Sebastián Miranda, Paso Mbutu, Estribo de Plata y Calle 15.	Se recibió un listado con referentes claves de las USF existentes en las zonas involucradas. Se facilitó información sobre la población total existente en el área de estudio.	 Solicitud de Información
13 de Agosto "Reunión con representantes de gobiernos locales"	Representantes del Municipio: Laude Morel (Intendenta Municipal) David Morel (Secretario General) Israel Florenciano (Jefe de Catastro) Representantes de Paracel: Latifi Chelala (Gerente de Comunicación y Sustentabilidad Social) Diana Liesegang (coordinadora de comunicación visual).	Municipalidad de Sargento José Félix López	-Presentación del emprendimiento, los trabajos a realizarse en el marco de la elaboración de los estudios sociales correspondientes al componente forestal y el equipo responsable de campo.	La Intendente manifiesta apertura y disposición para acompañar las acciones que se realicen en el marco de la elaboración de los estudios sociales para el componente forestal del proyecto; y designa a: David Morel (Secretario General) e Israel Florenciano (Jefe de Catastro) y como enlaces técnicos a nivel local. Menciona que el distrito tiene bastantes necesidades; sobre todo en materia de salud y educación. Asimismo, señala que en la zona existen radios comunitarias tales como Itaky FM-88.9, Radio Más-98.5, y Radio Activa-103.5. Señala la importancia de utilizar esos canales de información a fin de socializar el proyecto con más pobladores y	 Municipalidad de Sargento José Félix López  -Registro de Reunión

	Equipo Social: Caren Kremer Ana Segovia			aclarar algunas dudas en materia de producción de eucalipto a gran escala.	
Lunes 17-08-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Loreto: Virgen del Camino, Hugua Po'i	-Realizar entrevistas a referentes comunitarios e institucionales. -Registro fotográfico de la comunidad y georreferenciación de instituciones identificadas.	-Aplicación de instrumentos de entrevista y encuesta a referente de organización y directores de Instituciones Educativas. -Se realizó un registro fotográfico de las instituciones y sitios de interés de las comunidades involucradas.	 Entrevista con referente comunitaria
Martes 18-08-2020 "Reunión con representantes de Gobiernos Locales"	Intendente Municipalidad Paso Barreto: Lic. Bruno Carlos Piccinini Soerensen Representantes de Paracel: Latifi Chelala (Gerente de Comunicación y Sustentabilidad Social) Diana Liesegang (coordinadora de comunicación visual) Equipo Social: Caren Kremer	Asunción	-Presentación del emprendimiento, los trabajos a realizarse en el marco de la elaboración de los estudios sociales correspondientes al componente forestal y el equipo responsable de campo. - Solicitar la designación de referentes técnicos institucionales	El Intendente menciona la importancia del emprendimiento a nivel local y para el país. Manifiesta su acompañamiento y disposición para facilitar acciones en el marco de la elaboración de los estudios sociales para el componente forestal del proyecto, y designa a la Sra. Dominica Luscich (Secretaria General).	 Reunión -Intendente Paso Barretio -Registro de Reunión
Martes 18-08-20	Equipo Social: Ana Segovia Yrene Díaz	Loreto: Hugua Po'i	-Realizar entrevistas a referentes institucionales.	-Aplicación de instrumentos de entrevista y encuesta a referentes de organización y de la Unidad de Salud Familiar – USF.	

"Aplicación de entrevistas, encuestas"			-Registro fotográfico de la comunidad y georreferenciación de instituciones identificadas.	-Se realizó un registro fotográfico de las instituciones y sitios de interés de las comunidades involucradas.	 Reunión con responsable de la USF
Viernes 19-08-20 Solicitud de información: MAG, DGEEC e INFONA	Equipo social: Caren Kremer Responsable Paracel: Latifi Chelala	Asunción	Solicitud de información tanto a nivel departamental como distrital; datos estadísticos de población, acceso a servicios básicos, pobreza, NBI, uso de suelo, recursos forestales, entre otros	Se recibió información actual referente a los temas solicitados, esto por parte de las tres instituciones a las que se envió la solicitud.	 Solicitud de Información
Miércoles 19-08-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Loreto: Jhugua Guazú, Laguna Cristo Rey	-Realizar entrevistas a referentes institucionales. -Registro fotográfico de la comunidad y georreferenciación de instituciones identificadas.	-Aplicación de instrumentos de entrevista y encuesta a referentes de educación y de la Unidad de Salud Familiar – USF. -Se realizó un registro fotográfico de la comunidad de Laguna Cristo Rey y se concertaron próximas reuniones.	 Registro fotográfico de la comunidad
Jueves 20-08-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Paso Barreto: Isla Hermosa Loreto: Laguna Cristo Rey	-Realizar entrevistas a referentes institucionales. -Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta a responsables de la Unidad de Salud Familiar – USF de Paso Barreto, del Puesto de Salud de Isla Hermosa, de las Instituciones Educativas de Isla Hermosa y la localidad de Laguna Cristo Rey. -Se realizó un registro fotográfico de las instituciones y sitios de interés de las comunidades involucradas.	 Visita a la USF de Paso Barreto

Fecha/ Actividad	Responsables/ Asistentes	Distritos/ Localidad involucradas	Objetivos de la Actividad	Principales resultados	Registro fotográfico referencial / Fuente de verificación
Viernes 21-08-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Horqueta: Paso Mbutu	-Realizar entrevistas a referentes comunitarios y de instituciones de la zona. -Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta a referente de la institución educativa, referente de organización y de la Unidad de Salud Familiar – USF. -Se realizó un registro fotográfico de las instituciones y sitios de interés de la comunidad.	 Paso Mbtu- Acceso  Paso Mbutu  Entrevista con referente comunitario
Martes 08-09-2020 "Aplicación de entrevistas, encuestas"	Equipo Social: Caren Kremer Ana Segovia Yrene Díaz	Sargento José Félix López - Puentesiño	-Realizar entrevistas concertadas con referentes institucionales y de estancias. - Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta a referentes de la Municipalidad, Unidad de Salud Familiar, Dirección de Extensión Agraria, Supervisión Educativa, y a referentes de estancias de la zona. -Se realizó un registro fotográfico de las instituciones y sitios de interés de la comunidad.	 Entrevista Estancia Trementina
Miércoles 09-09-20 "Aplicación de entrevistas grupales, encuestas"	Equipo Social: Caren Kremer Ana Segovia Yrene Díaz	Sargento José Félix López - Puentesiño	-Realizar entrevistas grupales con la participación de referentes comunitarios y productores locales. - Registro fotográfico de la comunidad y georreferenciación de instituciones.	- Se realizaron en total dos reuniones a fin de aplicar el instrumento de entrevista grupal y de encuesta a representantes del Consejo de Salud, organizaciones y productores locales. -Se realizó un registro fotográfico de las instituciones y sitios de interés existentes en la zona.	 Reunión con productores

Fecha/ Actividad	Responsables/ Asistentes	Distritos/ Localidad involucradas	Objetivos de la Actividad	Principales resultados	Registro fotográfico referencial / Fuente de verificación
Viernes 11-09-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Paso Barreto	-Realizar entrevistas concertadas con referentes institucionales. - Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta a referentes de la Municipalidad local y de la Supervisión Educativa. -Se realizó un registro fotográfico de las instituciones y sitios de interés existentes en la zona.	 Entevista con funcionarios de la Municipalidad
Sábado 12-09-20 Lunes 14-09-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Loreto: Anderí, Hugua Po'i, Virgen del Camino Paso Barreto	-Realizar entrevistas concertadas con referentes institucionales. - Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de encuesta y entrevista con referente de la comisión vecinal de la localidad Anderí, registro fotográfico de las comunidades de Virgen del Camino, Jhugua Po'i y la ciudad de Paso Barreto.	 Registro fotográfico de instituciones
Martes 15-09-20 "Aplicación de entrevista grupal, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Horqueta: Paso Mbutú Estribo de Plata	-Realizar entrevista grupal con referentes comunitarios. -Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta durante la reunión llevada a cabo con representantes la comunidad: pescadores, sombrereros, comerciantes, y referentes de la comisión de agua y la USF. -Se realizó un registro fotográfico de las instituciones y sitios de interés existentes en la zona.	 Reunión con referentes de la localidad

Fecha/ Actividad	Responsables/ Asistentes	Distritos/ Localidad involucradas	Objetivos de la Actividad	Principales resultados	Registro fotográfico referencial / Fuente de verificación
Miércoles 16-09-20 Jueves 17-09-20 "Aplicación de entrevistas, encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Arroyito – Horqueta: Calle 15 Loreto: Santísima Trinidad	-Realizar una entrevista con referentes comunitarios e institucionales. - Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta con referente de Institución Educativa de Calle 15 y con representantes de la Comisión Vecinal de la localidad de Santísima Trinidad. -Se realizó un registro fotográfico de las instituciones y sitios de interés existentes en la zona.	 Entrevista con la representante institucional
Viernes 18-09-20 "Aplicación de grupo focal y encuestas"	Equipo Social: Ana Segovia Yrene Díaz	Paso Barreto	-Realizar entrevista grupal con referentes comunitarios e institucionales. - Registro fotográfico de la comunidad y georreferenciación de instituciones.	-Aplicación de instrumentos de entrevista y encuesta, se contó con la participación de representantes de: comisión de vivienda, comisión vecinal, USF, concejal distrital y funcionarios de la Municipalidad. -Se realizó un registro fotográfico de las instituciones y sitios de interés existentes en la zona.	 Reunión con representantes del distrito
Lunes 19-09-20 al Miércoles 21-09-20 "Aplicación de entrevistas, encuestas virtuales"	Equipo Social: Ana Segovia Yrene Díaz	Paso Barreto: Colonia Jorge Sebastián Miranda Bella Vista: Ayala Cue Horqueta: Domínguez Nigó	-Realizar entrevistas con referentes comunitarios e institucionales, a través de plataformas virtuales.	-Aplicación de instrumentos de entrevista y encuesta a representantes de Instituciones Educativas y comunitarios de la Colonia Jorge Sebastián, Domínguez Nigó y la comunidad Ayala Cue por medio de reuniones virtuales.	 Reuniones en línea

Direct observation	▪ Direct observation carried out to describe the biophysical environment, identify fauna and flora species, the characteristics of housing, sanitation, health facilities, roads, etc.
Households and key spots georeferencing	▪ Walking tours were conducted to verify the number of houses and representative locations such as schools, health centers, and recreation areas, among others. During these tours, coordinates were taken using GPS, to represent every location based on a Geographic Information System for subsequent analysis and action planning.
Project Socialization Meetings (Aty guasu)	▪ In the Aty guasu format, 16 meetings were held for the socialization of the PARACEL Project, in 10 of these meetings, the signing of the minutes of the Prior, Free and Informed Consent, also called "Permission to consult", took place. ▪ And 10 workshops on Consultation and Free, Prior and Informed Consent were held.
Participatory Rural Appraisal (PRA) workshop	▪ After the effective socialization of the PARACEL Project, 10 data collection workshops were held to prepare the baseline using the Participatory Rural Appraisal methodology.

Source: Drawn up by authors.

Each of the activities of the Socioeconomic Surveys, Project Socialization Meetings (Aty guasu) and all the Participatory Rural Appraisal Workshops have been detailed, with photographic record in the section "Description of the process" of each community studied. This material can be found in the following locations within this document: Takuarita community, Vy'a Renda community, Takuarendyju community, Redención community, Apyka Jegua community, Guyra Ñe'egatu Amba community, Jeguahaty community, Mberyvo community, Sati community and Yvyty Rovi community.

Table . Socialization, consultation, permit application and information gathering activities.

Type of Activity	Participants	Date	Location
Assembly of leaders	27 leaders of indigenous communities, 4 representatives of PARACEL, 3 representatives of Natán Foundation, 2 representatives of INDI, 4 representatives of the Ministry of Livestock and Agriculture.	November 4, 2020	Yby Yaú – Concepción
Project Socialization Meeting	1 female leader from Redenciòn Indigenous Community, 3 representatives of Natán Foundation.	November 5, 2020	Concepción – Concepción
Meeting with key informants	3 representatives of Natán Foundation and 1 Secretary of Indigenous Affairs of the Governorate.	November 6, 2020	Concepción - Concepción

Meeting with key informants	3 representatives of the Natán Foundation and 1 Director of Risk Management, Reduction and Mitigation of the Municipality of Concepción.	November 6, 2020	Concepción-Concepción
Meeting with key informants	3 representatives of the Natán Foundation and 1 Technician of the Ministry of Agriculture and Livestock.	November 6, 2020	Concepción-Concepción
Project Socialization Meeting	3 representatives of Natán Foundation and 18 members of the Takuarita Indigenous Community.	November 12, 2020	Sargento José Félix López - Concepción
Signing of the Prior, Free and Informed Consent Act	3 representatives of Natán Foundation and 18 members of the Takuarita Indigenous Community.	November 12, 2020	Sargento José Félix López - Concepción
Project Socialization Meeting	3 representatives of the Natán Foundation and 14 members of the Vy'a Renda Indigenous Community.	November 24, 2020	Paso Barreto - Concepción
Project Socialization Meeting	3 representatives of the Natán Foundation and 4 members of the Takuarendyju Indigenous Community.	November 24, 2020	Paso Barreto - Concepción
Project Socialization Meeting	2 representatives of the Natán Foundation and 4 members of the Vy'a Renda Indigenous Community.	November 25, 2020	Paso Barreto - Concepción
Meeting with key informants	2 representatives of the Natán Foundation and 1 Veterinarian of the Trementina Farm.	November 25, 2020	Paso Barreto - Concepción
Project Socialization Meeting	3 representatives of the Natán Foundation and 6 members of the Takuarita Indigenous Community.	November 26, 2020	Sargento José Félix López - Concepción
Project Socialization Meeting	3 representatives of the Natán Foundation and 32 members of the Redención Indigenous Community.	November 28, 2020	Concepción
Signing of the Prior, Free and Informed Consent Act	3 representatives of the Natán Foundation and 32 members of the Redención Indigenous Community.	November 28, 2020	Concepción
Project Socialization Meeting	4 representatives of the Natán Foundation and 7 members of the Takuarendyju Indigenous Community.	December 8, 2020	Paso Barreto - Concepción

Signing of the Prior, Free and Informed Consent Act	4 representatives of the Natán Foundation and 7 members of the Takuarendyju Indigenous Community.	December 8, 2020	Paso Barreto - Concepción
Signing of the Prior, Free and Informed Consent Act	4 representatives of the Natán Foundation and approximately 200 members of the Vy'a Renda Indigenous Community.	December 8, 2020	Paso Barreto - Concepción
Project Socialization Meeting	4 representatives of the Nathan Foundation and 26 members of the Jeguahaty Indigenous Community.	December 9, 2020	Paso Barreto - Concepción
Signing of the Prior, Free and Informed Consent Act	4 representatives of the Nathan Foundation and 26 members of the Jeguahaty Indigenous Community.	December 9, 2020	Paso Barreto - Concepción
Project Socialization Meeting	4 representatives of the Natán Foundation and 2 members of the Sati–Pai Renda Chiru Poty Indigenous Community.	December 9, 2020	Bella Vista - Amambay
Project Socialization Meeting	2 representatives of the Natán Foundation and 10 members of the Mberyvo Indigenous Community.	December 12, 2020	Yby Yaú – Concepción
Signing of the Prior, Free and Informed Consent Act	2 representatives of the Natán Foundation and 10 members of the Mberyvo Indigenous Community.	December 12, 2020	Yby Yaú – Concepción
Project Socialization Meeting	2 representatives of the Natán Foundation and 3 members of the Apyka Jegua Indigenous Community.	December 12, 2020	Bella Vista – Amambay
Project Socialization Meeting	2 representatives of the Natán Foundation and 13 members of the Apyka Jegua Indigenous Community.	December 13, 2020	Bella Vista – Amambay
Signing of the Prior, Free and Informed Consent Act	2 representatives of the Natán Foundation and 13 members of the Apyka Jegua Indigenous Community.	December 13, 2020	Bella Vista – Amambay
Project Socialization Meeting	2 representatives of the Natán Foundation and 23 members of the Sati– Pai Reta Chiru Poty Indigenous Community.	December 13, 2020	Bella Vista – Amambay
Signing of the Prior, Free and Informed Consent Act	2 representatives of the Natán Foundation and 23 members of the Sati– Pai Reta Chiru Poty Indigenous Community.	December 13, 2020	Bella Vista – Amambay

Project Socialization Meeting	2 representatives of the Natán Foundation and 2 members of the Guyra'engatu Amba Indigenous Community.	December 13, 2020	Bella Vista – Amambay
Signing of the Prior, Free and Informed Consent Act	2 representatives of the Natán Foundation and 2 members of the Guyra'engatu Amba Indigenous Community.	December 13, 2020	Bella Vista – Amambay
Reunión de Socialización del Proyecto	2 representatives of the Natán Foundation and 5 members of the Yvyty Rovi Cerro Poi Indigenous Community.	December 14, 2020	Bella Vista – Amambay
Signing of the Prior, Free and Informed Consent Act	2 representatives of the Natán Foundation and 5 members of the Yvyty Rovi Cerro Poi Indigenous Community.	December 14, 2020	Bella Vista – Amambay
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 10 members of the Yvyty Rovi Cerro Poi Indigenous Community and 1 representative of INDI.	December 15, 2020	Bella Vista – Amambay
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 22 members of the Apyka Jegua Indigenous Community and 1 representative of INDI.	December 15, 2020	Bella Vista – Amambay
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 25 members of the Sati – Pai Reta Chiru Poty Indigenous Community and 1 representative of INDI.	December 16, 2020	Bella Vista – Amambay
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 20 members of the Guyra Ñe'engatu Amba Indigenous Community and 1 representative of INDI.	December 16, 2020	Bella Vista – Amambay
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 14 members of the Mberyvo Indigenous Community and 1 representative of INDI.	December 17, 2020	Yby Yaú – Concepción
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Nathan Foundation, 25 members of the Jeguahaty Indigenous Community and 1 representative of INDI.	December 17, 2020	Paso Barreto – Concepción
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 15 members of the Vy'a Renda Indigenous	December 17, 2020	Paso Barreto – Concepción

	Community and 1 representative of INDI.		
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 5 members of the Takuarendyju Indigenous Community and 1 representative of INDI.	December 18, 2020	Paso Barreto – Concepción
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 20 members of the Takuarita Indigenous Community and 1 representative of INDI.	December 18, 2020	Sargento José Félix López - Concepción
Free, Prior and Informed Consent and Consultation Workshops	4 representatives of the Natán Foundation, 45 members of the Redención Indigenous Community and 1 representative of INDI.	December 18, 2020	Concepción - Concepción
Assembly of leaders	15 leaders of indigenous communities, 4 representatives of PARACEL, 5 representatives of Natán Foundation, 1 representative of INDI, 2 representatives of the Secretariat of Indigenous Affairs of the Governorate of Amambay and 1 representative of the Municipality of Pedro Juan Caballero	January 27, 2021	Pedro Juan Caballero – Amambay
Individual interviews and georeferencing of locations	5 pollsters of the Natán Foundation and 105 people surveyed from the Redención Indigenous Community.	February 05, 2021 February 06, 2021 February 07, 2021 February 08, 2021 February 09, 2021 February 10, 2021	Concepción – Concepción
Participatory Rural Appraisal Workshop	5 representatives of the Natán Foundation and 24 members of the Redención Indigenous Community.	February 22, 2021	Concepción – Concepción
Individual interviews and georeferencing of locations	5 pollsters of the Natán Foundation and 42 people surveyed from the Takuarita Indigenous Community.	February 12, 2021 February 13, 2021 February 15, 2021	Sargento José Félix López - Concepción
Participatory Rural Appraisal Workshop	5 representatives of the Natán Foundation and 50 members of the Takuarita Indigenous Community.	February 19, 2021	Sargento José Félix López - Concepción
Individual interviews and georeferencing of locations	5 pollsters of the Natán Foundation and 43 people surveyed from the Vy'a Renda Indigenous Community.	February 14, 2021 February 15, 2021 February 16, 2021	Paso Barreto – Concepción

Participatory Rural Appraisal Workshop	5 representatives of the Natán Foundation and 35 members of the Vy'a Renda Indigenous Community.	February 16, 2021	Paso Barreto – Concepción
Individual interviews and georeferencing of locations	5 pollsters of the Natán Foundation and 7 people surveyed from the Takuarendyju Indigenous Community.	February 14, 2021	Paso Barreto – Concepción
Participatory Rural Appraisal Workshop	5 representatives of the Natán Foundation and 11 members of the Takuarendyju Indigenous Community.	February 16, 2021	Paso Barreto – Concepción
Individual interviews and georeferencing of locations	5 pollsters of the Natán Foundation and 43 people surveyed from the Jeguahaty Indigenous Community.	March 16, 2021	Paso Barreto – Concepción
Participatory Rural Appraisal Workshop	5 representatives of the Nathan Foundation and 33 members of the Jeguahaty Indigenous Community.	March 16, 2021	Paso Barreto – Concepción
Individual interviews and georeferencing of locations	4 pollsters of the Natán Foundation and 35 people surveyed from the Sati– Pai Renda Chiru Poty Indigenous Community.	March 16, 2021	Bella Vista – Amambay
Participatory Rural Appraisal Workshop	4 representatives of the Natán Foundation and 20 members of the Sati– Pai Renda Chiru Poty Indigenous Community.	March 16, 2021	Bella Vista – Amambay
Individual interviews and georeferencing of locations	4 pollsters of the Natán Foundation and 18 people surveyed from the Apyka Jegua Indigenous Community.	March 16, 2021	Bella Vista – Amambay
Participatory Rural Appraisal Workshop	4 representatives of the Natán Foundation and 21 members of the Apyka Jegua Indigenous Community.	March 16, 2021	Bella Vista – Amambay
Individual interviews and georeferencing of locations	5 pollsters of the Natán Foundation and 17 people surveyed from the Mberyvo Indigenous Community.	March 17, 2021	Yby Yaú – Concepción
Participatory Rural Appraisal Workshop	5 representatives of the Natán Foundation and 15 members of the Mberyvo Indigenous Community.	March 17, 2021	Yby Yaú – Concepción
Individual interviews and georeferencing of locations	4 pollsters of the Natán Foundation and 24 people surveyed from the Guyra	March 17, 2021	Bella Vista – Amambay

	Ñe'engatu Amba Indigenous Community.		
Participatory Rural Appraisal Workshop	4 representatives of the Natán Foundation and 21 members of the Guyra Ñe'engatu Amba Indigenous Community.	March 17, 2021	Bella Vista – Amambay
Individual interviews and georeferencing of locations	6 pollsters of the Natán Foundation and 15 people surveyed from the Yvyty Rovi Cerro Poi Indigenous Community.	March 18, 2021	Bella Vista – Amambay
Participatory Rural Appraisal Workshop	6 representatives of the Natán Foundation and 15 members of the Yvyty Rovi Cerro Poi Indigenous Community.	March 18, 2021	Bella Vista – Amambay

Source: own elaboration.