MIXED PLANTING OF NATIVE AND NON-NATIVE SPECIES IN PARAGUAY-I

ID: BCR-PY-451-14-001

Document prepared by *Desarrollos Madereros SA and Cambium Earth SL*

Juan Murillo, Miguel Moncada, Lucero Hidalgo & Bibiana Duarte

Consultants: Leonel Mingo and Mariela Beljansky

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Name of the project	Mixed planting of native and non-native species in Paraguay-I ID: BCR-PY-451-14-001
Project holder	Company: Desarrollos Madereros SA Commercial Brand: Pomera Maderas
Project holder's contact information	Pablo Aquino, Forestry Engineer Email: paquino@pomeramaderas.com Address: Itaipu Superhighway, Km 13 North, Hernandarias. Phone: +59 5 631 23623 / +59 631 21985
Project participants	Desarrollos Madereros SA Cambium Earth SL
Version	6.2
Date	2024/11/14

Project type	Agriculture, Forestry and Other Land Uses (AFOLU)
Grouped project	No
Applied Methodology	BCR0001 "Quantification of GHG Removals" BioCarbon Registry version 4.0, published on February 9, 2024.
Project location (City, Region, Country)	Tapytá, Paraguay: (26°12'34 "S, 55°45'57 "W) Hernadarias, Paraguay (25°21'4 "S, 54°46'6 "W)
Starting date	2018/12/01
Quantification period of GHG emissions reduction	40 years (2018/12/1 to 2058/11/30)
Estimated total and average annual GHG emission reduction amount	Total emission reductions: 153.133 tCO_2 [1] Annual average: 3.828 tCO_2/year
Sustainable Development Goals	The project addresses the following 9 SDGs: SDG 1 No Poverty

[1] Throughout the whole document comma will be used as decimal separator and point as separator of every three digits. Additionally, the date format throughout the document is year/month/day.

	SDG 2 Zero Hunger SDG 3 Good Health and Well-Being SDG 4 Quality Education SDG 6 Clean Water and Sanitation SDG 9 Industry, Innovation and Infrastructure SDG 12 Responsible Consumption and Production SDG 13 Climate Action SDG 15 Life of Terrestrial Ecosystems
Special category, related to co-benefits	Not applicable

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1 Project Type and Eligibility

1.1 Scope in the BCR Standard

The scope of the BCR Standard is limited to:	
The following greenhouse gases, included in the Kyoto Protocol: Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O).	X
GHG projects using a methodology developed or approved by BioCarbon, applicable to GHG removal activities and REDD+ activities (AFOLU Sector).	X
Quantifiable GHG emission reductions and/or removals generated by the implementation of GHG removal activities and/or REDD+ activities (AFOLU Sector).	X
GHG projects using a methodology developed or approved by BioCarbon, applicable to activities in the energy, transportation and waste sectors.	
Quantifiable GHG emission reductions generated by the implementation of activities in the energy, transportation and waste sectors.	

The CO_2 capture project complies with the applicability conditions of the methodology approved by BioCarbon Registry BCR0001 Quantification of GHG Removals V4.0, February 2024.

In addition, the following criteria were used:

- ISO 14064-2:2019
- ISO 14064-3:2019
- BCR0001 Quantification of GHG Removals V4.0, February 2024
- Clean Development Mechanism AR-ACM0003
- Standard BCR V3.4, June 2024
- BCR Tool Sustainable Development Safeguards SDSs Tool, v1.1 July, 2024
- BCR Tool: Sustainable Development Goals V 1.0 June 13, 2023
- BCR Tool: Permanence and Risk Management V1.1 March 19, 2024

- BCR Tool: Monitoring, reporting and Verification V1.0 February 13, 2023
- BCR Tool: Baseline and Additionality V 1.3 March 1, 2024
- BCR Tool: Avoid Double Counting V2.0, February 7, 2024
- Tool 14 Carbon stock estimation and carbon stock change of trees and shrubs in F/R CDM project activities V 04.2
- BioCarbon Registry Requirements

In compliance with ISO 14064-3:2019 section 5.1.6, the project developer shall adjust the scope not only to the requirements of the selected methodology but also set the scope considering its own objectives (see objectives in section 2.2 "Objectives" of this document) and the needs and expectations of the intended user, in order for this project to be registered in the voluntary carbon market.

The following parameters will be defined in order to achieve this goal:

a. Spatial and temporal limits: The total area of the project is 172,76 hectares. The project will be developed in Paraguay on two Farms 141 kilometers apart, both owned by the proponent, DMSA. The first is in the municipality of Hernandarias, Department of Alto Paraná, in the Yvypyta Forest Management Unit (FMU), hereinafter Hernandarias, where 138,8 hectares will be planted, and the second in the municipality of San Juan Nepomuceno, Department of Caazapá, in the FMU called Tapytá where 34 hectares will be planted. The standard is applicable to forest plantation projects that are developed in areas that have not been occupied by natural forest or other natural vegetation cover other than forest in the period between 5 years prior to the start of the activity and the start date itself, a condition that is met by the soils of this project. The plots that form part of the spatial limits of the project were lands degraded by livestock farming. The time limit of the project is 40 years: between the start date, 2018/12/01 and 2058/11/30. The project will capture a total amount of 153.133 tCO_2 over a 40-year period, equivalent to an average capture of 3.828 tCO_2 per year. The intended user of the current project will be credit purchasers in the voluntary market, where all the carbon credits generated will be traded.

b. The areas within the geographical boundaries of the project do not fall into the wetland category, nor do they contain organic soils; flood irrigation is not used. Carbon stocks in soil organic matter, litter and dead wood are likely to decrease, or remain stable in the absence of project activities, i.e., relative to the baseline scenario; Given the small area and depth of the drainage ditches in relation to the 172,76 ha of project, their effects on soil organic carbon are not significant, so GHG emissions, other than CO2, can be omitted; Soil disturbance, due to project activities, if any, are in accordance with appropriate soil conservation practices and do not recur in less than 20 years. The description of the applicability requirements is explained in detail in section 3.1.3.

c. Physical infrastructure, activities, technologies and processes: The project involves planting *Eucalyptus grandis* -and hybrids thereof- that will be thinned after 6 years of life and harvested after 10 years, as well as a set of 11 native species that will be planted immediately after the first thinning and on which no thinning or harvesting will be carried out. Once harvested, the eucalypt trees will be replanted, covering two harvest cycles and leaving the last cycle unharvested. The native species will be conserved with the objective of leaving a semi-native forest in the project area. For more details regarding the plantations see section 2.3 of this document. DMSA has more than 20 years of experience in the forestry sector, in which it has always operated with great social and environmental sensitivity. In addition, all its plantations have been certified by the FSC®[2] (Forestry Stewardship Council) since 2006. This project will also have this certification. Therefore, the design, planting and maintenance of the forest are carried out through a sustainable forest management program that allows the commercialization of the wood, reducing negative impacts on biodiversity, local communities, the water balance of the watersheds and the scenic beauty of the landscape.

[2] https://app.powerbi.com/view?r=eyJrIjoiN2U3NGMyNWEtZTAxNSooMzVhLWExNmMtOThhZjdiYjQ4MWNkIiwidCI6IjEyNGU2OWRiLWVmNjUtNDk2Yi05NmE5LTVkNTZiZWMxZDI5MSIsImMiOjl9

d. GHG Sources, Sinks or Reservoirs: The only greenhouse gas that this forestry project will be concerned with is carbon dioxide. GHG sequestration will occur through carbon stocks that will be generated by tree planting. These include aboveground biomass and belowground biomass in roots.
e. Types of GHG: In compliance with the Kyoto Protocol and ISO: 14064-3, N_2O, CH_4 and CO_2 must be quantified. Considering that the proposed project is only forestry and that no biomass burning will be carried out, the only GHG to be quantified will be CO_2.
f. Periods: The project will be validated and verified for the first time in May 2023, 4.5 years after the start of the project. AS the first verification was carried out with the validation process, the real calculations show that the total amount of VCCs generated in this period is 16.711, and the annual average for the first verification period is 3.713. These values include a 20% of VCCs that will be allocated in the reserve account for reversion risk as indicated in the BCR Standard. In principle, the following verifications will be carried out every 5 years.

1.2 Project Type

Activities in the AFOLU sector, other than REDD+	X
REDD+ Activities	
Activities in the energy sector	
Activities in the transportation sector	
Activities related to Handling and disposing of waste	

1.3 Project Scale

NA

2 General Description of the Project

The project aims to establish a semi-native forest during a 40-year period. This will be achieved through transitional mixed forest plantations with species of the genus

Eucalyptus spp that will be managed by thinning, complete cutting, and one last unharvested cycle interspersed with unmanaged natives in an area of 172,76 hectares, spread over two farms in Paraguay, in the municipalities of Hernandarias (Department of Alto Paraná) and in the municipality of San Juan Nepomuceno (Department of Caazapá), both properties of DMSA. The historical use of the land has been pasture for cattle ranching.

The activities that will result in GHG reductions correspond to the establishment of 172,76 ha, initially with *Eucalyptus grandis* and its hybrids, which will be thinned to 50% after 6 years of planting and harvested after 10 years of life, with the third harvest cycle remaining unharvested. This last cycle will not be harvested in order to maximize the carbon capture and minimize soil disturbance and the effect of eucalypt harvesting on the native species, which will have a considerable size by then. On the other hand, the native species will be planted after the first thinning of the eucalypt trees and will not undergo management or harvesting.

The development of the project will contribute to the achievement of nine sustainable development objectives:

- SDG 1) No poverty
- SDG 2) Zero hunger
- SDG 3) Good health and well-being
- SDG 4) Quality education
- SDG 6) Clean water and sanitation
- SDG 9) Industry, innovation and infrastructure
- SDG 12) Responsible consumption and production
- SDG 13) Climate action
- SDG 15) Life of land

The "Mixed planting of native and non-native species in Paraguay-I" project will capture a total amount of 153.133 tCO_2 over a 40-year period, which is equivalent to an average capture of 3.828 tCO_2 per year.

2.1 GHG Project Name

Mixed planting of native and non-native species in Paraguay-I

2.2 Objectives

There are two main objectives of the project "Mixed planting of native and non-native species in Paraguay-I". The first is to capture carbon dioxide from the atmosphere through a forest plantation to generate carbon credits that will then be traded entirely in the voluntary market. The second is to contribute positively to the community and biodiversity of the area by leaving as a legacy a forest of mostly native species where there used to be pastures for cattle ranching.

The first objective will be achieved through afforestation with *Eucalyptus* species and a group of 11 native species on low-quality soils degraded by cattle ranching, which would have been used for cattle ranching in the absence of the project. GHG absorption will occur through the carbon stocks that will be generated by tree planting. These include aboveground biomass and belowground root biomass. CO_2 sequestration will not only occur during the 40-year crediting period. Once this period is over, a semi-native forest will remain in the project area, which will be preserved without being subjected to any type of thinning, clear-cutting or harvesting, to continue capturing CO_2, collaborating with the objectives set out in the Paris Agreement regarding GHG reduction and at the same time contributing positively to the flora, fauna and communities of the region.

The second objective will be achieved thanks to all the additional co-benefits generated by the project:

- Creation of employment opportunities for local communities and improvement of the overall economic situation of the area and the region in general.
- Contribution to biodiversity: when a greater number of different species coexist in an ecosystem, both in terms of specific and genetic diversity and abundance of individuals, the system's capacity to maintain equilibrium is greater. For example, the consequences of low rainfall are mitigated in a mature forest, and crop pests quickly find biological controllers that maintain their population balance.
- Promote the conservation and protection of local biodiversity. Planting native trees provides habitat for native bird, insect, mammal and other

species, and encourages the natural regeneration of native flora and fauna[3] .

- Native trees help control soil erosion, especially in areas where deforestation has been severe. Native trees have deep roots that help maintain soil stability, reducing water and wind erosion and nutrient loss by improving soil structure and increasing organic matter content.
- Native trees contribute to regulate the local climate and generate microclimates, increasing relative humidity and reducing temperature.
- Native trees contribute to water conservation. Native trees also play an important role. Their deep roots help retain water in the soil, increasing its holding capacity and reducing surface runoff.

The design of the project is innovative because, in the first place, it uses fast-growing exotic plant species (such as *Eucalyptus grandis* and hybrids) with the objective of conditioning the land, providing shade that allows the adequate growth of native species, planted progressively and that will be preserved, without any type of thinning or harvesting.

2.3 Project Activities

The main project activity consists of planting 172,76 ha with eucalypt and a set of 11 native species in plots of suboptimal quality, which in the absence of the project would probably have continued to be used for cattle ranching.

The plantations are located in two Forest Management Units (FMUs) owned by DMSA:

- Hernandarias, 138,74 hectares
- In Tapytá, 34,02 hectares
- The two locations are approximately 141 km apart.

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3 Pero P., et al., 2019. Proceedings X International Congress on Silvopastoral Systems, p. 263-291. Asuncion, Paraguay, 24-26 September 2019
https://repositorio.inta.gob.ar/bitstream/handle/20.500.12123/9047/INTA_CRPatagoniaSur_%20EEASantaCruz_Peri_PL_%20SSP_de_Sudam%c3%a9rica_Alternativa_productiva.pdf?sequence=1&isAllowed=y

Initially, the entire project area, 172,76 ha, will be planted with *Eucalyptus grandis* and its hybrids, which will be thinned to 50% after 6 years of planting and harvested after 10 years of life, and the third cycle will not be harvested. On the other hand, the native species will be planted after the first thinning of the eucalypt trees.

The planting of the eucalypt trees started in December 2018 where a total of 13,43 hectares were planted, then 102,47 hectares were planted in 2019, in 2020 3,02 hectares, 17,53 in 2022 and finally in 2023 the remaining 36,31 hectares will be planted to reach the total of 172,76 hectares.

The planting of native species will be carried out progressively starting in 2024, after the thinning of eucalypt, to reach in 2029 the total of the project plots with a coverage of 42% of native species over what was planted in 2018, 2019, 2020 and 2022, and in the remaining 36,4 hectares to be planted in 2023 native species will have a coverage of 27% per hectare. Native species will not be thinned or harvested. The 11 native species used in the project are shown below:

Table 1 Native Species Used in the Project.

No.	**Common name**	**Scientific Name**	**Family**
1	Guatambú	*Balfourodendron riedelianum*	Rutaceae
2	Ingá	*Inga laurina*	Fabaceae
3	Peterevy	*Cordia trichotoma*	Boraginaceae
4	Aratiku	*Rollinia emarginata*	Annonaceae
5	Timbo	*Enterolobium contortisiliquum*	Fabaceae
6	Yvyraro	*Pterogyne nitens*	Fabaceae
7	Missionary cedar	*Cedrela fissilis*	Bignoniaceae
8	Ñangapiry	*Eugenia uniflora*	Myrtaceae
9	Lapacho	*Handroanthus heptaphyllus*	Bignoniaceae
10	Yvyrapyta	*Peltophorum dubium*	Fabaceae
11	Grapia	*Apuleia leiocarpa*	Fabaceae

Source: DMSA, 2023.

Note: A catalog with a description of these native species is presented in ANNEX 6.

All the details and development of the composition and criteria used for the creation of the strata are provided in section 3.7.2 "Stratification".

Below is a summary table with the planting date, area and location of the strata that make up the project.

Table 2. Activities: Year of Eucalyptus Planting in the project Strata.

Stratum	Year Planted	Species	Area (ha)	Location
1	2018	*Eucalyptus grandis x urophylla*	13,43	Hernandarias
2	2019	*Eucalyptus grandis*	32,14	Hernandarias
3	2019	*Eucalyptus grandis x camaldulensis*	17,62	Hernandarias and Tapytá
4	2019	*Eucalyptus grandis x urophylla*	52,71	Hernandarias and Tapytá
5	2020	*Eucalyptus grandis x urophylla*	3,02	Hernandarias
6	2022	*Eucalyptus grandis x urophylla*	17,53	Hernandarias
7*	2024	*Eucalyptus grandis*	11,83	Hernandarias
8*	2024	*Eucalyptus grandis x urophylla*	24,48	Hernandarias and Tapytá
Total			172,76	

*At the date of preparation of the PDD (May 2023) strata 7 and 8 were not planted and therefore will not be considered for the calculation of CO_2 capture in the first stage of quantification covering the period 2018/12/01 to 2023/05/31.
Source: DSMA, 2023.

Table 3. Dates of Native Species Planting.

Stratum	Native Plantation Year	Planted Area (Hectares)	Percentage of Area to Be Planted with Natives
1	2024	13,40	42%
2, 3 and 4	2025	102,50	42%
5	2026	97,00	42%
-	2027	0	0%
6	2028	17,50	42%
7 and 8	2030	36,40	27%

Source: DMSA, 2023.

The project is based on the application of sustainable production practices and advanced plantation technology. The plantations will be managed using sustainable management practices under FSC (Forestry Stewardship Council) certification, a quality management system certification that is being implemented. The main technology applied to the reforestation project consists of direct planting with low environmental impact techniques that will be explained in the "Project Activities" subsection of this same section.

Geographic information systems (GIS) and geographic positioning systems (GPS) are used for stratification, monitoring and verification of reforestation activity.

Absorption and storage of GHGs will occur through sequestration by the photosynthetic activity of the trees, and carbon pools generated in their tissues, including aboveground and belowground plant biomass. The project activities also provide additional co-benefits, especially by creating employment opportunities for the local communities and improving the overall economic situation of the areas and the region in general. Full details regarding the benefits of the project to society can be found in section 9 of this document.

Two types of monitoring will be carried out, an internal one, which will be carried out every year in July, and another one oriented to the verification process by a third party organization (CAB), whose frequency will be at least every five years.

The baseline period, extensive livestock farming, is considered from the beginning of the livestock farming activity in 2005, when the first contract was signed in the project area, until the completion of the last contract in 2010 (an example of a nominated contract is shown in ANNEX 2, and all contracts are provided as part of the confidential supporting documentation[4]).

[4] Folder 3- Establishment of baseline - livestock contracts DMSA.

The planting of *Eucalyptus spp.* and the 11 native species will be carried out in two designs, according to the established strata:

a) **Design 1.** In strata 1 to 6, the eucalypt will have 7 meters between rows. The native species will have 14 meters between rows (native to native). These rows of native species will be located between the eucalypt, once these are thinned to 50% leaving one of every two individuals of the same line. The 11 species will be planted with a separation of 2 meters between plants (357 plants per hectare) with a systematic distribution in the order mentioned above. In these strata the eucalypt will have 501 trees per hectare at the time of planting and with the thinning there will be 251 trees per hectare.

b) **Design 2.** In strata 7 and 8 the eucalypt will have a spacing of 4 meters between rows, which will be thinned to 50% of the rows after 6 years. The native rows will be planted in the row where the eucalypt was thinned and will have a spacing of 16 meters between rows and 2 meters between plants (313 plants per hectare). In these strata the eucalypt will have 833 trees per hectare at the time of planting and the thinning will leave 400 per hectare. These will be planted in the second half of 2023 and therefore will not be considered for the CO_2 capture calculations of the first stage of quantification.

Table 4. Planning and Management Timeline.

Stratum (1-8)	Eucalypt Plantation Activities	Period (start)	Period (end)	Project Year	Natives Plantation Activities	Period (start)	Period (end)	Project Year
1	Planting 501 pl/ha	Dec-2018	Nov-2019	1	Planting 357 pl/ha	Dec-2023	Nov-2024	6
	Thinning 50%	Dec-2023	Nov-2024	6				
	1st Full harvest	Dec-2027	Nov-2028	10				
	Planting 501 pl/ha	Dec-2028	Nov-2029	11				
	Thinning 50%	Dec-2033	Nov-2034	16				
	2nd Full harvest	Dec-2037	Nov-2038	20				
	Planting 250 pl/ha	Dec-2038	Nov-2039	21				
2	Planting 501 pl/ha	Dec-2019	Nov-2020	2	Planting 357 pl/ha	Dec-2024	Nov-2025	7

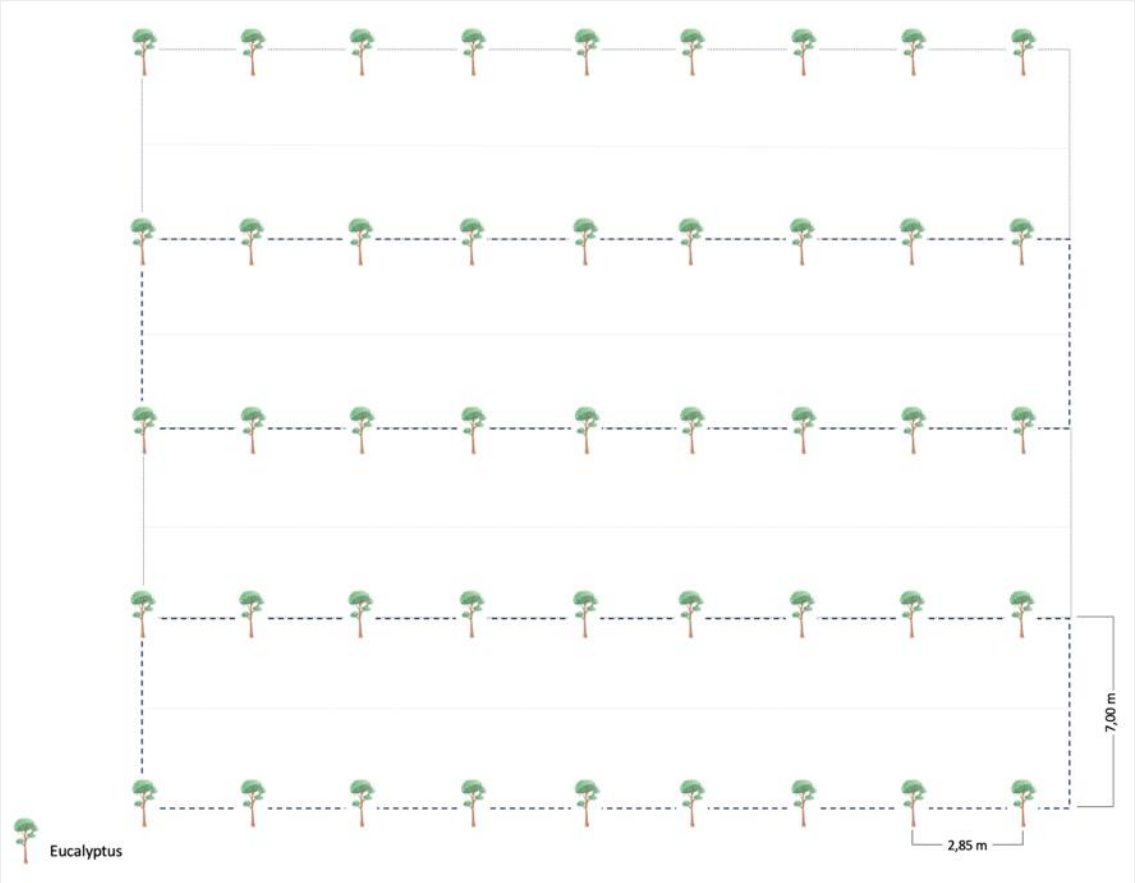
Stratum (1-8)	Eucalypt Plantation Activities	Period (start)	Period (end)	Project Year	Natives Plantation Activities	Period (start)	Period (end)	Project Year
	Thinning 50%	Dec-2024	Nov-2025	7				
	1st Full harvest	Dec-2028	Nov-2029	11				
	Planting 501 pl/ha	Dec-2029	Nov-2030	12				
	Thinning 50%	Dec-2034	Nov-2035	17				
	2nd Full harvest	Dec-2038	Nov-2039	21				
	Planting 250 pl/ha	Dec-2039	Nov-2040	22				
3	Planting 501 pl/ha	Dec-2019	Nov-2020	2	Planting 357 pl/ha	Dec-2024	Nov-2025	7
	Thinning 50%	Dec-2024	Nov-2025	7				
	1st Full harvest	Dec-2028	Nov-2029	11				
	Planting 501 pl/ha	Dec-2029	Nov-2030	12				
	Thinning 50%	Dec-2034	Nov-2035	17				
	2nd Full harvest	Dec-2038	Nov-2039	21				
	Planting 250 pl/ha	Dec-2039	Nov-2040	22				
4	Planting 501 pl/ha	Dec-2019	Nov-2020	2	Planting 357 pl/ha	Dec-2024	Nov-2025	7
	Thinning 50%	Dec-2024	Nov-2025	7				
	1st Full harvest	Dec-2028	Nov-2029	11				
	Planting 501 pl/ha	Dec-2029	Nov-2030	12				
	Thinning 50%	Dec-2034	Nov-2035	17				
	2nd Full harvest	Dec-2038	Nov-2039	21				
	Planting 250 pl/ha	Dec-2039	Nov-2040	22				
5	Planting 501 pl/ha	Dec-2020	Nov-2021	3	Planting 357 pl/ha	Dec-2025	Nov-2026	8
	Thinning 50%	Dec-2025	Nov-2026	8				
	1st Full harvest	Dec-2029	Nov-2030	12				
	Planting 501 pl/ha	Dec-2030	Nov-2031	13				

Stratum (1-8)	Eucalypt Plantation Activities	Period (start)	Period (end)	Project Year	Natives Plantation Activities	Period (start)	Period (end)	Project Year
	Thinning 50%	Dec-2035	Nov-2036	18				
	2nd Full harvest	Dec-2039	Nov-2040	22				
	Planting 250 pl/ha	Dec-2040	Nov-2041	23				
6	Planting 501 pl/ha	Dec-2022	Nov-2023	5	Planting 357 pl/ha	Dec-2027	Nov-2028	10
	Thinning 50%	Dec-2027	Nov-2028	10				
	1st Full harvest	Dec-2031	Nov-2032	14				
	Planting 501 pl/ha	Dec-2032	Nov-2033	15				
	Thinning 50%	Dec-2037	Nov-2038	20				
	2nd Full harvest	Dec-2041	Nov-2042	24				
	Planting 250 pl/ha	Dec-2042	Nov-2043	25				
7	Planting 833 pl/ha	Dec-2024	Nov-2025	7	Planting 313 pl/ha	Dec-2029	Nov-2030	12
	Thinning 50%	Dec-2029	Nov-2030	12				
	1st Full harvest	Dec-2033	Nov-2034	16				
	Planting 400 pl/ha	Dec-2034	Nov-2035	17				
	Thinning 50%	Dec-2039	Nov-2040	22				
	2nd Full harvest	Dec-2043	Nov-2044	26				
	Planting 416 pl/ha	Dec-2044	Nov-2045	27				
8	Planting 833 pl/ha	Dec-2024	Nov-2025	7	Planting 313 pl/ha	Dec-2029	Nov-2030	12
	Thinning 50%	Dec-2029	Nov-2030	12				
	1st Full harvest	Dec-2033	Nov-2034	16				
	Planting 400 pl/ha	Dec-2034	Nov-2035	17				
	Thinning 50%	Dec-2039	Nov-2040	22				
	2nd Full harvest	Dec-2043	Nov-2044	26				
	Planting 416 pl/ha	Dec-2044	Nov-2045	27				

* The start date is 2018/12/01.
** The list of native species to be planted in the project is shown in Table 1

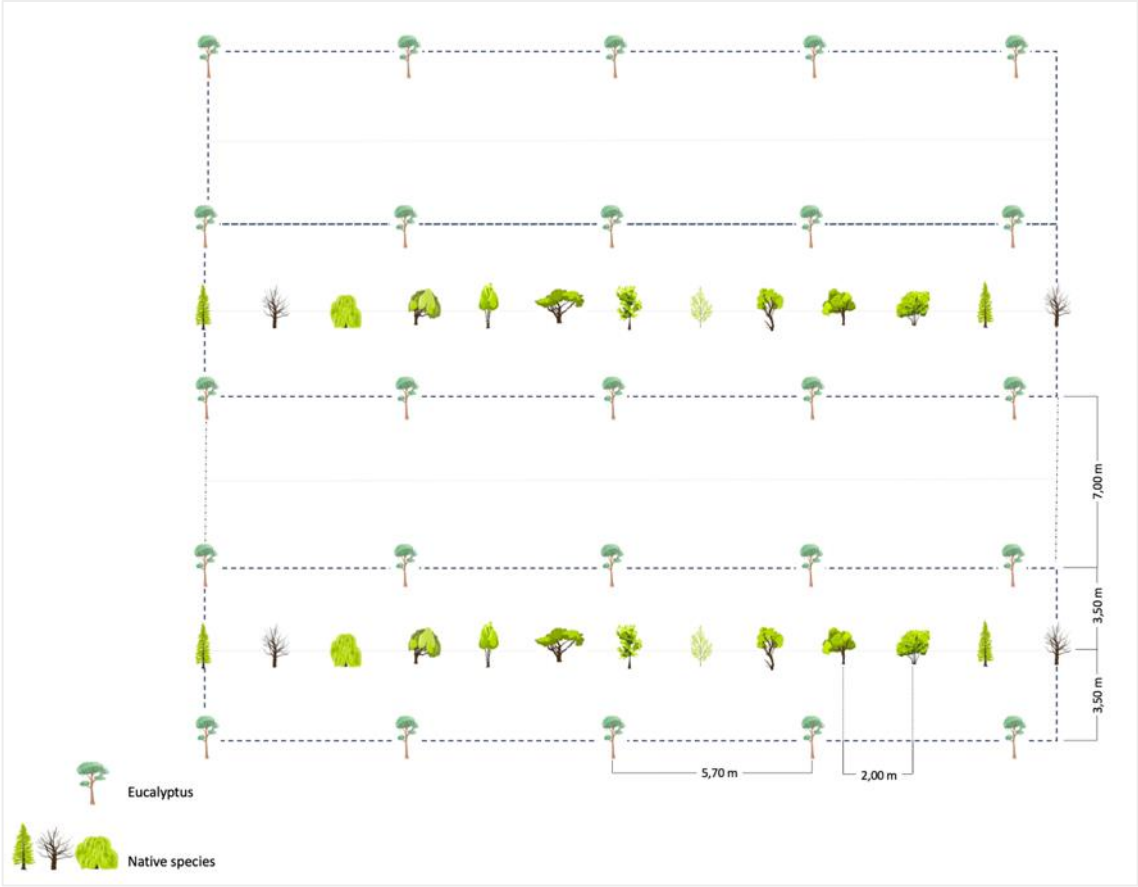
Source: DMSA, 2023

Figure 1 Design 1, stage 1: strata 1 to 6 prior to thinning in year 6th after its planting, with an initial density of 501 eucalypt pl/ha.



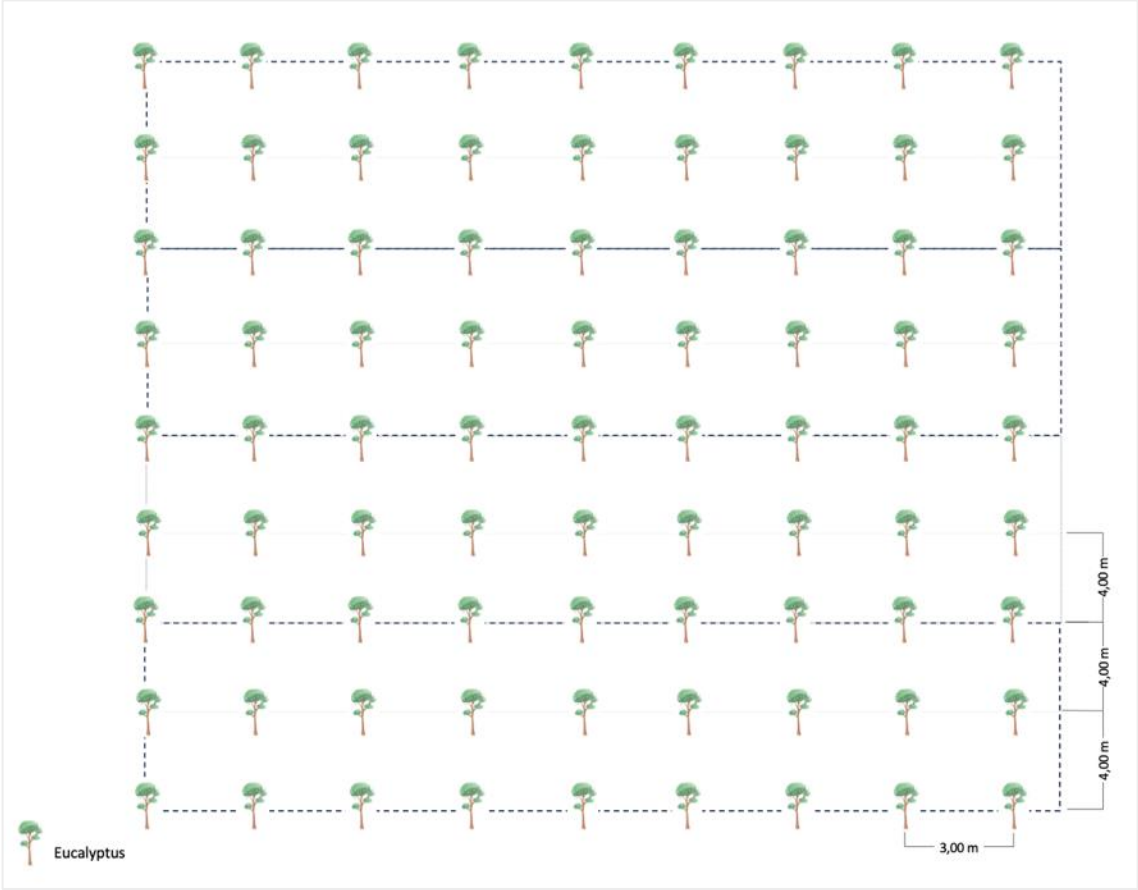
Source: DMSA, 2023.

Figure 2. Design 1, stage 2: strata 1 to 6 after eucalypt thinning and planting of native species in year 6, with a resulting density of 251 eucalypt pl/ha and 357 natives pl/ha.



**This situation happens in every cycle: in the first two, after thinning, and in the third and last cycle this is the final distribution since there is no management.*
Source: DMSA, 2023.

Figure 3. Design 2, stage 1: strata 7 and 8 prior to thinning in year 6th after its planting, with an initial density of 833 eucalypt pl/ha.



Source: DMSA, 2023.

Figure 4. Design 2, stage 2: strata 7 and 8 after eucalypt thinning and planting of native species in year 6, with a resulting density of 400 eucalypt pl/ha and 313 natives pl/ha.

**This situation happens in every cycle: in the first two, after thinning, and in the third and last cycle this is the final distribution since there is no management.*
Source: DMSA, 2023.

The project activities are:

Nursery

The production of high-quality plants allows homogeneous plantations to be established, with good initial growth and high survival rate.

Desarrollos Madereros S.A.'s Forest Nursery is located in Hernandarias, with an installed production capacity of approximately 2.000.000 seedlings per year. Production is oriented to the development of high-quality eucalypt clonal plants. Nutrition techniques adapted to the needs of the clones, root development and pest management are used. The reason for using clones in this project is due to the

search for better growth, with individuals adapted to grow in suboptimal conditions such as the degraded soil of the project and thus trying to capture CO_2 more quickly and ensuring the stability of the forest stand. The clonal plant production process applies different techniques that allow the generation of roots from branches or cuttings.

The production of sprouts is developed in the DMSA nursery, specifically in the Casa Planta Madre (greenhouse) facility, using matrices that are formed from 7 genetic materials of high quality in the resulting wood and in the adaptation of the seedlings to the environment where this project is developed.

The tubers used are biodegradable, hemicellulose-based, and therefore environmentally friendly, in addition to the preparation of a suitable substrate that allows the generation of the root system and vegetative growth.

The harvesting of shoots and staking consists of selecting and harvesting the cuttings or shoots from the matrix, where they are cut with scissors about 5 to 7 cm in height. Subsequently, they are placed in a culture medium or substrate, then introduced into a greenhouse where the temperature and humidity are controlled and after 25 to 30 days the cuttings manage to develop roots. In the next step, it goes to another level of greenhouse for pre-acclimatization for about 5 days, then outdoors in full sun, where it receives nutrition via fertigation and cultural care such as pruning and classification by size. After 3 to 4 months from the harvesting of shoots, plants of 25 to 30 cm in height are ready to be taken to the definitive site or planted in the field.

Figure 5. Clonal production of Eucalyptus spp. in Hernandarias nursery.

Source: DMSA, 2023.

Soil Preparation

The objective of soil preparation is to provide the plants with the best conditions to achieve a good development of the root system that optimizes access to water and nutrients, and also to provide good anchorage.

This activity consists of the horizontal and vertical rototilling of the soil, breaking layers of physical impediment that hinder the normal development of the root system of the plants, in addition, better access to water, air and nutrients that favor the normal development of the plant is achieved. To achieve this, light or heavy harrow, subsoiler and / or ridges are used, depending on the site to be prepared.

In this project, the minimum tillage technique is applied to reduce the impact on the soil, i.e., soil preparation does not cover 100% of the surface, but will be done in strips, preparing only a band 1 to 2 m wide along the planting lines.

This system is one of those that generates the least soil disturbance, since it greatly reduces the area of land to be tilled[5]. At the same time, the days on which soil preparation is carried out are carefully selected according to the appropriate moisture conditions in order to minimize soil erosion[6] .

Soil preparation is divided into three stages: in the first one, a harrow pass with a tractor is carried out over 100% of the property to remove the remaining pasture from the cattle ranching stage. In the next stage, a 32-inch harrow pass with an agricultural tractor is made over the strips with a width of 2 meters and a depth of 20 to 30 cm, removing the soil to form rows at the distance determined in each stratum.

Finally, after two weeks of this operation, the soil is harrowed with a tractor in the strips to make the soil ready for planting.

Plantation

In order to reduce soil disturbance, the eucalypt plants are transported with a light vehicle (less than 2.000 kg) to the limits of the stratum; inside the stratum, they are transported on foot with containers to the strips and the planting is done manually, using a planting shovel with a gel dispenser, where the biodegradable tube containing substrate and root parts is planted vertically in the soil, covering the upper part of the tube with 2 to 3 cm of soil from the same hole.

Planting is planned to be carried out at two times of the year: in autumn and in spring, when weather conditions are favorable for optimum plant development.

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[5] http://revistas.uach.cl/pdf/bosque/v16n2/art01.pdf

[6] https://www.jircas.go.jp/sites/default/files/publication/manual_guideline/manual_guideline-_-_44.pdf

In the case of native species, it will be carried out in the same way after thinning the eucalypt trees at 6 years of age.

Fertilization

At the end of the eucalypt plantations, fertilization with nitrogen, phosphorus and potassium NPK and micronutrients is carried out at a dose of 120 grams per plant, at 15 cm from the seedling and incorporated into the soil.

Weed Control

Especially during the first months of eucalypt development, the growth of individuals is compromised by interspecific competition, mainly herbaceous and scrub vegetation competing for light, water and nutrients, and affecting the homogeneity of space.

The roots of newly planted eucalypt and weeds are concentrated in the surface soil where the availability of nutrients, particularly nitrogen (N) and phosphorus (P), is highest. To improve conditions for plant development and ensure establishment and survival, weed control is carried out periodically in the plantations at different stages of control.

The weed control programs applied in the project use a combination of manual and/or mechanical and chemical control practices, always following the guidelines established by the FSC standard. Priority is given to minimizing the use of agrochemicals and reducing the area of application. The handling, storage, application, and final disposal of phytosanitary products are carried out under strict safety standards for the operator and the environment, in accordance with the "Programa de Manejo Responsable de Agroquímicos" (Responsible Agrochemical Management Program)[7] .

[7] It is provided as complementary documentation to the project in the Project Activities folder.

Table 5. Weed Control Activities.

Stages of Weed Control	
First stage	This is done with soil preparation that includes harrowing and tillage.
Second stage	At the end of planting and fertilization with the application of pre-emergent herbicide selective systemic action, in the planting rows; this activity is performed with agricultural sprayer coupled to the three-point system of the tractor, is to prepare the mixture with water in the spray tank at the recommended dose, then proceed to the targeted application covering a strip of 1,5 to 2 meters wide in the row. This application controls weed germination in the planting row for a period of 60 to 90 days.
Third stage	Herbicide application is used to control broadleaf and fine-leaf weeds, aimed at wetting only the weeds and not the eucalypt plants, in the row and between the rows of the plantation. This application is made with a backpack sprayer 90 days after planting the eucalypt.
Fourth stage	For this stage, the competition and types of weeds existing in the plot are evaluated, then the most appropriate type of weed control is defined, which may be chemical and/or mechanical. In the case of chemical controls, the same operation described in the third stage is repeated; in the case of mechanical controls, harrows, brush cutters and machetes, etc. are used. It is carried out about two months after the previous stage. The same operation is carried out for up to 1,5 years and according to the need for control due to the presence of weeds that compete with the growth of the eucalypt.

Source: DMSA, 2023.

Pruning

During the life cycle of the eucalypt tree, a total of 7 pruning operations are carried out at different levels depending on its height and age, with the main objective of obtaining knot-free wood of higher quality. Once the pruning has been completed, the branches that fell on the roads are incorporated into the frame. The individual protection elements required for the pruning activity, the detailed procedure for the activity and the control and verification mechanism can be found in the pruning operating procedure designed by DMSA in the supplementary documentation folder[8] .

Table 6. Eucalypt Pruning Management at Different Levels.

Pruning Level	Meters to Prune (m)	Pruning height (m)	Age (months)	Tool
1	1,25	1,25	10	Scissors
2	1,25	2,50	12	Scissors
3	1,80	4,30	15	Saw
4	2,00	6,30	18	Saw
5	2,00	8,30	22	Saw
6	1,45	9,75	28	Saw
7	1,45	11,20	33	Saw

Source: DMSA, 2023.

Figure 6 shows the pruning procedure at levels 3 and 4.

[8] Pruning procedure. PO 08 DMSA Pruning first to seventh level - V10 in Supplementary Documentation folder and Project Activities subfolder.

Figure 6. Example of saw pruning performed on eucalypt.

Source: DMSA, 2023.

Thinning and Clear-Cutting

Thinning is the silvicultural intervention that aims to harvest part of the existing trees to encourage the development of the remaining trees. The number of thinnings to be carried out in the plantation is associated with the type of management applied and can be only one (first thinning) or more than one (intermediate thinning). For the first two cycles, thinning will be done selectively at 6 years of age and the selected trees will be marked with paint before cutting.

Clear-cutting for the first two cycles consists of forestry operations whereby all or most of the individuals in a selected area are removed at the same time. The zone or area to be harvested is correctly identified and marked. This operation will be carried out when the eucalypt trees are 10 years old by cutting the trunk at its base, leaving the stump on the ground.

The eucalypt timber will be marketed in both thinning and clear-cutting. The operating procedure for thinning and clear-cutting activities is detailed below.

Table 7. Forest Harvesting Activities.

Activity	Description
Operational planning of intervention works	Its purpose is to organize the work in a rational manner, minimize erosion by identifying and defining the direction of dragging according to the plan for each lot to be executed, and reduce soil compaction by defining the extraction routes. Prior to the start of the thinning and harvesting work, the Area Manager shall prepare a work plan or operational planning called "work order", which shall include the following aspects: ● Location and general characteristics of the stand to be intervened. ● Existing roads (main and secondary) and location of new extraction or extraction roads and direction of circulation. ● Identification of particular attributes (wetlands, watercourses, protection forest, and conservation forests). ● Location of areas destined for planking or wood stockpiling. ● Identification of the direction in which the wood is dragged to each plank.
Step-by-step harvesting activities (thinning and clear-cutting)	
1. Tree felling	This task can be done with a chainsaw. In this stage the trees will be felled directing their fall, allowing quick extraction in the subsequent operation. If felling is done with chainsaws, the operators of these machines must maintain a minimum distance equal to twice the height of the trees being felled. All cut trees must fall on the ground and under no circumstances should any tree be left hanging on another tree after being cut with a chainsaw. If this occurs, the chainsaw operator will call the person in charge of the Operational Unit to give the directives and supervise the definitive felling by mechanical means, minimizing the risks for the worker.
2. Chainsaw delimbing	After limbing, the chainsaw operators must ensure that there are no machines operating near the trees to be limbed and that there are no cut trees hanging on standing trees. Depending on the product to be obtained, limbing is carried out from 15 to 5 cm at a fine point.
3. Axe/chopping/bark stripping of	This task is carried out after felling or when the tree is still standing and is specific to eucalypt trees. Before debarking, workers should make sure that

Activity	Description
posts and columns	there are no machines operating near the trees and that there are no cut trees hanging on standing trees on the site.
4. Cutting	This task is carried out simultaneously with manual delimbing and its dimensions vary from 1 to 3 meters for firewood, and 5 to 5,50 and 11 meters for sawn and debindable timber.
5. Manual stacking (thinning)	It consists of the production and transportation of firewood as well as the collection, stacking and management of forest residues in the sites assigned for this purpose.
6. Mechanized harvesting (thinning and clear-cutting)	Once the trees have been cut, they can be stacked at the edge of the sacking road, or they can be extracted to the stockpile areas. The equipment used in this operation may be hydraulic grapple and/or forwarder. Timber will not be extracted from soils saturated with water. The machines must extract and stockpile the thinning piles on the edge of the roads defined in the Work Order and under no circumstances will they be allowed to extract the wood to sectors not authorized for this purpose. The main purpose of this measure is to control and localize soil compaction. In any of the cases, once the machine has taken a group of trees, it must start the extraction towards the previously defined plank. In order to minimize the risk of accidents, the direction of extraction and dragging of the trunks, previously defined in the work order, must be respected. In no case shall this activity (or the activity of the machines) damage the remaining trees (valid for the case of thinning).
7. Measuring and marking in planing (thinning, clear-cutting)	Once the trees have been correctly placed on the stockpile field, the measurement and marking operation can begin. For this operation, paints, tapes and/or graduated rods are used.

Activity	Description
8. Chainsaw cutting (thinning, clear-cutting)	This task is performed after measuring and marking and its purpose is to transversely section the shafts in order to obtain rolls of predetermined lengths. The cutting is carried out in 11 meters and 5,5 meters.
9. Harvesting in plantation (thinning, clear-cutting)	The purpose of this task is to separate the previously cut rolls into categories in the flatbed or stand according to their purpose. If the rolls are sorted in the flatbed, either pneumatic sorting machines (loggers) or hydraulic cranes mounted on agricultural tractors can be used. These machines take the rolls from the flatbed and sort them by loading them onto trucks. Roll selection maneuvers shall be limited to the area of the stock piles and shall not extend to other sectors of the stand, in order to control and localize soil compaction. Under no circumstances should wood piles be placed inside the protection area or on the edges of streams or bodies of water.
10. Cargo	In this task, the product is loaded onto trucks. The following machines can be used for this purpose: front loaders and/or grapple loaders, loggers and hydraulic cranes (tractor or truck mounted). The loading operation should be framed within the same parameters mentioned in the stockpiling task and it is also the responsibility of each operating unit manager to assign waiting and maneuvering areas for the timber transport trucks.

Source: DMSA, 2023.

Pest Monitoring and Control

Pest monitoring in plantations is of vital importance to ensure the proper health of the stands. Early detection of pests and diseases is important to determine the best action to take in each situation.

The main pest affecting forest plantations in this region are leaf-cutting ants. There are currently two genera (*Atta* and *Acromyrmex*) that affect tree growth due to the intense defoliation they generate if they are not properly controlled.

Controls are performed pre and post planting and should be carried out throughout the life cycle of the plant.

The control strategy is based on a set of measures that, in an integrated manner, allow sustaining damage levels below the damage threshold described in the agrochemical application and cutter ant control procedure in the supplementary documentation folder[9] . The measures are intended to have a low impact on the environment and at the same time represent a low risk to forest operators and neighboring local communities. Controls are carried out through the use of FSC-permitted phytosanitary products. The handling, storage, application, and final disposal of phytosanitary products are carried out in accordance with the "Responsible Agrochemical Management Program"[10] . In order to reduce the use of phytosanitary products, all controls are carried out in a targeted manner at the anthill and planning the optimum time for control, avoiding rainy or high humidity periods.

Commitment of Desarrollos Madereros S.A. to the SDGs

The company is committed to the Sustainable Development Goals (SDGs). The forestry management of plantations and natural areas follows international FSC certification standards (DMSA has had such certification for all its forestry activities since 2006), in the framework of which it implements social management systems with neighboring communities and environmental management systems for all its operations and natural areas.

The various activities that make up DMSA's carbon capture and climate mitigation project contribute to the global 2030 Agenda. The SDGs allow us to have clear objectives to focus on when measuring the potential impact of the project's actions. All SDGs are detailed in section 11 of this report.

[9] Operating procedure 05-DMSA Application of agrochemicals - ant control cut in complementary documentation sub-folder project activities.

[10] Responsible Agrochemical Management Program in supplementary documentation sub-folder project activities.

2.4 Project Location

The project is being developed in Paraguay, on two farms separated by approximately 141 km:

- The first is located in the municipality of Hernandarias, Department of Alto Paraná, called FMU[11] Yvypytá, hereinafter referred to as Hernandarias.
- The second, FMU Tapytá, is located in the department of Caazapá and is hereinafter referred to as Tapytá.

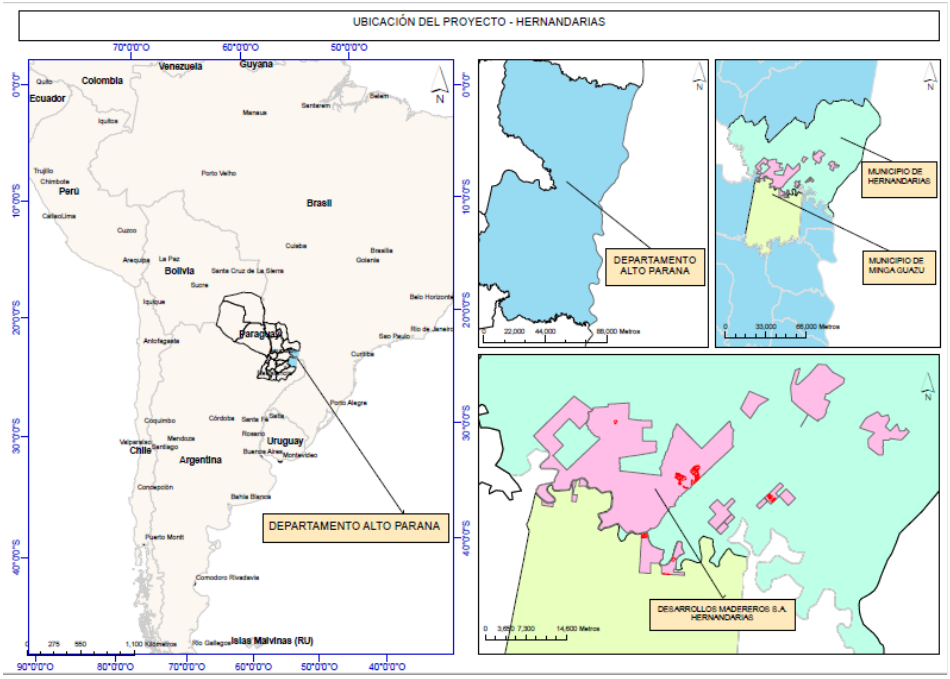
Table 8. Geographical Coordinates and Area of the Project's Farms

Farm	Reference Location[12]	Project Area (ha)
Hernandarias	-25,361682 -54,773279	138,80
Tapytá	-26,207745 -55,771425	34,00

Source: DMSA, 2023.

[11] Forest Management Unit.
[12] Latitude, longitude coordinates expressed in decimal degrees in WGS84 (EPSG:4326)

Figure 7. Hernandarias.

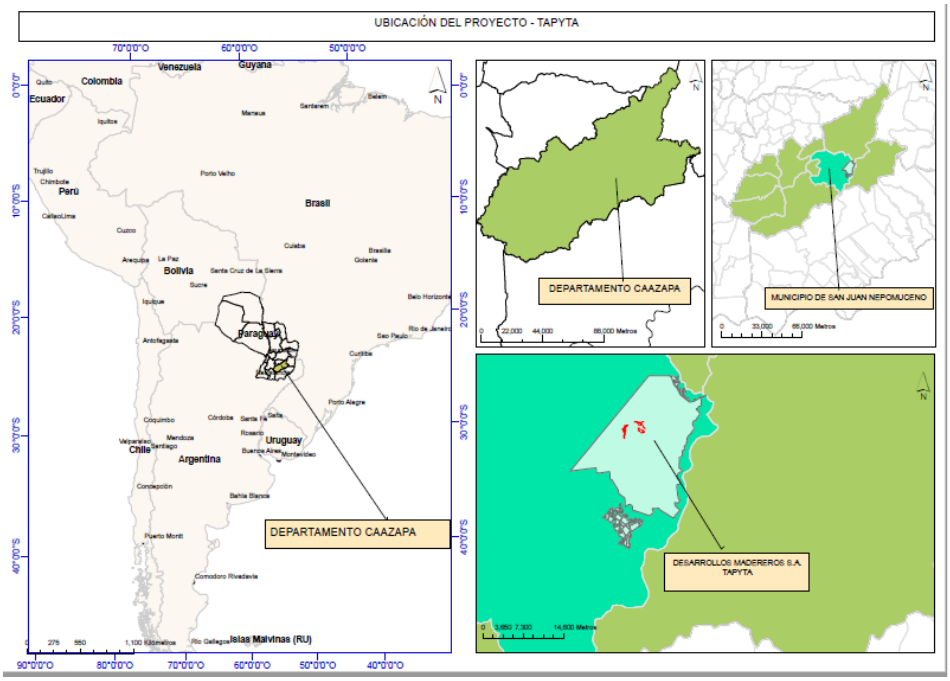


Source: DMSA, 2023.

Note: The lots of this project are highlighted in red in their geographical context.

Hernandarias is the name we will use in this document to refer to the Yvypytá Forest Management Unit (FMU), located in the municipalities of Hernandarias and Minga Guazú, in the Eastern Region of Paraguay, Department of Alto Paraná.

Figure 8. Tapytá.



Source: DMSA, 2023.

Note: The lots of this project are highlighted in red in their geographical context.

Tapytá is the term we will use in this document to refer in short to the Tapytá Forest Management Unit (FMU), located in the Eastern Region of Paraguay, Department of Caazapá, Municipality of San Juan Nepomuceno.

2.5 Additional Information About the GHG Project

Social Context, Services and Infrastructure

In Hernandarias, the forest project plots are located about 25 km from *Ciudad del Este*, the second largest city in the country (306.679 inhabitants[13]), which has the main services. The Department of Alto Paraná in which they are located has a

[13] https://www.ine.gov.py/Publicaciones/Proyeciones%20por%20Departamento%202021/10_Alto%20Parana_2021.pdf

population density of 56 inhabitants/km². The territory of this rural but at the same time peri-urban context is dominated by large agricultural properties, which coexist with some colonies of small producers.

The Tapytá project plots are located in the department of Caazapá, Paraguay's sixth largest department in terms of surface area, but with a population density of 13,6 inhabitants/km², much lower than that of Alto Paraná. The populations neighboring the project are made up of small peasant communities on very fragmented properties. In Caazapá, the population is basically rural and less than 20% live in urban areas. The main economic activity is agriculture (soybeans, corn, sugar cane). Industrial establishments are precarious and scarce: there are sugarcane honey distilleries, native forest and eucalypt sawmills, and starch factories. The most important town is San Juan Nepomuceno, about 25 km away, where there is a sanitary and educational infrastructure. The Farm is connected to this city by a paved road in some stretches.

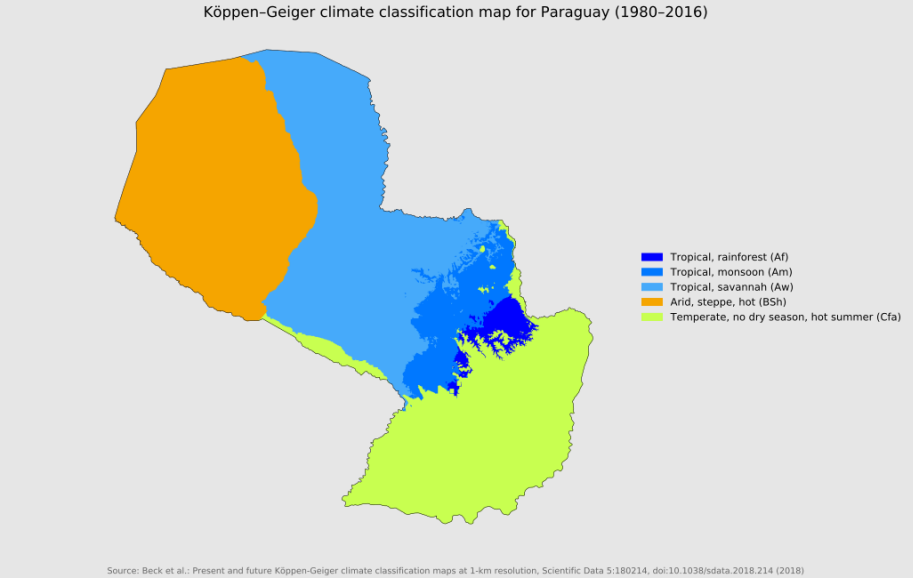
The multidimensional poverty index is an indicator that evaluates the percentage of the population that lacks access to basic services (employment, housing and material goods, health, education). This index showed an average incidence of multidimensional poverty of 20,76% of the population at the country level in 2021[14]: while Alto Paraná (where Hernandarias is located) is below this average, with an incidence of 15,61%, Caazapá (where Tapytá is located) heads the list of departments with the highest incidence in the country, with 51,49% declaring elementary deprivations in the permanent household survey.

Weather

The humid subtropical climate (Cfa) where the projects are located is the predominant climate in the southern part of the Eastern Region.

[14] https://www.ine.gov.py/news/news-contenido.php?cod-news=1254#:~:text=En%20cuanto%20a%20la%20incidencia,pa%C3%ADs%2C%2029%2C75%25

Figure 9. Köppen-Geiger climate classification of Paraguay.



Source: Beck H.E., et al. 2018.[15]

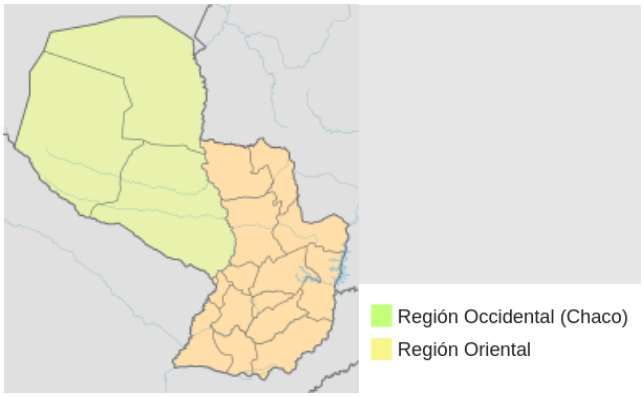
Paraguay is framed in an area of high humidity and warm temperatures all year round, with hot and rainy summers, and mild winters with high temperatures that can cause frost in almost all the national territory and warm days. Average temperatures increase from south to north, while precipitation decreases from east to west. Warm temperatures are present throughout most of the year, as average annual temperatures exceed 20 °C throughout the national territory, due to the proximity to the Tropic of Capricorn (it crosses Paraguay in the middle). In the Eastern Region, the annual average temperature is between 20 and 24 °C, while in the Western Region or Chaco, the annual average is around 25 °C.

The area of influence of the project, located in the Eastern Region, in the departments of Cazapá and Alto Paraná, is characterized by the Humid Subtropical

[15] Beck, H. E., Zimmermann, N. E., McVicar, T. R., Vergopolan, N., Berg, A., & Wood, E. F., 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Nature Scientific Data*.https://upload.wikimedia.org/wikipedia/commons/4/48/Koppen-Geiger_Map_PRY_present.svg .

Climate (Cfa) also called "temperate no dry season hot summer". According to Grassi, B (2020)[16], this climatic unit reports an average temperature below 22 °C, the rainy season begins in mid-spring, between October and November and continues during the summer months until mid-autumn, it is also the time of year with the highest number of storms. The least rainy season is the winter, however, fails to establish a dry climate and remains humid (humid subtropical).

Figure 10. Regions of Paraguay.



Source: Wikipedia, 2023[17]

Rainfall

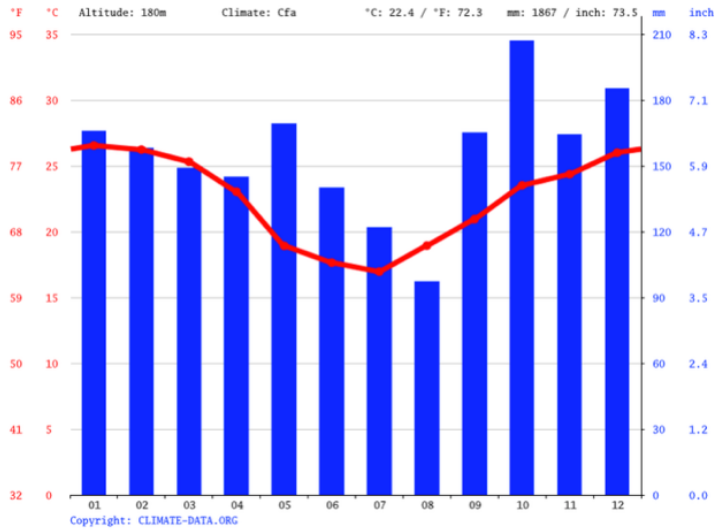
Rainfall in the Paraná region, where the project's estancias are located, is abundant and regularly distributed in all months. As can be seen in the climograms of both sites, the rainfall regime is very similar: the two periods of maximum rainfall are from March to May and from October to November, with July and August being the driest months. Even in the month with the lowest rainfall, August, rainfall does not usually fall below 90 l/m³ per month.

[16] Grassi, B., 2020: Paraguay Climate Study 2019. MADES-STP. Asuncion, Paraguay. http://dncc.mades.gov.py/wp-content/uploads/2020/10/Estudio-del-Clima-Paraguay-2019-1.pdf

[17] https://es.wikipedia.org/wiki/Organizaci%C3%B3n_territorial_de_Paraguay#/media/Archivo:Paraguay_regions_map_2.svg

The accumulated annual rainfall in the Hernandarias area reaches 1.867 mm/year, and in the Tapytá area 1.856 mm/year.

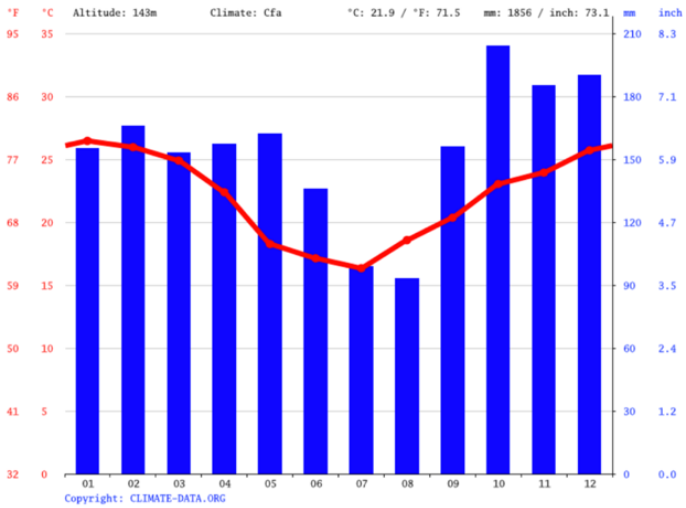
Figure 11. Climogram of Ciudad del Este (Hernandarias).



Source: Climate data, 2024[18] .

[18] https://es.climate-data.org/america-del-sur/paraguay/alto-parana/ciudad-del-este-3925/#climate-graph

Figure 12. Climogram of San Juan Nepomuceno (Tapytá).



Source: Climate data, 2024[19] .

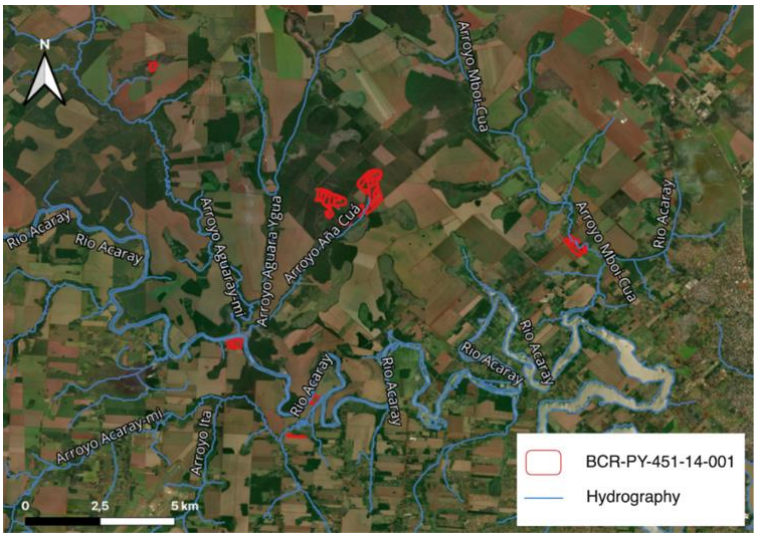
Hydrology/Hydrogeology

The plots located in the Hernandarias area are located near the Acaray River. This river rises in the Caaguazú Mountain range and receives the waters of the Itakyry and Yguazú rivers, flowing through the departments of Caaguazú and Alto Paraná until it flows into the Paraná River, approximately 15 km from the easternmost parcel of the project.

This river, as well as its main tributary, the Yguazú River, are highly altered by anthropic infrastructures such as the Acaray hydroelectric plant and the Yguazú Dam and Reservoir. On the other hand, there are small streams in the area that flow into the Acaray River, the closest of which is the Aña Cuá stream, located near the project lots in the central part. There are also other streams such as Mboi-Cua, Aguaray-mi, Aguara Ygua to the north of the Acaray River, and Acaray-mi and Ita streams to the south.

[19] https://es.climate-data.org/america-del-sur/paraguay/caazapa/san-juan-nepomuceno-44210/#climate-graph

Figure 13. Hydrographic network around the Hernandarias Farm.



Source: MADES from public consultation (number 78248); DMSA, 2023. ArcGIS World Imagery base mapping[20] . Datum WGS84.

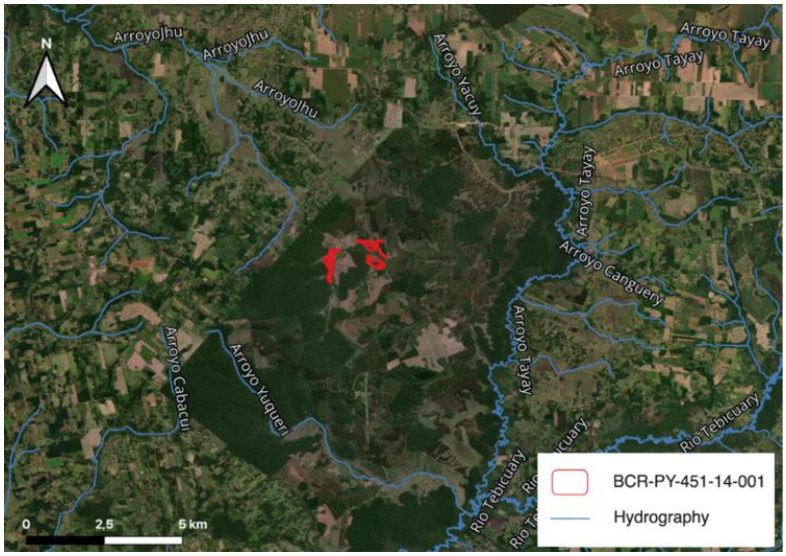
Hydrographic network in the Tapytá area

In the District of San Juan Nepomuceno (Tapytá), the project's Farm is at a relatively high elevation and there are no significant watercourses in the immediate surroundings, but at a considerable distance: between 3 and 10 km run the Jhú and Ytay streams to the north, the Cabacui and Yunqueri streams to the south and the Tayay and Canguery streams to the east.

The largest of these rivers, the Tebicuary River, rises 35 km northeast of the property, in the Caaguazú Mountain Range, and as it descends to its middle course it takes on the characteristics of a plain river with extensive channels bathed in its flood plain.

[20] ArcGIS World Imagery Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

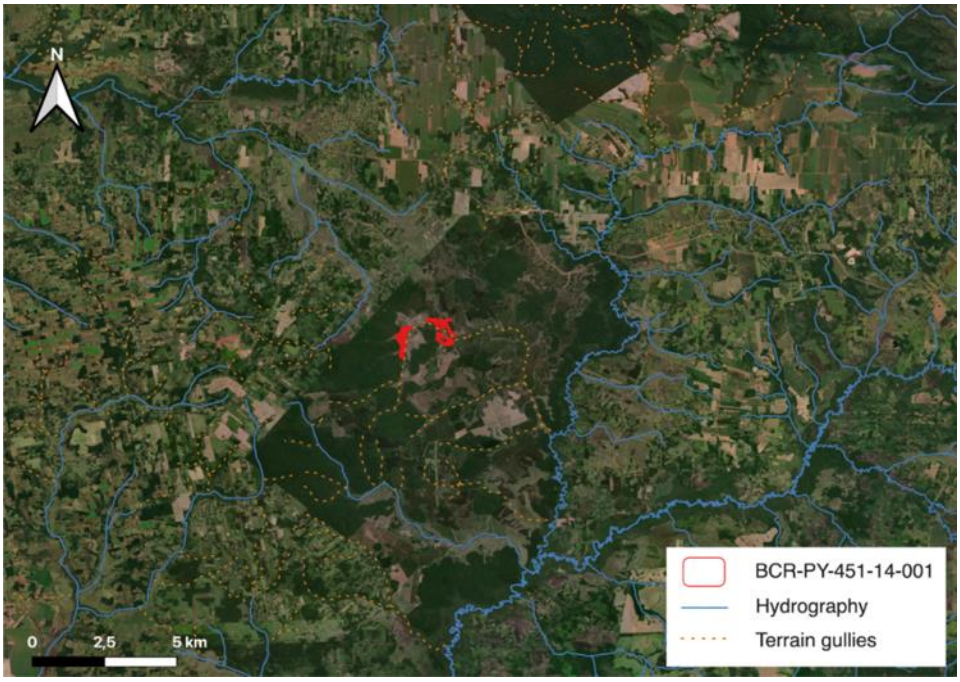
Figure 14. Hydrographic network around the Tapytá Farm.



Source: MADES from public consultation (number 78248); DMSA, 2023. ArcGIS World Imagery base mapping. Datum WGS84.

Although there are no permanent streams on the Tapytá Farm, there are certain watercourses through which water flows seasonally, and which serve as drainage areas, aquifer recharge and water supply for the permanent watercourses downstream of the site. The conservation of these areas as well as the gallery forests is one of the environmental objectives of DMSA's forestry and environmental management.

Figure 15. Terrain gullies / seasonal water flows around the Tapytá Farm.

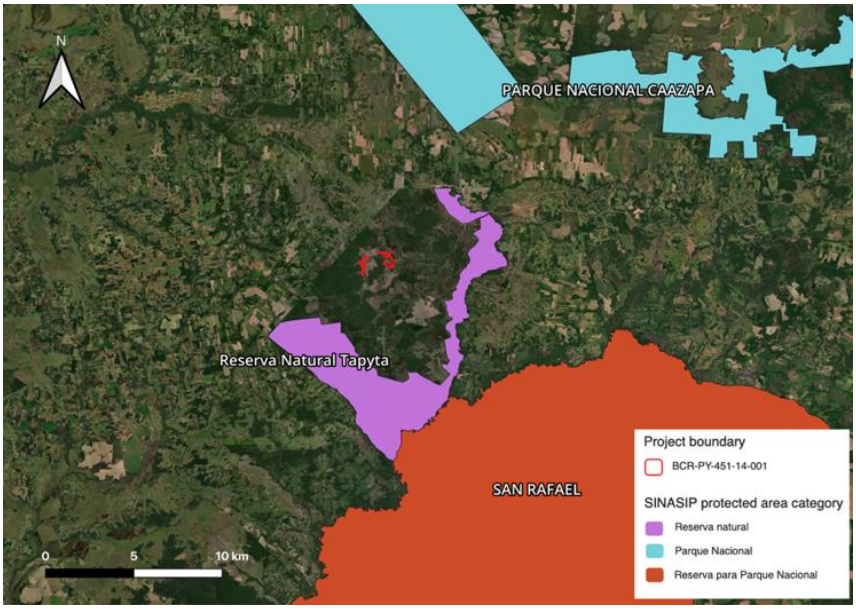


Source: MADES from public consultation (number 78248); WWF HydroSHEDS Flow Accumulation, 2023; DMSA, 2023. ArcGIS World Imagery base mapping. Datum WGS84.

Flora and Fauna

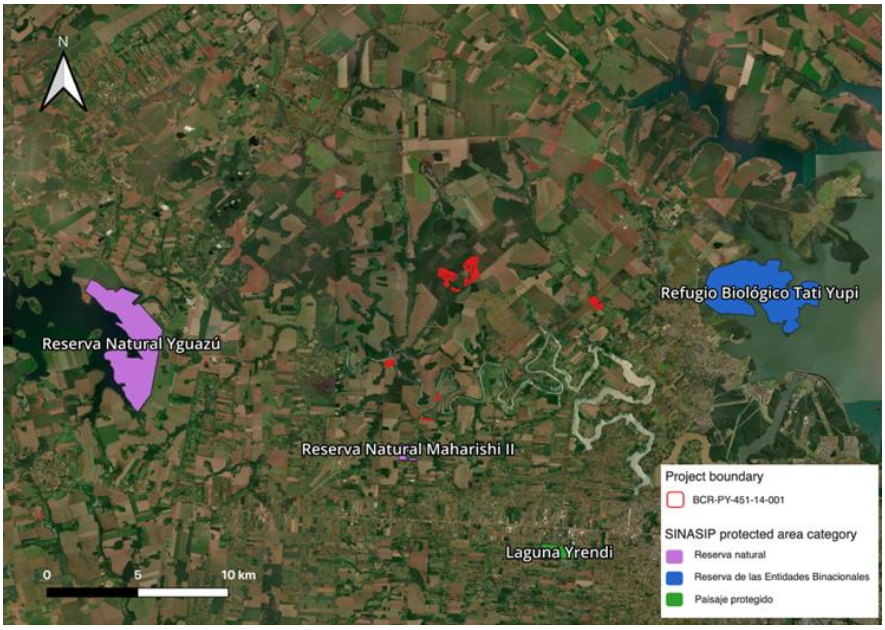
The project area is surrounded by three protected areas that belong to the National System of Protected Wildlife Areas (SINASIP): the Caazapá National Park, the San Rafael Park Reserve Area and the Tapytá Private Nature Reserve, as shown in the following figure.

Figure 16. Protected areas in the surroundings of the Tapytá Farm.



Source: SINASIP database obtained through MADES from public consultation (number 79294); DMSA, 2023. ArcGIS World Imagery base mapping. Datum WGS84.

Figure 17. Protected areas in the surroundings of the Hernandarias Farm.



Source: SINASIP database obtained through MADES from public consultation (number 79294); DMSA, 2023. ArcGIS World Imagery base mapping. Datum WGS84.

Tapytá Flora and Fauna

According to the coverage maps in section 3.1.1. Applicability conditions, it is possible to observe that the project areas at the start date were covered by weeded pastures, so the flora and fauna in the project area obey this coverage.

According to the management plan for the Tapytá Private Nature Reserve prepared by FMB (2014)[21] the flora and fauna found in the project area corresponds to **savannah or grassland** vegetation formations, in these vegetation formations the presence of trees is very scarce and what is observed is the presence of low heliophytes such as kurupika'y (*Sapium longifolium*), coconut (*Acrocomia aculeata*) and tembetary (*Fagara rhoifolia*). In the middle stratum of this formation, there are several shrub species of different families, such as myrtaceae (*Psidium cinereum and P. guajava*), asteraceae (*Baccharis sp.*) and of the *apeaceae* family (*Eryngium horridum and Eryngium sp.*). In these savannas, grasses are the dominant vegetation whose most common genera are: *Andropogon, Axonopus, Setaria, Paspalum* and *Elionorus*. In fields called clean fields or humid prairies there are individuals of the families Cyperaceae, Onagraceae and Polygonaceae.

In addition, there are other vegetation formations that, although not within the project area, are part of the area of influence in the SINASIP protected areas and which, together with the native forest that will be established at the end of this project, will form a biological corridor and will provide a buffer for these natural ecosystems.

The gallery forests that surround the Tajay and Tebicuary rivers, for example, do not exceed 10 m in height in the arboreal stratum, among the most representative species are: yva'ro (*Prunus sp.*), yvyra ovi (*Helietta apiculata*), *Myrsine sp*, *Chomelia*

[21] FMB, 2014. Tapytá Natural Reserve. Plan De Manejo 2015 - 2020. Asunción, Paraguay: Fundación Moisés Bertoni Para La Conservación De La Naturaleza (Fmb), Fondo De Conservacion De Bosques Tropicales (Fcbt). https://fcbt.org.py/wp-content/uploads/2022/05/Plan-de-Manejo-Reserva-Natural-Privada-Tapytá.pdf .

obtusa, koku (*Allophylus edulis*), *Actinostemon concolor*, *Sebastiana klotzschiana*, *Gomidesia palustris*, *Calyptranthes concina*, *Eugenia sp*, yukeri (*Acacia sp.*), amba'y (*Cecropia pachystachya*), inga'i (*Inga marginata*), tembetary (*Fagara sp.*), and the bamboos, takuara (*Guadua angustifolia*) and takuapi (*Merostachys clausenii*). In the lower stratum of the gallery forest, there are grasses and some species of the families *Acanthaceae*, *Melastomataceae* (*Miconia sp.*), *Rubiaceae* (such as the genera *Psychotria* and *Palicourea*) and two species of karaguata (*Bromelia serra* and *B. balansae*). In addition, the gallery forest provides ideal habitat for epiphytes such as orchids and other bromeliads (FMB, 2014).

In the medium/high forest near the Tajay and Tebicuary rivers, the arboreal stratum reaches a height of 15 m, whose crowns touch each other, there are species such as: yvyra pyta (*Peltophorum dubium*), incense (*Myrocarpus frondosus*), urunde'y para (*Astronium fraxinifolium*), lapacho (*Handroanthus heptaphyllus*), mission cedar (*Cedrela sp.*), alecrin (*Holocalyx balansae*), guajayvi (*Patagonula americana*), peterevy (*Cordia trichotoma*), among others (FMB, 2014).

The information on the mastofauna found in the Tapytá Private Natural Reserve is consolidated in the following table.

Table 9. Mammals Present in Tapytá Reserve.

Order	**Number of species/families**
Didelphimorphia	5 species (weasels/marmosets)
Cingulata	3 species (armadillos)
Pilosa	2 species (anteaters)
Primates	2 species (monkeys)
Lagomorpha	2 species (rabbits)
Chiroptera	6 species (bats)
Carnivora	4 species of Felidae (felines) 2 species of Canidae (foxes) 3 species of Mustelidae (ferrets) 1 species of Mephitidae (skunks) 2 species of Procyonidae (coatis).
Perissodactyla	1 species (tapir)

Order	Number of species/families
Rodentia	5 families and 8 species (rodents)

Source: FMB, 2014.

In terms of threatened species reported for the Tapytá reserve, there are 10 species in some category of threat at the national and/or global level. According to the IUCN (2013), two species are in the Vulnerable category and four are classified as Near Threatened. At the national level (SEAM), two species are Threatened with extinction and four are endangered (FMB, 2014).

Flora and Fauna Hernandarias

The study area is located in the Alto Paraná Ecoregion (Acevedo, 1990). The ecoregion is composed of a sub-tropical hygrophytic forest (Hueck, 1978), in which the Alto Paraná type forest predominates. It has also been described as a Warm Temperate Rainforest by Holdrige (1969), and as a Paranaense Phytogeographic Province by Cabrera and Willink (1973), taken from the 2001 Environmental Impact Study[22] .

The dominant land use cover in the Hernandarias Farm corresponds to grasslands. However, there are wooded vegetation formations in the area of influence of the Hernandarias Farm, which make up areas of ecological and biological interest for the area, such as the high forest, interior Atlantic Forest, medium altitude forests, gallery forests and low forests.

The tall forest is one of the most representative formations of the area of influence, which reaches 30 m in height in its arboreal stratum and reaches up to 40 m in height. This mass has a considerably high diversity of species, whose main ones are: *Cedrela spp*. (cedar), *Tabebuia spp.* (lapacho), *Apuleia leiocarpa* (yvyra pere), *Balfourodendron riedelianum* (guatambu), *Myrocarpus frondosus* (incense),

[22] Environmental Impact Assessment Study. Main Report/October.2000 / submitted and approved by SEAM/ environmental impact statement N° 32/01 dated 23/3/2001.

Peltophorum dubium (yvyra pyta), *Pterogyne nitens* (yvyra ro), *Nectandra spp.* (aju'y), *Ocotea spp.* (guaicá), among others.

This forest is also characterized by a large number of species of lianas, epiphytes, tree ferns and palms such as *Syagrus romanzoffianum* (pindó) and *Euterpe edulis* (palm heart). It is the only ecoregion in the country where there are specimens of *Araucaria angustifolia* (kuri'yo araucaria), and it represents the western distribution limit of this species.

The Interior Atlantic Forest (BAI), according to the classification of Dinerstein *et al*. (1995), or "Subtropical deciduous semi-deciduous forest", according to Brack and Weik (1994), is a formation that formerly occupied a large part of the Eastern Region of Paraguay, northeastern Argentina and southeastern Brazil, and that has now been drastically reduced to less than 5% of its original extension, mainly due to the expansion of the agricultural frontier at the expense of the forest and lowland forests generally associated with flooded or permanently saturated soils.

The relicts of medium-altitude forests (on reddish clay soils) are altered due to burning, forming fragmented mosaics of forests and fields for agricultural and livestock activities. The upper stratum of this forest type is also highly disturbed, with dominant species of low timber interest, such as *Pterogine nitens* (yvyra ro), Albizia hassleri (yvyra ju), *Balfourodendron riedlianum* (guatambu) and *Piptadenia rigida* (kurupa'y ra). The middle stratum, which is dominant in these forests, is composed of *Apuleia leiocarpa* (yvyra pere), *Lonchocarpus leucanthus* (yvyra ita), *Holocalyx balansae* (yvyra pepe).

In the lower stratum of the medium altitude forests, there are 5 m high sceophyte species such as: *Tabernaemontana australis* (sapirangy) and *Inga marginata* (inga'i); while in the understory there are several species of the Rubiaceae and Melastomataceae families and ferns, as well as seedlings from natural regeneration. A natural community dominated by bamboos has also been recorded, with species such as *Merostachys sp.* (takuapi) and *Chusquea ramosissima* (takuarembó) occupying important areas in the headwaters of watersheds and even as thickets.

On the other hand, the gallery forests along the banks of the Acaray River and other minor watercourses recorded species such as *Luehea divaricata*, *Lonchocarpus leucanthus, Actinostemon concolor, Urera caracassana, Trichilia pallida, Cecropia pachistachia, Matayba eleagnoides, Eugenia uniflora,* among others. These forests are quite diminished and degraded, because they were used as shelters for cattle, or in some cases have been completely eliminated, leaving the watercourses completely unprotected.

Finally, lowland forests on flooded or saturated soils, generally associated with springs, have a great diversity of plant species, such as *Syagrus romanzoffiana* (pindo), *Cecropia pachystachya* (ambay), *Vitex megapotamica* (taruma), *Allophylus edulis* (koku) and *Cyathea atrovirens* (chachi). Several species adapted to permanent flooding conditions such as: *Begonia cucullata, Blechnum brasiliense* and *Pityrogramma trifoliata.*

From the faunistic point of view, the region involved in the Project corresponds to the most diverse in the country, especially in terms of birds and amphibians. It has interesting, endangered fauna and also species already considered extinct, such as *Anodorhynchus glaucus* and *Mergus octosetaceous*. However, much of the original fauna is not found in the project area due to the severe anthropic impacts in the area, which produced radical changes in the landscape.

The fauna of this region was considered very typical of forest ecosystems of the humid subtropical type. The Atlantic Forest, including the Interior Forest, is a known center of faunal endemism for many groups, especially birds (Haffer 1974, Stotz et al 1996). The tall, well-stratified forest, whose primary production was concentrated mainly in the treetops, made an ideal habitat for small mammals (bats, mice and marsupials) and birds. This zone of the forest, as in all cases of humid forests, comprised the greatest faunal biomass (macrofauna) and possessed all the elements of the food web, including large predators represented by eagles and owls.

On the ground, the abundance of pigs and deer (*Pecari tajacu, Tayassu pecari, Mazama spp*.) as well as medium and small rodents (Cavia, Holochilus, Agouti, Dasyprocta) favored the presence of large and medium predators (Panthera, Puma, Leopardus spp., Oncifelis spp., Herpailurus). This great diversity contained in the

forests was complemented by the few interspersed natural fields (savannas), so there was also fauna associated with these ecosystems such as anteaters (*Myrmecophaga tridactyla*) and aguara guasu (*Chrysocyon brachyurus*).

It can be concluded that until the 1970s and early 1980s, Alto Paraná had many areas of continuous forest where the exuberance of the vegetation was reflected in the diversity and abundance of fauna. Until that time, a good number of the country's species were concentrated in this ecoregion, including most of the fauna that is currently considered threatened.

3 Quantification of GHG Emissions Reduction

3.1 Quantification Methodology

The project is developing under the BCR0001 methodology "Quantification of the Reduction of GHG Emissions" version 4.0 of the BioCarbon Registry.
In turn, the following tools will be used that complement the previously mentioned methodology:

g. The standard for the voluntary Carbon market. BCR standard
h. IPCC 2003, 2006, 2019 guidelines for national greenhouse gas inventories. Volume 4. Agriculture, forestry and other land uses.

3.1.1 Applicability Conditions of the Methodology

The BCR0001 V 4.0 methodology in its section 6 states the conditions of applicability under which it can be applied and which therefore the project must comply with.

The applicability criteria has been individually analyzed in detail, including evidence of its compliance.

Table 10. Summary of Compliance with the Conditions of Applicability of the BCR0001 Methodology Version 4.0

Conditions of applicability of the BCR0001 methodology version 4.0	
a. The areas in the geographical limits of the project do not correspond to the category of forest (according to the national definition adopted by the country in which the project activity is proposed) nor to natural vegetation cover other than forest at the beginning of the project activities. project or 5 years before the project start date.	**Explanation:** the areas within the geographical limits do not correspond to the forest category according to the definition granted by Paraguay in article 42 of law 422/1973, at the beginning of the activities, nor 5 years before the start of the project. **Justification:** see point A below this table, soil cover analysis (Figure 21 to Figure 35), where it is explained the analysis of land cover made and its results.
b. The project activities do not generate transformation of natural ecosystems	**Explanation:** by developing on land previously used for extensive livestock farming, the condition is met: no natural ecosystems have been transformed for the development of this project. **Justification:** see point B below this table, which justifies compliance with this condition by demonstrating the previous use of the land.
c. The areas within the geographic limits of the project do not correspond to the category of wetlands	**Explanation:** the project will not be developed in wetlands. None of the selected plots can be considered wetlands following the RAMSAR[23] Convention and the National Wetland Inventory of Paraguay[24]. **Justification:** see point C below this table, land cover analysis.

[23] https://ramsar.org/documents?field_quick_search=2550

[24] https://www.mades.gov.py/mapas/

Conditions of applicability of the BCR0001 methodology version 4.0	
d. The areas within the geographic limits of the project do not contain organic soils.	**Explanation:** Organic soils were defined by the IPCC (2006)[25] as those that have at least 12% organic carbon by weight (around 20% organic matter) and are subject to episodes of water saturation and are defined as histosols and other soils with a histic horizon. Following this definition it can be stated that the project activities are not carried out in organic soils. **Justification:** see point D below this table.
e. Carbon stocks in soil organic matter, litter and dead wood may decline or remain stable in the absence of project activities, i.e. relative to the baseline scenario.	**Explanation**: the carbon reserves in the soil, leaf litter and dead wood associated with the baseline of the project area, whose use has been extensive livestock farming, together with the environmental conditions, accelerate the mineralization processes of organic matter, making its accumulation difficult[26]. In the region, due to its traditional land use, there is an overuse of soils, making them more susceptible to erosion and salinization processes, processes that make the accumulation of organic matter difficult. In the absence of project activities, the baseline is expected to remain as livestock pastures, which have no accumulation of leaf litter or dead wood compared to plantations and forest covers. The organic matter of the soil, leaf litter, dead wood, can decrease due to the erosion processes that occur in areas with livestock due to the trampling of livestock. On the contrary, carbon stocks and soil organic matter are expected to

[25] IPCC. (2006) IPCC Guidelines for National Greenhouse Gas Inventories. Prepared by the National Greenhouse Gas Inventories Programme, Eggleston, In: H. S., Buendia L., Miwa K., Ngara T., and Tanabe K. (Eds.), IGES, Japan.

[26] https://www.fao.org/3/i6937es/I6937ES.pdf

Conditions of applicability of the BCR0001 methodology version 4.0	
	increase thanks to the project's afforestation activities. **Justification**: developed in point E below.
f. Flood irrigation is not used	**Explanation**: Flood irrigation is not used to carry out the project activities. The rainfall regime of the sites makes the use of irrigation of any type unnecessary. **Justification**: It is developed in point F below this table.
g. The project activities do not include the planting and/or management of species reported as invasive.	**Explanation**: This project uses *Eucalyptus grandis* and various hybrids of this species, along with a mix of 11 native species that will eventually completely replace *Eucalyptus grandis*. **Justification**: See point G below this table, which refers to the list of species considered invasive in Paraguay and the absence of *Eucalyptus grandis* among them, a species that is also completely cut down at the end of its third 10-year cycle.
h. Drainage effects are negligible, so GHG emissions other than CO_2 can be omitted.	**Explanation**: no drainage is carried out for the establishment of the plantation, therefore, GHG emissions other than CO_2 are omitted for this case. **Justification**: Developed in point H below this table.
i. Soil disturbances due to project activities, if any, are carried out in accordance with appropriate soil conservation practices and are not repeated in less than 20 years.	**Explanation**: In the long term, the effect that could occur due to specific land preparation tasks will be offset by the positive effect of the change in land use from degraded grassland to livestock use to forestry use, which as a general balance will improve the quality of the land. floor. In turn, this project has the FSC certificate, which implies that the design, planting and maintenance of the forest are carried out through a sustainable forest management program, minimizing negative impacts.

Conditions of applicability of the BCR0001 methodology version 4.0	
	Justification: Developed in point I under this table.

Next, compliance of the current project with these requirements will be demonstrated:

A) The areas in the geographical limits of the project do not correspond to the category of forest (according to the national definition adopted by the country in which the project activity is proposed)[27] nor to natural vegetation covers other than forest, nor to the beginning of the project activities, nor five years before the project start date.

The areas within the geographical limits do not correspond to the forest category according to the definition granted by Paraguay in Article 42 of Law 422/1973, at the beginning of the activities, nor 5 years before the start of the project. Through Article 42 of Law 422/1973[28] Paraguay defines a forest as a "natural ecosystem with biological diversity, intervened or not, regenerated and/or restored by natural succession or forest enrichment techniques with native species, that produces goods, provides services environmental and social". On the other hand, the definition of forest marked in 2018 by Decree 175, which regulates Article 42 of the aforementioned Law 422/1973, points to the following definition of forest specifying the parameters of surface, tree height and cover. within the ranges given by the Kyoto Protocol:

• Eastern Region of Paraguay, in which this project is located: minimum area of 1 hectare (1 ha), with a tree height equal to or greater than five meters (5 m) that achieves a minimum canopy coverage in its state. natural of at least thirty percent (30%).

[27] According to Decree 175 of 2018, in the eastern area of Paraguay where the project is located, a forest is defined as a minimum area of 1 hectare (1 ha), with a tree height equal to or greater than five meters (5 m) and a minimum canopy coverage in its natural state of at least thirty percent (30%)

[28] https://py.vlex.com/vid/ley-n-422-73-641255869#:~:text=Decl%C3%A1rase%20de%20inter%C3%A9s%20p%C3%BAblico%20el,el%20r%C3%A9gimen%20de%20esta%20Ley.

In order to demonstrate the non-existence of forest 5 years before the start of the project, the BCR0001 V 4.0 Methodology in section 10 establishes that the mapping of land use covers and for the identification of natural plant covers other than forest, the owner of the GHG project must use the categories defined by the Corine Land Cover methodology[29].

The Corine Land Cover program proposes a specific methodology to carry out an inventory of land cover and use, useful information for decision making in aspects related to the management and conservation of natural resources, territorial planning, as well as also for sectoral analysis of livestock, agriculture, forestry, etc.

An important characteristic of the methodology is the use of a hierarchical legend[30] with categories that allow data to be aggregated at the national level or disaggregated, to work at the departmental, municipal level or for specific areas. Also vital in the methodology is the use of remote sensing images to produce maps at different scales defined by the objectives and scope of the study.

For the present work, this methodology was respected, taking the legend to a third level with the exception of the agriculture part that reaches the second level (transitional cultivation). This is because a wide variety of different agricultural crops are found in the area surrounding the project.

The images used correspond to Landsat 8, which has 30 m spatial resolution. This collection was chosen given the temporal availability of images for the entire period from 2013 to 2023.

[29] https://www.eea.europa.eu/publications/COR0-part1

[30] https://www.eea.europa.eu/data-and-maps/figures/corine-land-cover-1990-by-country/legend

Taking into consideration the ESA WorldCover 10m v200 land use classification cartographic product[31] in 2021, as well as current high-resolution satellite images, the land cover occupied by each class in the analysis area is estimated for the most recent period.

Using at least 30 points per class, there are a total of 600 points of which 70% are allocated to training and the remaining 30% to validation and keeping around 20% of these within the project plots.

These points are labeled manually by a photointerpreter trained for this purpose, and in the case of the most recent period, supported by the classification reference of said ESA product, high resolution satellite images, and carrying out a field visit to know the ground truth in the case of the points located within the project plots, in order to reduce as much as possible the uncertainty of the ground truth used in the analysis.

Table 11. Land Cover Analysis Using CLC.

CLC Class	Cover (%)	Labeled Points	Training Points	Validation Points
2.1 Transitional crops	40	240	168	72
2.3.3 Weeded Pastures	20	120	84	36
3.1.1 Dense Forest	20	120	84	36
3.1.5 Forest Plantation	15	90	63	27
5. Water Surfaces	5	30	21	9
Total	100	600	420	180

Source: DMSA, 2023.

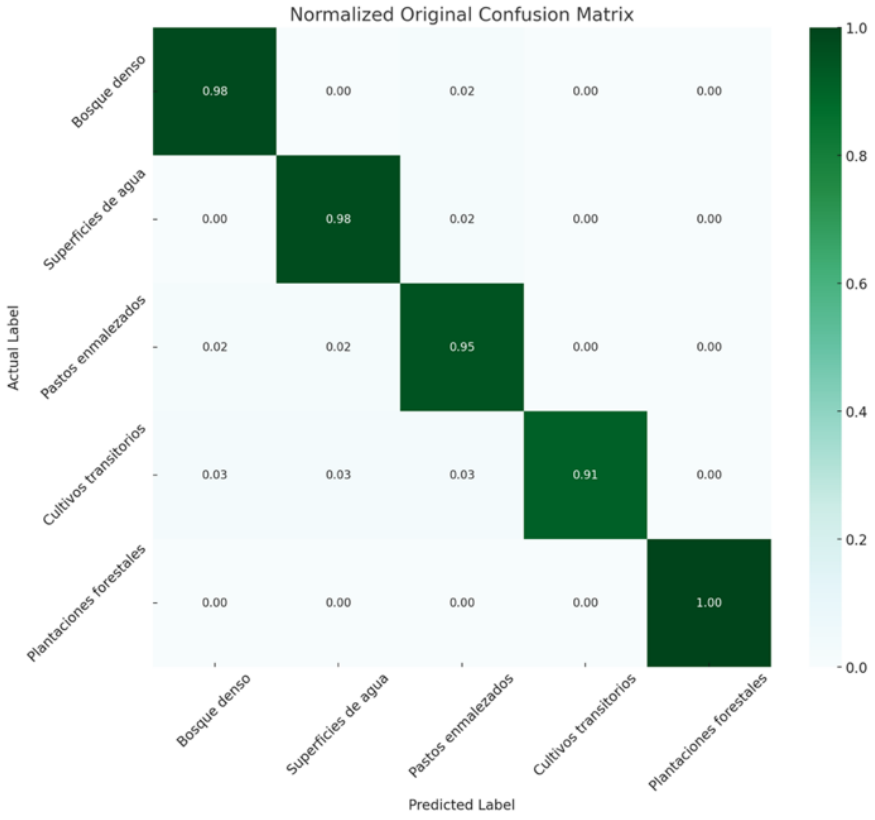
[31] Zanaga, D., Van De Kerchove, R., Daems, D., De Keersmaecker, W., Brockmann, C., Kirches, G., Wevers, J., Cartus, O., Santoro, M., Fritz, S., Lesiv, M., Herold, M., Tsendbazar, N.E., Xu, P., Ramoino, F., Arino, O., 2022. ESA WorldCover 10 m 2021 v200. (doi:10.5281/zenodo.7254221).

The *Create Signatures* and *Maximum Likelihood Classification* tools of the ArcGIS software (version 10.5) were used to process the images and obtain the result of the land cover.

It is important to highlight that the project area has areas where the width is less than 30 meters. This causes the pixels to overlap with old forest plantations adjacent to our project, but outside its area.

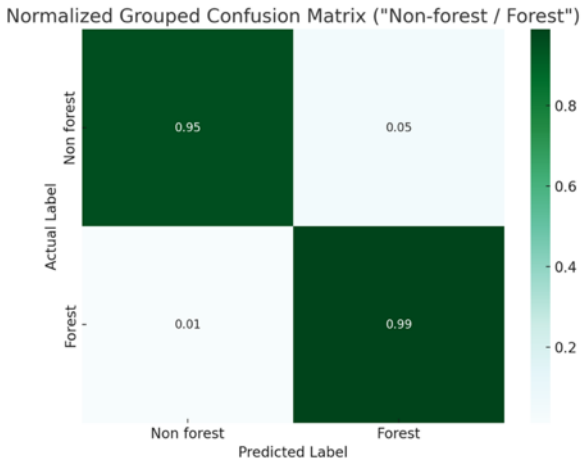
The model is evaluated through a normalized confusion matrix that shows the proportions of correct and incorrect predictions in each class. It follows that the performance of the model is high, especially when it comes to differentiating between forest cover versus absence of this.

Figure 18. Confusion matrix for land cover analysis using CLC.



Source: DMSA, 2023

Figure 19. Confusion matrix for the analysis of forest and non-forest cover.

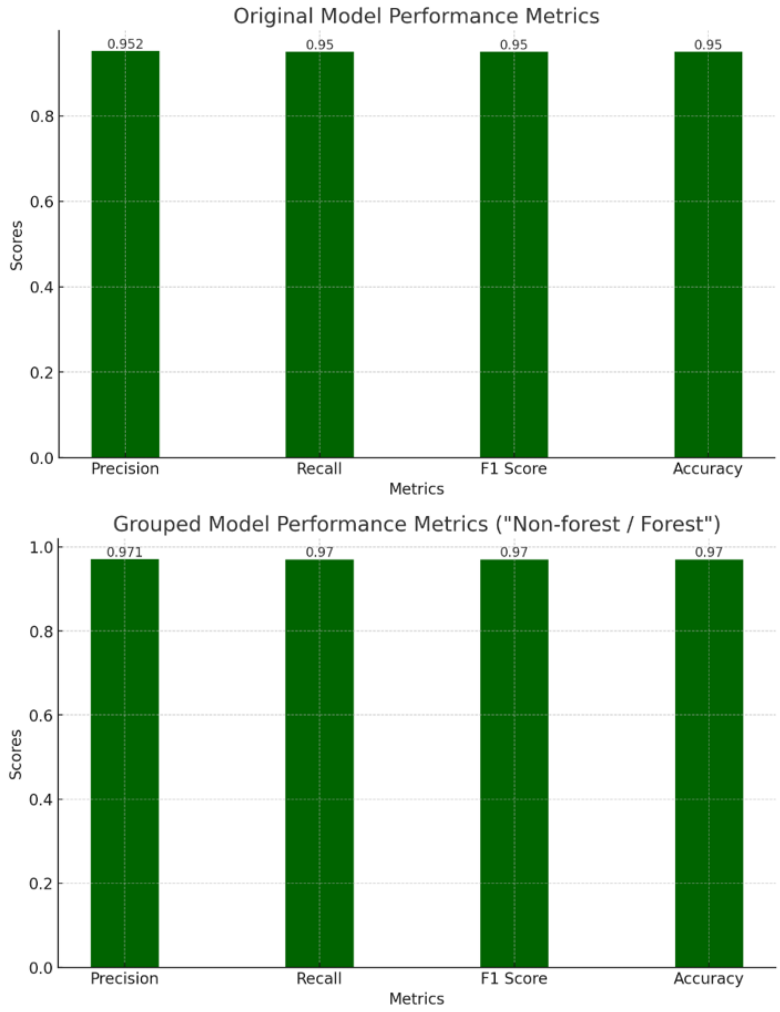


Source: DMSA, 2023

On the other hand, the following metrics emerge from the confusion matrix:

- Accuracy: measures the proportion of correct predictions among all positive predictions made by the model.
- Sensitivity (or recall): measures the proportion of true positives correctly identified out of all truly positive cases.
- F1: is the harmonic average of precision and recall, providing a balance between both.
- Accuracy: It offers us the proportion of correct predictions (both positive and negative) among the total number of cases.

Figure 20. Result of coverage analysis metrics using CLC.



Source: DMSA, 2023

These metrics show that the error is in any case below 5%, the fact that older plantations are not included in the project area is also demonstrated during the audit carried out on site.

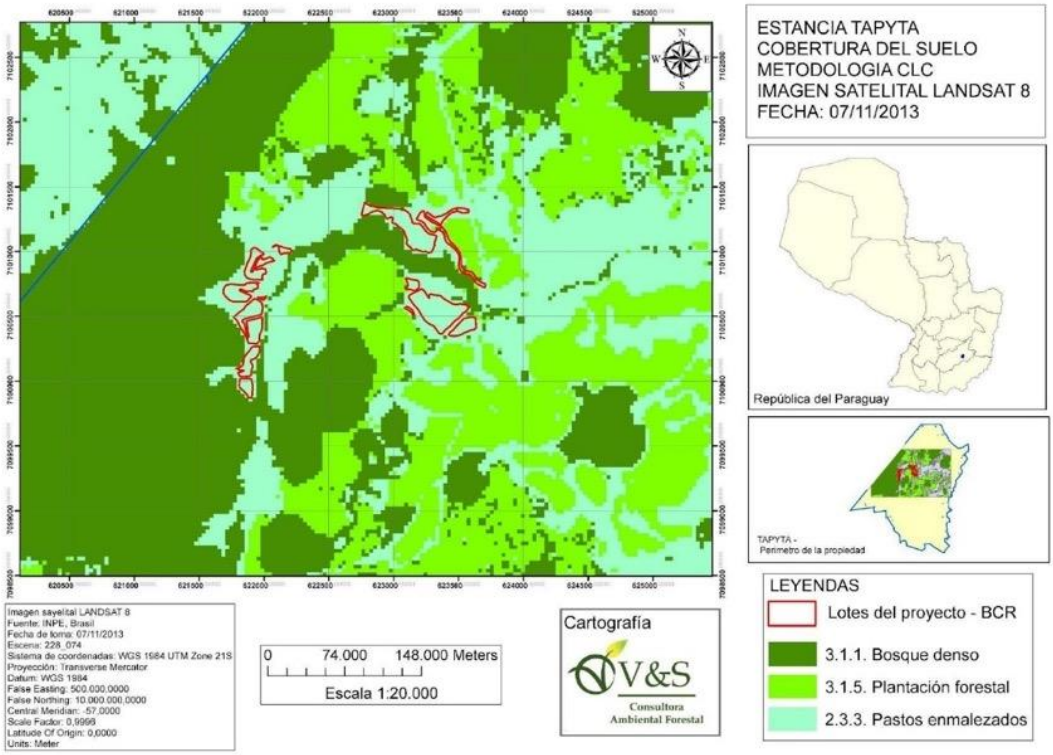
For all images a scale of 1:20.000 was used, provided that the plans were printed on DIN A3. The graphic scale is independent of the size of paper used to print the plans.

To demonstrate the non-existence of the Forest 5 years after the start of the project, images from the year 2013, 2018 and 2023 are analyzed for each farm. It is important to highlight that in the images corresponding to the year 2023 in Hernandarias lots with the legend of "Weeded Pastures". This is because the lots make up strata 7 and 8, which were not planted on the date of preparation of the PD and therefore will not be counted for the CO_2 capture calculations in the first quantification stage that will be carried out in the year 2023.

Tapytá

Compliance with this applicability condition will be demonstrated including mapping with the application of the Corine Land Cover methodology, firstly for the year 2013 (5 years before the start of the project) for the year 2018 (start date of the project). and June 2023 (date of preparation of the PD).

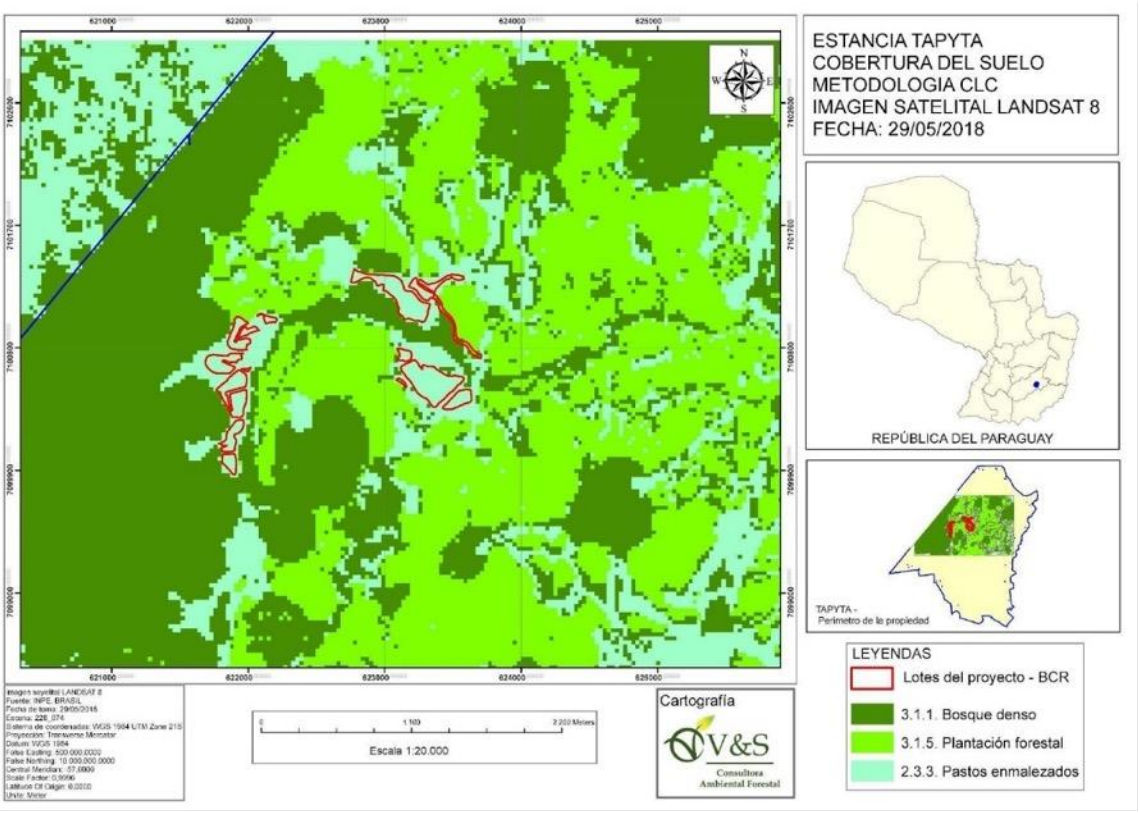
Figure 21. Land cover 2013 - 5 years before the start of the project.



Source: DMSA, 2023.

Weeded pastures used by the livestock that was carried out in the place.

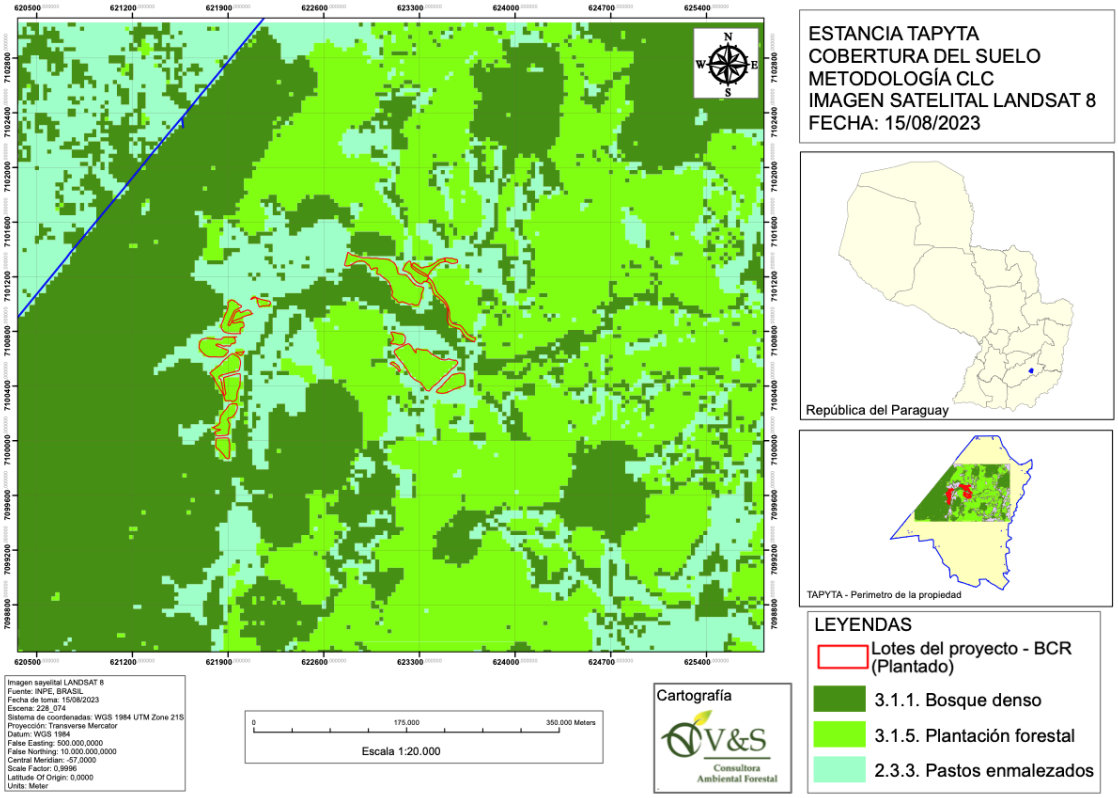
Figure 22. Tapytá 2018 land cover - start of the Project.



Source: DMSA, 2023.

As seen in Figure 21 and Figure 22, at the start date of the project there was no forest or forest plantations within the project area (delimited in red). The cover remained the same as in 2013. Most of the cover 2.3.3 Weeded pastures were used for livestock. Therefore, the non-existence of forest is demonstrated 5 years after the start of the project.

Figure 23. Land cover 2023 - date of preparation of the current document.



Source: DMSA, 2023.

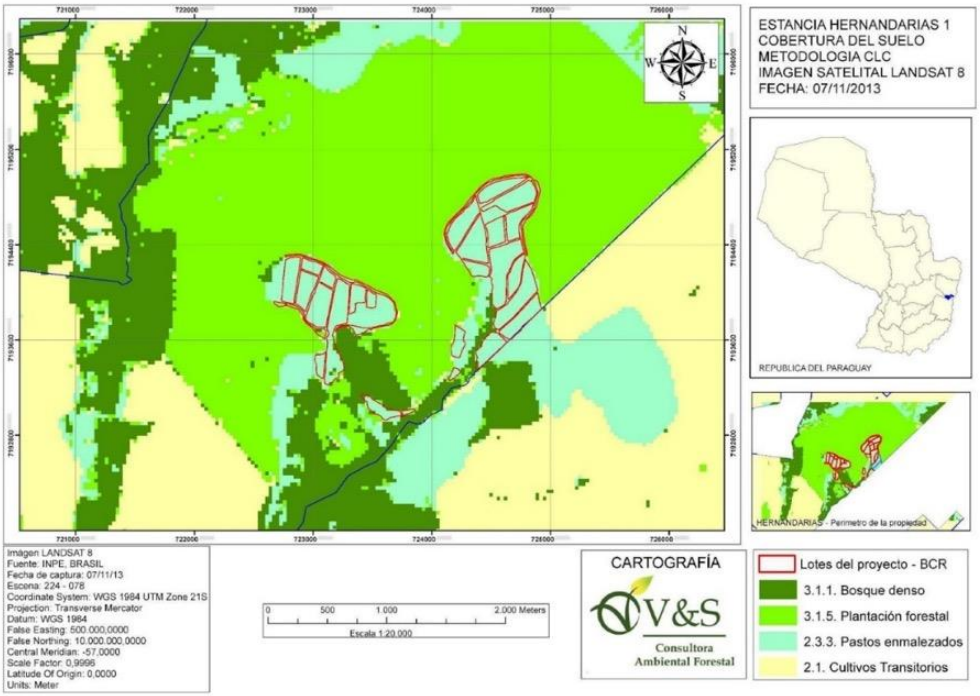
As a complement, it can be seen in the previous image that in the year 2023 (year of preparation of this document) the project area is completely covered by coverage 3.1.5 Forest Plantation.

Hernandarias

Compliance with this applicability condition will be demonstrated by including mapping with the application of the Corine Land Cover methodology, firstly for the year 2013 (5 years before the start of the project) for the year 2018 (start date of the project) and June 2023 (date of preparation of the PDD.

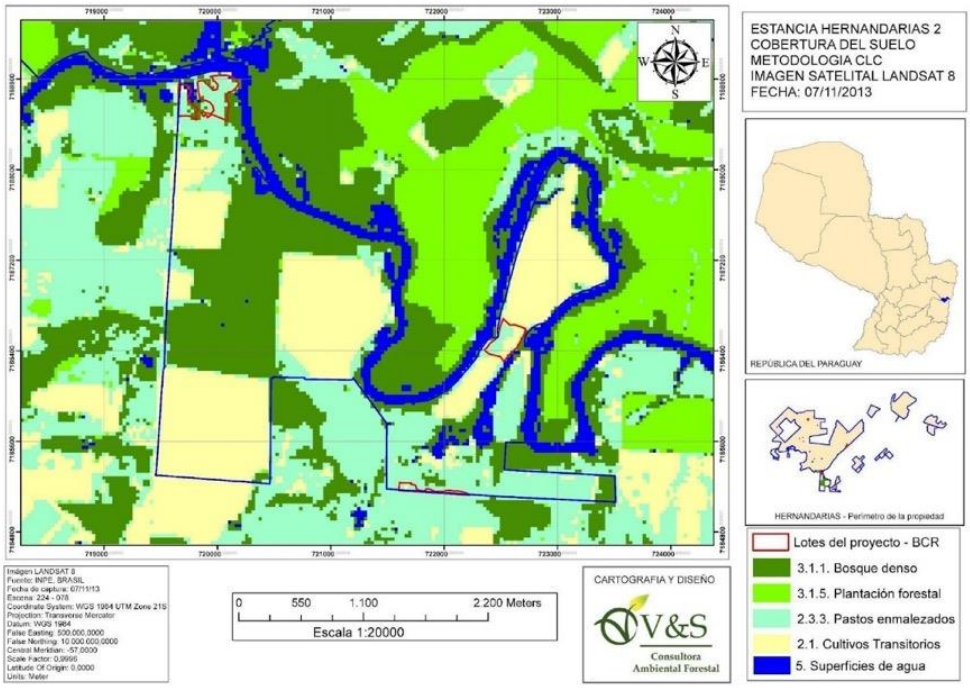
As the project plots in the Hernandarias Farm are far away, they will be presented in 4 images so that the detail of each one is more noticeable.

Figure 24. Hernandarias 1-year 2013 - 5 years before the start of the project.



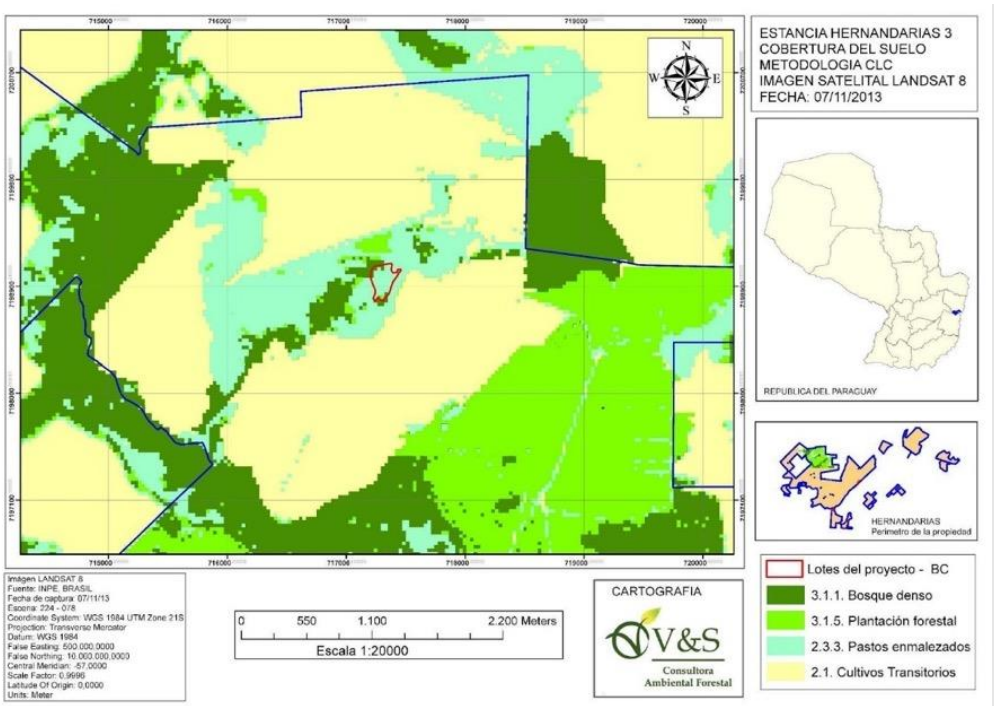
Source: DMSA, 2023.

Figure 25. Hernandarias 2-year 2013 - 5 years before the start of the project.



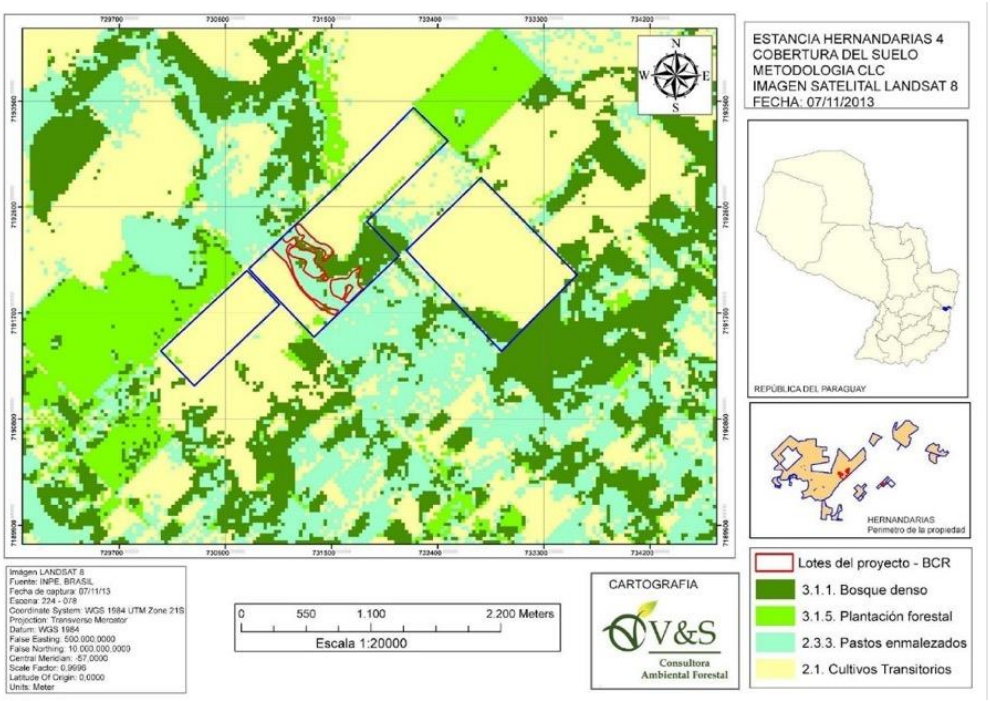
Source: DMSA, 2023.

Figure 26. Hernandarias 3-year 2013 - 5 years before the start of the project.



Source: DMSA, 2023.

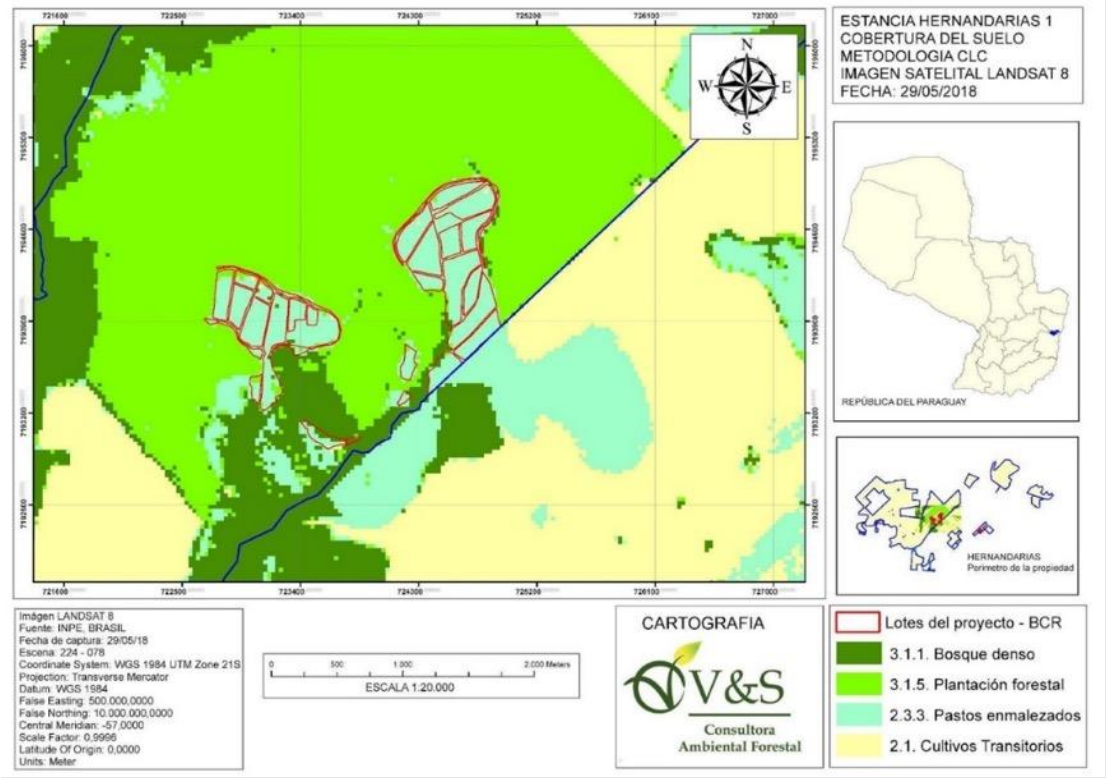
Figure 27. Hernandarias 4-year 2013 - 5 years before the start of the project.



Source: DMSA, 2023.

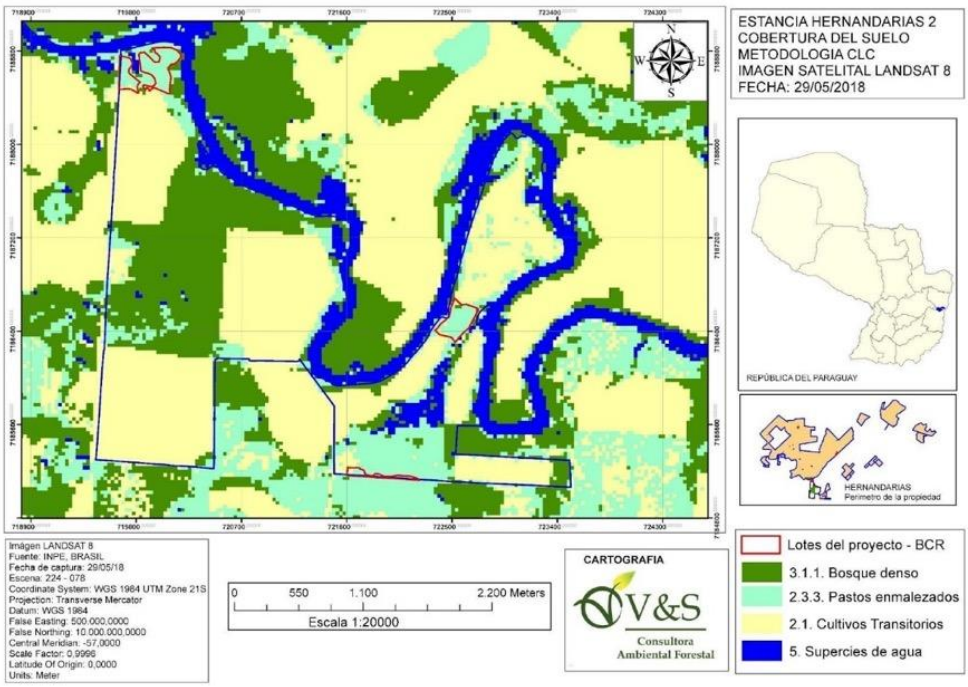
As can be seen in the previous images, 5 years after the start date of the project, there was no forest within the project area (delimited in red). The coverage belongs to 2.3.3 Weeded pastures that were used for livestock and a small portion to 2.1 Transitional crops.

Figure 28. Hernandarias 1-year 2018 - project start date.



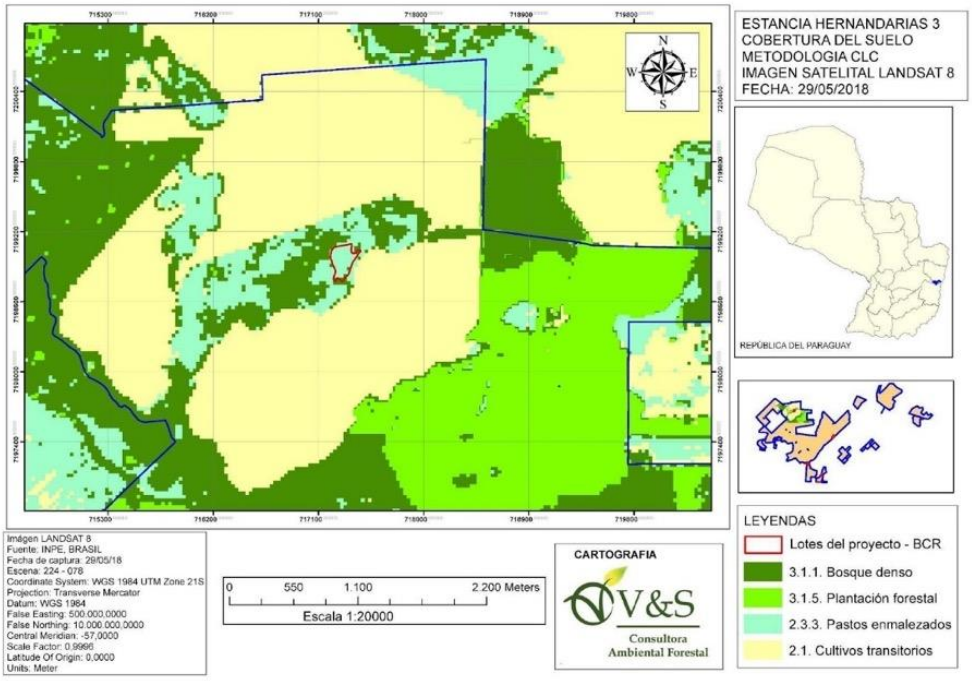
Source: DMSA, 2023.

Figure 29. Hernandarias 2-year 2018 - project start date.



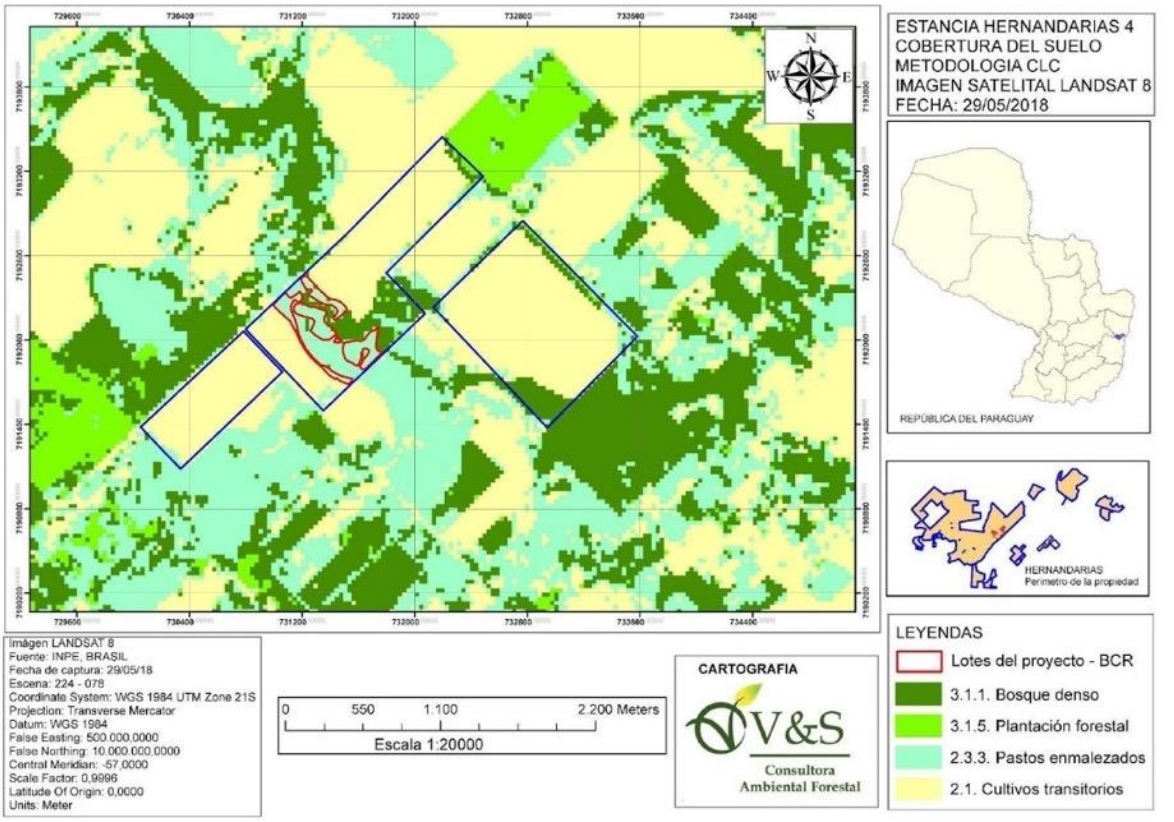
Source: DMSA, 2023.

Figure 30. Hernandarias 3-year 2018 - project start date.



Source: DMSA, 2023.

Figure 31. Hernandarias 4-year 2018 - project start date.

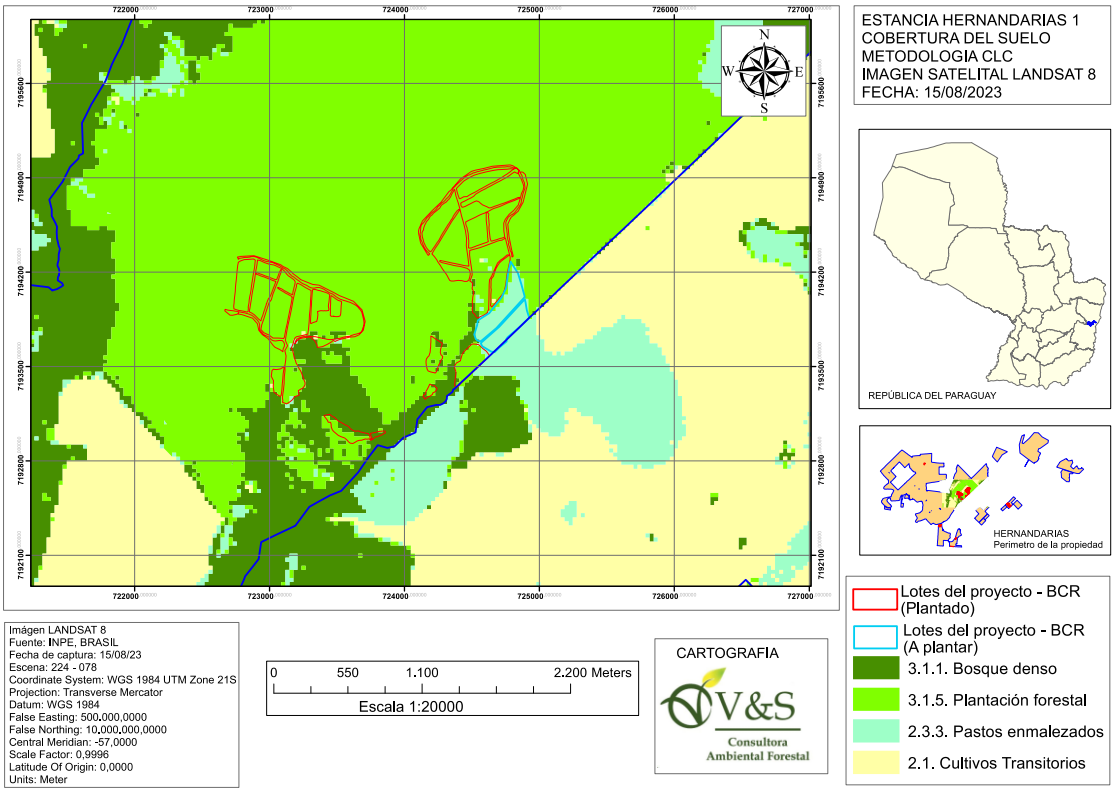


Source: DMSA, 2023.

As can be seen in the previous images, at the start of the project there were no forests or forest plantations within the project area (delimited in red). The coverage remained the same as in 2013. Most of it belonged to coverage 2.3.3 Weeded pastures that were used for livestock and a small portion of 2.1 transitional crops. Therefore, the non-existence of forests within the project area 5 years from the start date is demonstrated.

Next, it will be demonstrated that the lots that are going to be planted in the second half of 2023 do not constitute a forest at the start date of planting for the current project.

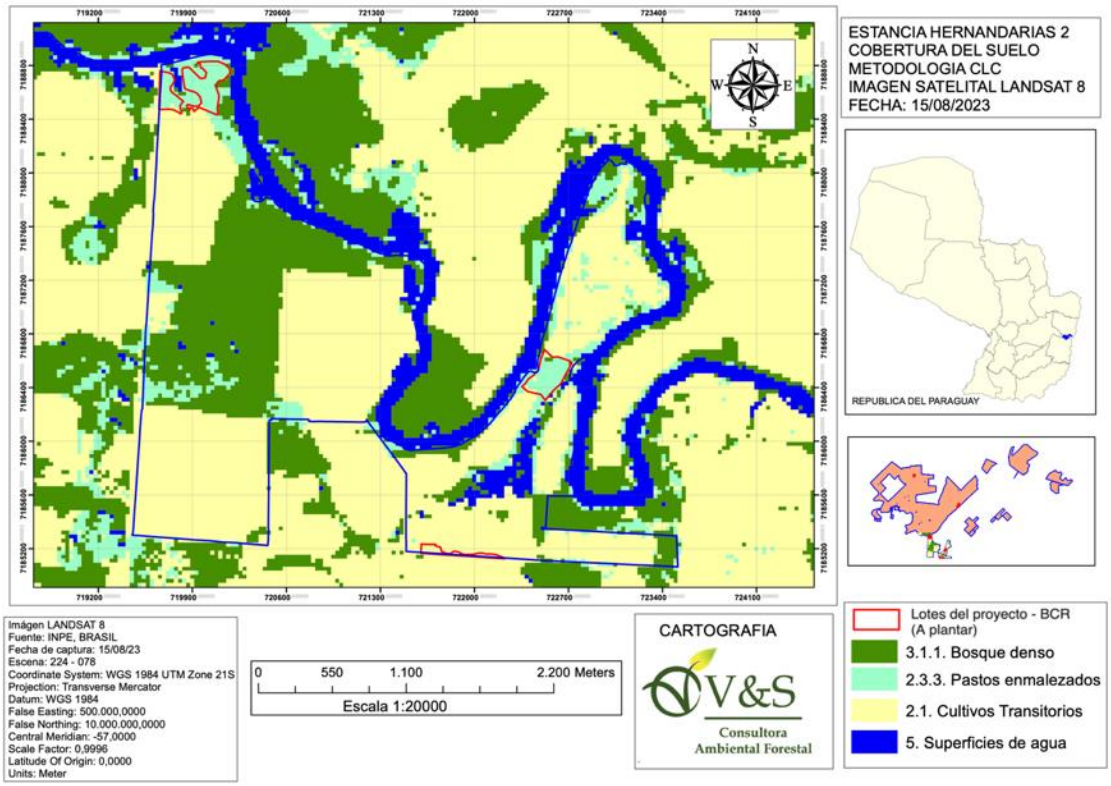
Figure 32. Hernandarias 1-year 2023 - date of completion of the PD



Note: The lots that are currently listed as "weeded grasslands" will be planted in the second half of 2023 according to the agreed planning and will therefore not be considered for the CO2 capture calculations in the first stage of quantification to be carried out in the 2023.
Source: DMSA, 2023

In the previous image you can see that there are lots that currently appear as 3.1.5 Forest plantation because they were planted in 2019 and 2020. The reason why there are lots that appear as 2.3.3 Weeded Pastures in the year 2023 is due to the fact that these are going to be planted in the second half of 2023 and therefore will not be considered for the CO2 absorption calculations in the first quantification stage.

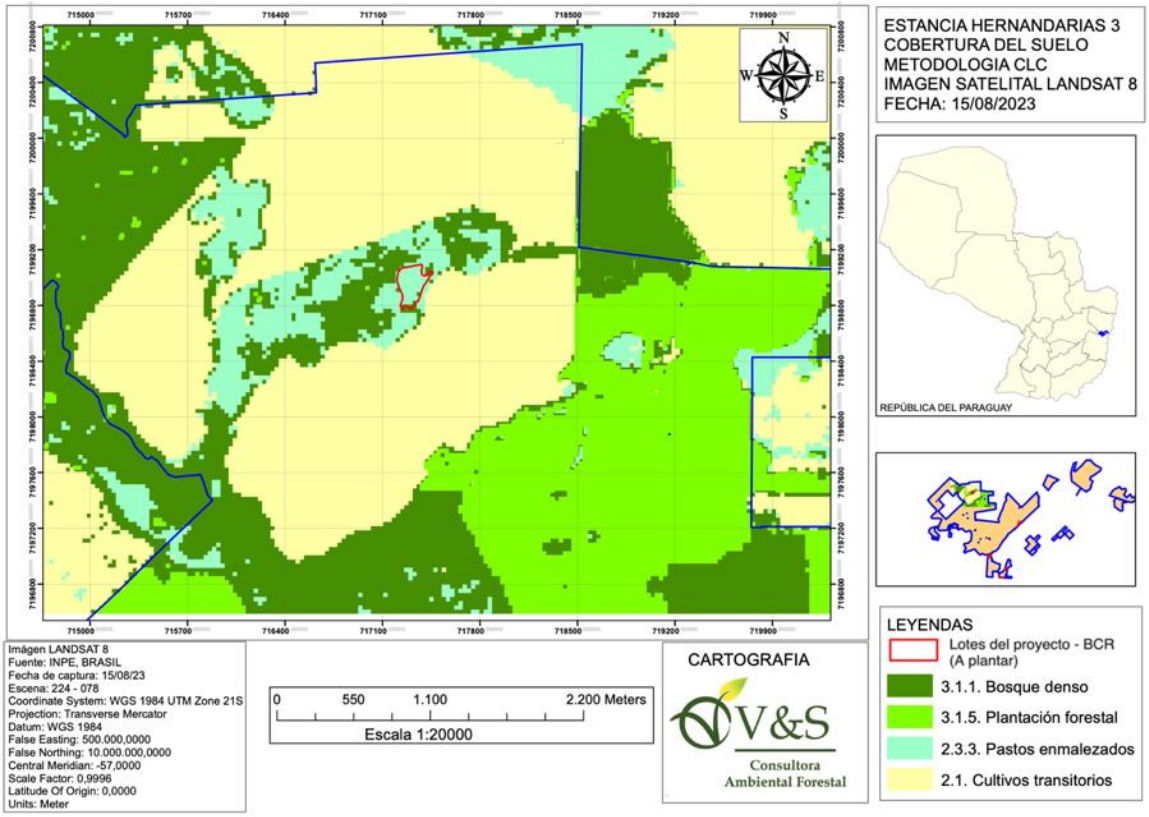
Figure 33. Hernandarias 2-year 2023 - date of completion of the PD



Source: DMSA, 2023.

Note: Lots currently listed as "weeded grassland" or "transitional crops" in the case of the southernmost plot will be planted in the second half of 2023 according to the agreed planning and will therefore not be considered for the calculations of CO_2 capture in the first stage of quantification to be carried out in 2023.

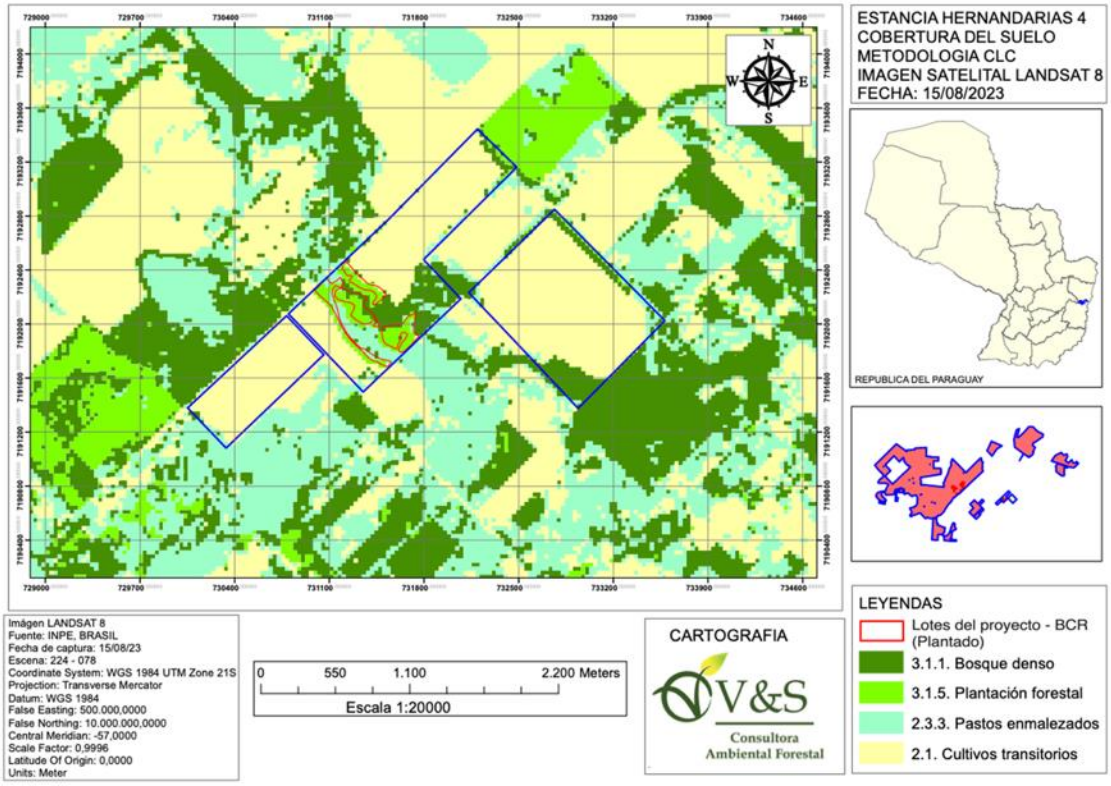
Figure 34. Hernandarias 3-year 2023 - date of completion of the PD



Source: DMSA, 2023.

Note: The lots that are currently listed as "weeded grasslands" will be planted in the second half of 2023 according to the agreed planning and therefore will not be considered for the CO_2 capture calculations in the first stage of quantification to be carried out in 2023.

Figure 35. Hernandarias 4-year 2023 - date of completion of the PDD



Source: DMSA, 2023.

B) The project activities do not generate transformation of natural ecosystems.

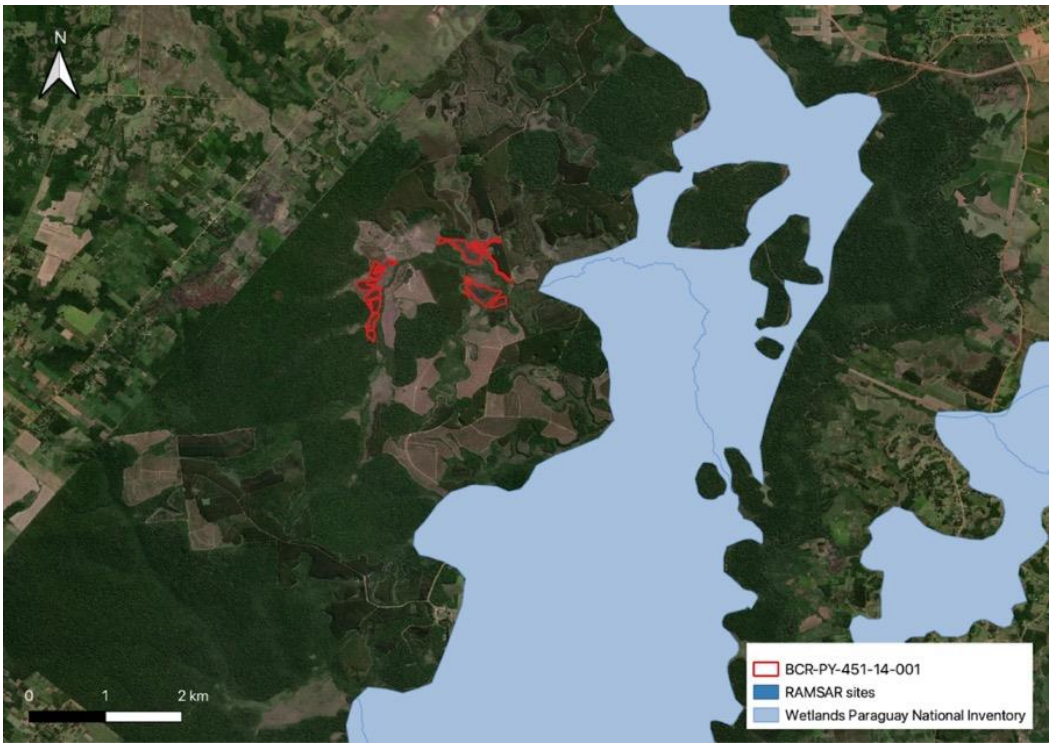
As stated in point 2.5 Additional Information about the GHG Project, Flora and Fauna section, the project area is not included within the protected areas delimited by the government of Paraguay. On the other hand, the previous use of these lands as pastures for livestock is proven by the contracts provided (ANNEX 2 shows an example of an anonymized contract, and all contracts are provided as part of the confidential complementary documentation[32]).

[32] Folder 3- Baseline establishment – DMSA livestock contracts

C) The areas within the geographic limits of the project do not correspond to the category of wetlands.

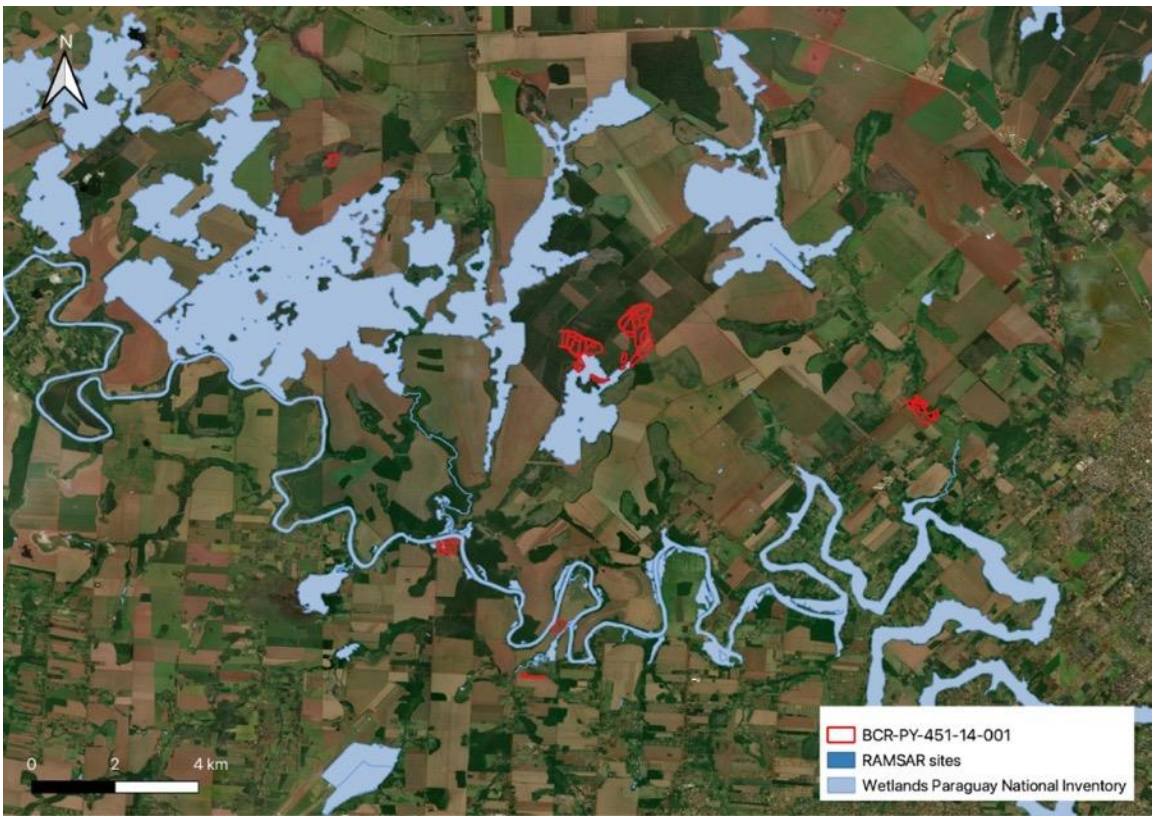
None of the selected plots can be considered wetlands following the RAMSAR Convention and the National Wetland Inventory of Paraguay. The analysis using Corine Land Cover (CLC) methodology detailed in the previous section (A) also shows the non-existence of wetlands within the project area (absence of class 4 of the hierarchy established by the CLC methodology).

Figure 36. Situation of lots of project BCR-PY-451-14-001 with respect to wetlands of the RAMSAR network and Paraguay's National Wetlands Inventory in the Tapytá area.



Source: RAMSAR, 2023; MADES, through public consultation (no. 78248) 2023. ArcGIS World Imagery Base Cartography. Datum WGS84.

Figure 37. Situation of the BCR-PY-451-14-001 project plots with respect to RAMSAR network wetlands and the National Wetlands Inventory of Paraguay in the Hernandarias area.



Source: RAMSAR, 2023; MADES, through public consultation (no. 78248) 2023. ArcGIS World Imagery base cartography. Datum WGS84.

D) The areas within the geographic limits of the project do not contain organic soils.

Organic soils were defined by the IPCC (2006) as those that have at least 12% organic carbon by weight (about 20% organic matter), are subject to episodes of water saturation and are defined as histosols and other soils with a tissue horizon. Following this definition, it can be stated that the project activities are not carried out in organic soils. In Tapytá the organic material is 1,7% and in Hernandarias it is 3%. It will be demonstrated below.

Edaphological Classification of Hernandarias Soils

In the Hernandarias project area, the types of soil present are classified as follows.

Typic Haplaquox Subgroup (O1.5)

This type of soil occurs in the majority of plots around Hernandarias, and is described as follows; Oxisol Subgroup Typic, Large Haplaquox group, very fine clay family, Valley landscape, Alluvial sediment origin, Relief 0 to 3%, Drainage, moderate and no rockiness [33].

The surface occupied by this Subgroup is coincident with that occupied by the Great Haplaquox Group and the Aquox Suborder. The soils are Typic Haplaquox because they maintain the characteristics of Haplaquox and do not present other conditions that deviate it from the typical concept. These soils are distributed in the depressions among other red Oxisols that occupy the highest sectors. They are clayey throughout the profile, being considered very fine clay at the phase level. They are of very low fertility, acidic, with low saturation in bases and an average level of exchangeable aluminum, poor in phosphorus and with the presence of organic matter (3%) in the surface horizon. These soils are located in the Departments of Alto Paraná and Itapúa, distributed from the Hernandarias area to Pirapó[34].

Rhodic Acrudox Subgroup (O2.5)

This type of soil could occur in the project area around Hernandarias located to the east.

The soils belong to the Great Acrudox Group where the Rhodic character indicates the reddish color (Radhon) and imply that in their profile between the depth of 25 and 125cm they present 50% or more, a color of hue 2.5 YR or redder, with a wet brightness value of 3 or less. These are dark red soils caused more by the presence of a large amount of iron oxide than by the content of organic matter. The texture is very fine clay. They are acidic soils with a moderate presence of exchangeable

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33 https://imagoteca.com.py/republica-del-paraguay-mapa-de-reconocimiento-de-suelos-de-la-region-oriental/

34 https://www.geologiadelparaguay.com/Estudio-de-Reconocimiento-de-Suelos-Regi%C3%B3n-Oriental-Paraguay.pdf

aluminum, low phosphorus and medium organic matter content (1,7%) in the surface layer.

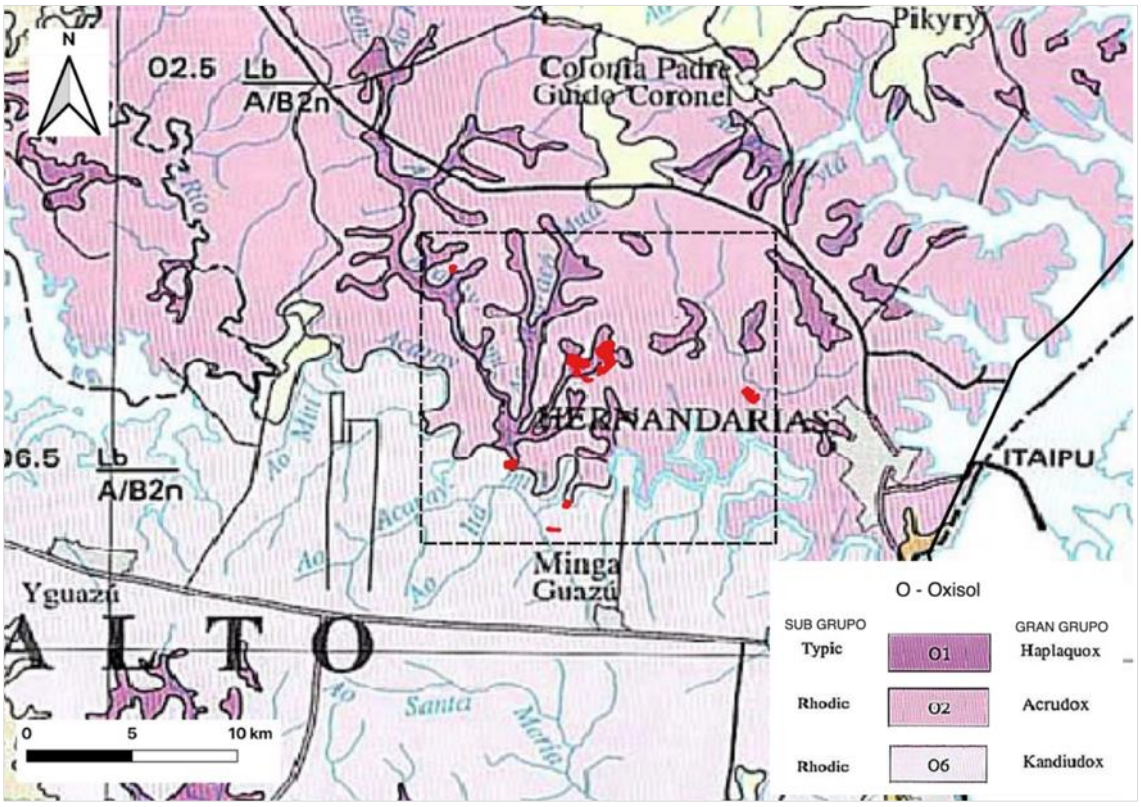
Rhodic Acrudox are deep soils, red in color and very clayey throughout the profile, with little or gradual increase in clay content with depth: the separation of the subhorizons is difficult due to the diffuse changes in color, texture and consistency. As they have high permeability and a clayey texture, they can be considered highly resistant to water erosion, as long as they are located on platforms and in sectors of hills with gentle slopes.

Rhodic Kandiudox Subgroup (O6.5)
This type of soil could occur in the project plots around Hernandarias located to the south.

This soil is a Kandiudox with a rhodic character, which means it has a red argillic horizon. In a thickness of 75cm, located between 25 and 125cm depth of the gloss with a value of 3 or less when wet. At the phase level, it has been characterized as very fine clay.

They are soils that have a dark reddish-brown color in the arable layer, dark red or red in the deep horizons depending on whether they are moist or dry respectively; They are very clayey and from 40 cm deep there is little variation in their texture, structure and consistency, and also chemically considering their acidity, cation exchange capacity, number of exchangeable bases and saturation with bases.

Figure 38. Approximate location of lots of the BCR-PY-451-14-001 project in the Hernandarias environment with respect to the soil recognition map of the eastern region of Paraguay.



Source: Ministry of Agriculture and Livestock of Paraguay, 1995. Datum WGS84.

Edaphological Classification of Tapytá Soils

The project areas are represented by different types of soil according to the classification of the Soil Recognition Map of the Eastern Region of the Republic of Paraguay published in 1995 by the Ministry of Agriculture and Livestock. This map is based on the information source of the national charts, scale 1:100.000 produced by the Directorate of the Military Geographic Service and the LANDSAT TM satellite images, Band 7,3 and 4 false color February and May 1991; July 1992. Scale

1:100.000, produced for MAG-World Bank. This being the best official information available at the national level [35].

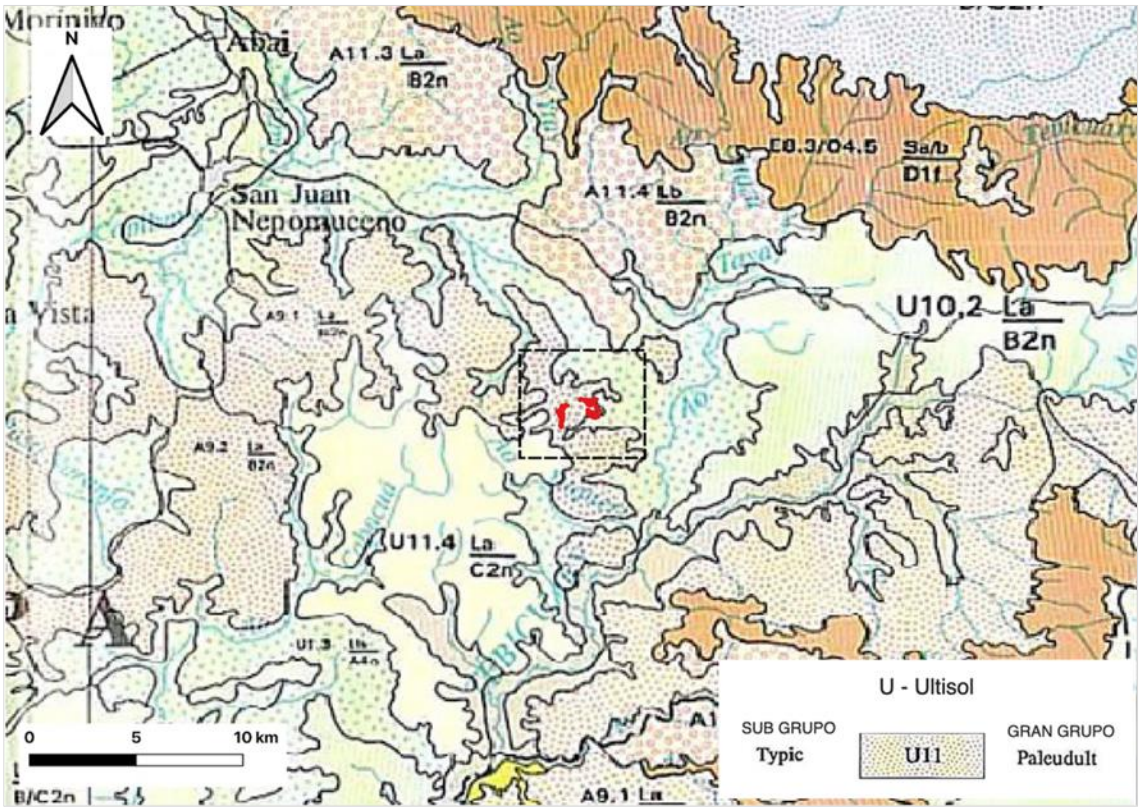
In the areas of the Tapytá project there are two types of soils of the Ultisol group with the following nomenclature: (U11.4 La/C2n): It is described as follows Typic Subgroup, Large Paleudult Group, Fine Clay Family, Lomada Landscape, Sandstone Origin, Relief 3 to 8%, Drainage, Good, Zero Roscosity. and (U1.3 Lls/A5n): It is described as follows Typic Subgroup, Large Albaquult Group, Fine Loamy Family, Plain Landscape, Alluvial Sediment Origin, Relief 0 to 3%, Very Poor Drainage, No Rockyness.

Typic Paleudult, fine clay (U11.4): it has been recognized towards the South of San Juan Nepomuceno, Department of Caazapá where it includes the Pindó Potrero, Guayakí and Potrero Ybaté Companies. The surface horizon is sandy loam, dark reddish brown in color. The texture change is verified at 35 cm, changing to sandy clay loam, and after 64 cm. The texture of the argillic horizon is clayey, dark red at greater depths. Cation exchange capacity and base exchange also increase with depth; but the base saturation is less than 50%, the acidity is high, and the exchangeable aluminum content is greater than 1 cmol/Kg of soil. In the superficial layer, the organic matter content is 1,7%, the structure is weak, in small subangular blocks. In argillic the structure is also in subangular, medium and moderately developed blocks. The presence of cutanes and small hard, white, silica concretions is observed [36].

35 https://imagoteca.com.py/republica-del-paraguay-mapa-de-reconocimiento-de-suelos-de-la-region-oriental/

36 https://www.geologiadelparaguay.com/Estudio-de-Reconocimiento-de-Suelos-Regi%C3%B3n-Oriental-Paraguay.pdf

Figure 39. Approximate location of lots of the BCR-PY-451-14-001 project in the area of Tapytá with respect to the soil map of the eastern region of Paraguay.



Source: Ministry of Agriculture and Livestock of Paraguay, 1995. Datum WGS84.

E) Carbon stocks in soil organic matter, litter and dead wood are likely to decrease or remain stable in the absence of project activities, i.e. relative to the baseline scenario.

The carbon reserves in the soil, leaf litter and dead wood associated with the baseline of the project area, whose use has been extensive livestock farming, together with the environmental conditions, accelerate the mineralization processes of organic matter, making it difficult to accumulation[37].

[37] https://www.fao.org/3/i6937es/I6937ES.pdf

In the region, due to its traditional land use, there is an overuse of soils, making them more susceptible to erosion and salinization processes, processes that make the accumulation of organic matter difficult.

In the absence of project activities, the baseline is expected to remain as livestock pastures, which have no accumulation of leaf litter or dead wood compared to plantations and forest covers. The organic matter of the soil, leaf litter, dead wood, can decrease due to the erosion processes that occur in areas with livestock due to the trampling of livestock. On the contrary, thanks to the activities of the afforestation project, carbon reserves in soil organic matter are expected to increase[38].

F) Flood irrigation is not used

The rainfall regime of the sites makes the use of irrigation unnecessary. Therefore, irrigation by flood or any other system will not be carried out. Since 2006, DMSA has had a Forest Management Plan under FSC certification, which details all forest management objectives and all operating procedures. In this document it can be confirmed that DMSA does not develop flood irrigation in any of its forestry projects and therefore will not do so in the current project either. The aforementioned Forest Management Plan is for internal use of DMSA. However, it is available upon request.

G) The project activities do not include the planting and/or management of species reported as invasive

Although the *Eucalyptus grandis* and its hybrids used in this project (listed in Table 2. Activities: Year of *Eucalyptus* Plantation in the Project Strata) are alien species in Paraguay, given the long time that has passed since their introduction into the country, the economic importance acquired by its cultivation, and, above all, the

[38] https://www.researchgate.net/profile/Ronnie-De-Camino/publication/262728776_Impactos_ambientales_de_las_plantaciones_forestales_y_medidas_correctivas_de_caracter_silvicultural/links/00463538a7617054cb000000/Impactos-ambientales-de-las-plantaciones-forestales-y-medidas-correctivas-de-caracter-silvicultural.pdf

difficulty of its spontaneous germination and the low risk of extension outside the plantation areas, it is not considered invasive.
This statement is also justified because the Invasive Species Specialist Group (ISSG) of the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN) excludes this species from its list, not considering it invasive[39].

H) Drainage effects are negligible, so non-CO_2 GHG emissions can be omitted.

No drainage of wetlands or waterlogged areas is carried out for the establishment of the plantation, therefore, GHG emissions other than CO_2 are omitted for this case. Since 2006, DMSA has had a Forest Management Plan under FSC certification, which details all forest management objectives and all operating procedures. In this document it can be confirmed that DMSA does not develop drainage in any of its projects and therefore will not do so in the current project either. This document is for internal use and is available upon request.

I) Soil disturbances, due to project activities, if any, are carried out in accordance with appropriate soil conservation practices and are not repeated in less than 20 years.

It is important to highlight that, although the project initially generates alterations in the soil due to the activities of soil preparation, planting and forestry use (detailed in section 2.3), the project is carried out on soils degraded by livestock farming, so the net impact will be positive for the soil [40] in the long term. This is

[39] The preparation of an Official List of Invasive Exotic Species of Paraguay is pending. While this is approved and published, the reference with the greatest international recognition - to which MADES itself refers in its resolutions - is the aforementioned https://www.iucngisd.org/gisd/, in whose database *Eucalyptus grandis* is not identified as an invasive species.
[40] https://www.researchgate.net/profile/Ronnie-De-Camino/publication/262728776_Impactos_ambientales_de_las_plantaciones_forestales_y_medidas_correctivas_de_caracter_silvicultural/links/00463538a7617054cb000000/Impactos-ambientales-de-las-plantaciones-forestales-y-medidas-correctivas-de-caracter-silvicultural.pdf

because at the beginning of the project eucalypt will be planted for forestry use, but from the first thinning in year 6, native species will begin to be planted. These will not undergo pruning or harvesting activities (see section 2.2 for details of the project objectives) so that a native forest remains at the end of the project.

In this way, with respect to their starting situation, forest plantations will increase organic matter, recycle nutrients, increase microorganisms that decompose organic matter and improve the physical structure of the soil and water infiltration, reducing erosion[41].

The project will have FSC certification, which implies the monitoring of a Forest Management Plan that includes measures and principles that ensure sustainable forest management that allows wood to be commercialized, avoiding negative impacts on biodiversity, local communities, the water balance of the basins and the scenic beauty of the landscape.

Regarding soil preparation activities, these contemplate the use of machinery such as tractor and harrow, they are aimed at increasing the porosity and aeration of the soil, with the objective of providing favorable conditions for the penetration of tree roots. In order to achieve an efficient activity and reduce the impacts on the soil due to the use of machinery such as tractor and harrow, the minimum tillage technique will be used[42]. This implies that soil preparation will be carried out in strips 1 to 2 m wide along the tree planting lines. This system greatly reduces the area of land that is tilled[43]. In addition, the days where the minimum tillage task is carried out are carefully selected according to the weather conditions to avoid soil erosion[44].

[41] https://bibliotecadigital.exactas.uba.ar/download/tesis/tesis_n5778_Rodriguez.pdf
[42] https://www.scielo.sa.cr/pdf/tem/v31n1/0379-3982-tem-31-01-167.pdf
[43] http://revistas.uach.cl/pdf/bosque/v16n2/art01.pdf
[44] https://www.jircas.go.jp/sites/default/files/publication/manual_guideline/manual_guideline-_-_44.pdf

Secondly, the planting of the trees is done manually, so soil disturbance is low[45]. The equipment and tools used in the plantation are shovels to dig the holes and a light vehicle (less than 2 thousand kg) is used to transport the plants to the limits of the stratum. Within it, transportation is done manually with containers. The operator makes a hole with the shovel only in the place where the tree is going to be planted. Planting is also done manually where the plant is inserted and then covered with soil that comes from the same hole.

Thirdly, the logging activity generates alteration of the soil due to the use of tractors for dragging[46] and loading of the rolls. As a mitigation measure for this activity, trucks do not enter the plantation plots, thus reducing soil compaction.

In this way, although these three activities generate alterations in the soil, the first two activities bring positive impacts for the soil, such as mechanized soil preparation that contributes to the reduction of soil compaction, soil losses, and increases the yields of forest plantations (Gómez N., et al, 2018)[47]. When the economic turn of the eucalypt trees is over, the native species will be planted without the use of machinery, only with manual tools, to avoid tillage in the project areas.

On the other hand, tree planting represents positive values for the increase in organic carbon in the soil – SOC. According to Ojeda J., et al (2022)[48], they reported a SOC stock for native forests of 65 ton C/ha and of 47 ton C/ha for eucalypt in the

[45] https://journals.lib.unb.ca/index.php/IJFE/article/view/30002/1882525236
[46] http://revistas.uach.cl/pdf/bosque/v16n2/art01.pdf
[47] Gómez-Calderón, N; Villagra-Mendoza, K; Solorzano-Quintana, M. La labranza mecanizada y su impacto en la conservación del suelo (literary revision). Tecnología en Marcha. Vol. 31-1. January-March 2018. Pp 170-180. DOI: 10.18845/tm.v31i1.3506
[48] Ojeda Rojas, Jazmín Guadalupe, Amarilla Rodríguez, Stella Mary, & Villalba Marín, Lucía Janet. (2022). Variación del stock de carbono en plantaciones forestales y bosques nativos de la Ecorregión del Bosque Atlántico del Alto Paraná, Paraguay. Investigación Agraria, 24(1), 53-60. Epub 00 June 2022.https://doi.org/10.18004/investig.agrar.2022.junio.2401701

Alto Paraná Atlantic Forest Ecoregion. These values did not present significant differences between them.

On the other hand, authors report for pasture coverage with isolated trees, dedicated to livestock, a SOC stock around 29,6 t C/ha (Diaz M., et al, 2020)[49] and 39,69 t C/ha (Díaz M., et al, 2019)[50] in the central Chacó in Paraguay.

This last study demonstrated that higher carbon content is found in shaded soils, and C concentrations in the soil decrease with depth and distance from the trees. That said, based on literature, tree covers have a positive impact on soil organic carbon capture versus treeless covers such as livestock land, as is the case of the project scenario versus the baseline (it should be noted that Soil Organic Carbon will not be measured within the scope of the project).

3.1.2 Methodology Deviations (if Applicable)

NA

3.2 Project Boundaries, Sources and GHGs

The project will be made up of two Farmes in the departments of Alto Paraná and Caazapá in Paraguay, with a total area of 172,8 ha, whose objective will be the plantation of eucalypt and native species. The carbon sinks that will be considered for the calculation of GHG emissions and reductions will be the above-ground and underground biomass of forest plantations.

3.2.1 Spatial Limits of the Project

The location of the project is detailed in section 2.4 Project location. Below is the distribution of the plots with the corresponding geographic coordinate limits[51].

[49] Díaz M., Ríos J., Moreno H., Vera de Ortiz M., 2020. Contenido de carbono en un sistema silvopastoril del Chaco central paraguayo. SSN: 1996–2452 RNPS: 2148 Revista Cubana de Ciencias Forestales. 2020; May- August 8(2): 344-357.

[50] Díaz M., Leguizamón L., Gamarra C., Vera de Ortíz M., Galeano M., 2019. Estimación del contenido de carbono en sistemas silvopastoriles de *Prosopis* spp en el chaco central paraguayo. Quebracho - Revista de Ciencias Forestales, vol. 27, no. 1, pp. 54-65, 2019

[51] Geographic coordinates in WGS84 reference system, EPSG 4326.

The KML file with the project plots will be shared in the complementary documentation folder[52]. At the same time, Section 16 shows that the project does not have double accounting.

Table 12. Spatial Limits of the Project Plots.

Plot	Strata	Surface (ha)	Xmax	Ymax	Xmin	Ymin
2900-A	1	2,4	-54,6992	-25,3667	-54,7024	-25,3695
2901-A	1	11	-54,6967	-25,3678	-54,7044	-25,3736
2629-A	2	2,2	-54,7652	-25,3448	-54,7732	-25,351
2627-A	2	16,2	-54,7655	-25,345	-54,7704	-25,3504
2622-A	2	11,1	-54,781	-25,353	-54,7838	-25,361
2624-A	2	2,6	-54,777	-25,3512	-54,7865	-25,3572
1403-A	3	13,2	-55,7768	-26,2049	-55,782	-26,2156
2620-A	3	4,4	-54,7852	-25,3514	-54,7867	-25,355
2626-A	4	13,7	-54,7693	-25,3465	-54,7729	-25,3527
2621-A	4	12,6	-54,7822	-25,3514	-54,7855	-25,3567
2623-A	4	1,3	-54,7829	-25,3548	-54,7873	-25,3576
2617-B	4	3,3	-54,7788	-25,3534	-54,781	-25,3556
2615-C	4	2,7	-54,7712	-25,3564	-54,7726	-25,3606
2630-A	4	4,1	-54,7678	-25,3568	-54,7704	-25,3598
2628-A	4	11,8	-54,7664	-25,3497	-54,7694	-25,3551
1402-B	4	3,3	-55,7618	-26,2022	-55,7654	-26,2111
2619-B	5	3	-54,7754	-25,3617	-54,7799	-25,3636
1402-E	6	17,5	-55,763	-26,2019	-55,7714	-26,211
2651-A	7	4,8	-54,7649	-25,3538	-54,7685	-25,3574
2650-A	7	7,1	-54,7653	-25,3513	-54,769	-25,3567
3003-A	8	3,4	-54,8146	-25,4018	-54,8164	-25,4047
3004-A	8	7,7	-54,8112	-25,4011	-54,8148	-25,4047
3001-A	8	6,6	-54,7856	-25,4202	-54,7892	-25,4236
2950-A	8	4,8	-54,8399	-25,3089	-54,8424	-25,3118
3002-A	8	2	-54,7903	-25,4334	-54,7965	-25,4343

Source: DMSA, 2023.

[52] See file Delimitation of project lots (KML) in the complementary documentation folder.

3.2.2 Carbon Reservoirs and GHG Sources

According to section 9.1 of the BCR0001 V4.0 methodology, above-ground and underground biomass will be considered as carbon reservoirs. The quantification of dead wood, leaf litter and organic carbon in the soil is optional, which, for conservative reasons, will not be quantified.

Source or reservoir	GHG	Included (Yes/No/Optional)	Justification
Source or reservoir 1: Aerial biomass	CO_2	Yes	Carbon stocks will increase thanks to project activities through the growth of trees (represented in leaves, branches and trunk) compared to the baseline of livestock grasslands.
	CH_4	No	N/A
	N_2O	No	N/A
Source or reservoir 2: Underground biomass	CO_2	Yes	Underground biomass (represented by tree roots) will increase thanks to project activities, compared to the baseline of pastures for livestock.
	CH_4	No	N/A
	N_2O	No	N/A
Source or reservoir 3: Dead wood and litter	CO_2	No	Dead wood and litter are expected to increase compared to the baseline. However, for conservative reasons, dead wood as a carbon reservoir is not considered.
	CH_4	No	N/A

Source or reservoir	GHG	Included (Yes/No/Optional)	Justification
	N_2O	No	N/A
Source or reservoir 4: Combustion of woody biomass	CO_2	No	The BCR0001 V4.0 methodology does not consider CO2 emissions due to the combustion of woody biomass. In any case, the project does not carry out burning.
	CH_4	No	The project does not combust woody biomass for soil preparation, therefore CH4 is not considered.
	N_2O	No	The project does not combust woody biomass for soil preparation, therefore N2O is not considered.

3.2.3 Time Limits and Analysis Periods

The duration of the Project follows the BCR0001 version 4.0 Methodology. The different periods of the project are defined below.

3.2.3.1 Project Start Date

The start date of the project is December 1, 2018, when the activities for the planting of the first lot (2901-A, 2900-A) were carried out according to the BCR0001 version 4.0 methodology. Moreover, it is important to highlight that this date is in accordance with the requirements of the BCR standard section 11.4: "*For ARR activities, this starting date corresponds to the time on which site preparation, the establishment of crop, commencement of restoration activities, or other actions related to project activities begin*", since it corresponds to the establishment of the first two plots of the project.

3.2.3.2 Quantification Period of GHG Emission Reductions

The project has a duration of 40 years. Therefore, it will extend until November 30, 2058.

3.2.3.3 Monitoring Periods

The first monitoring will take place in the month of May 2023, and the following monitoring is planned to be carried out every five years, although it is at the discretion of the proponent to carry them out more frequently.

3.3 Identification and Description of the Baseline or Reference Scenario

In accordance with the United Nations Framework Convention on Climate Change, when selecting the methodology to determine the baseline scenario of a project in the AFOLU sector, its owners must select the most appropriate among the criteria listed below, justifying the convenience of your choice.

a. Existing or historical changes, as applicable, in carbon stocks at the project boundary

b. Changes in carbon stocks within the project boundaries due to land use presenting an attractive course of action considering barriers to investment

c. Changes in carbon stocks, at the project boundaries, identifying the most probable land use, at the beginning of the project.

Following the recommendations of the BCR0001 methodology version 4.0 and the BCR GUIDELINES document: BASELINE AND ADDITIONALITY" v1.3, in its most recent version, criterion "c" will be used for the establishment and description of the baseline scenario. In turn, the steps listed in the same section will be followed to determine and identify the baseline and additionality scenario.

Baseline Scenario Selection. Historical Land Use.

The historical use of the land is pasture for livestock. This activity was developed on these plots prior to the start of the project. The evidence of said livestock activity is the livestock sales receipt presented in ANNEX 3.

Step Zero. Project Start Date.

The start date of the project is December 1, 2018, when the first plantations began in lots 2900A-2901A (see details in section 3.2.1 of this report). Joint validation and verification was contracted on 2023/05/18. Therefore, it meets the requirements that the start of the project be defined within the five years prior to the start of project validation. The work orders that demonstrate the start of the project are included below, and the complete documents are provided in the complementary documentation folder 01. START OF ACTIVITIES.

Figure 40. Hernandarias plantation work orders.

POMERA MADERAS

ORDEN DE TRABAJOS - PLANTACIONES

Nro: 679

Desarrollos Madereros S.A

Hernandarias Tel.: 0631 21985

Fecha: 24/11/2018 Fecha de Inicio: 24/11/2018 Fecha de Culminación: 02/12/2018

Contratista: INNOVACION AGROFORESTAL SRL Modo de Plantacion: PURA

Responsable: Ancelmo Arevalos Tipo de Plantacion: PLANTACION NORMAL

PARCELA	Superficie	SUP. PLANTADO	ESPECIE	ESTADO
2901-A	11.00	11.00	Eucalyptus Urograndis	PLANTADO

ACTA DE INTERVENCION

Departamento: Operaciones N° de Personas Acreditadas: 18 Cantidad de Plantas por Ha.: 479

Codigo Genetico: DDX00057 Cantidad de Plantas Utilizadas: 5,276 Entre Lineas: 7.00 Entre Lineas: 2.85

Requerimientos Ambientales y Sociales a Controlar

Impactos Positivos Ambientales y Sociales

1. Manejo Sustentable de Bosques implantados
2. Mejora en la calidad de vida

Impactos Negativos Ambientales y Sociales

1. No tirar Basuras
2. Utilizar los E.P.I Recomendados

Requerimientos de Salud y Seguridad

1. EPIs
2. Orden y Limpieza
3. Herramientas en buen Estado

Pedro Leguizamon
Firma Supervisor Aclaracion de Firma
Desarrollos Madereros S.A

Ancelmo Arevalos
Firma Supervisor Aclaracion de Firma
Contratista

Source: DMSA, 2023.

Figure 41. Tapytá plantation work orders.

POMERA MADERAS

ORDEN DE TRABAJOS - PLANTACIONES

Desarrollos Madereros S.A

Tapyta Tel.: 0544 320298

Nro: 1,052

Fecha: 04/10/2019 Fecha de Inicio: 04/10/2019 Fecha de Culminación: 04/10/2019

Contratista: GRUPO GERAL SERVICIOS S.A Modo de Plantacion: PURA

Responsable: CEBELIO NUÑEZ Tipo de Plantacion: PLANTACION MANUAL CON GEL

PARCELA	Superficie	SUP. PLANTADO	ESPECIE	ESTADO
1403-A	18.00	17.20	Grandis x Camaldulensis	PLANTADO

ACTA DE INTERVENCION

Departamento: Operaciones N° de Personas Acreditadas: 10 Cantidad de Plantas por Ha.: 427

Codigo Genetico: DDX0078 Cantidad de Plantas Utilizadas: 6,962 Entre Lineas: 7.00 Entre Lineas: 3.40

Requerimientos Ambientales y Sociales a Controlar

Impactos Positivos Ambientales y Sociales

1. Manejo Sustentable de Bosques implantados
2. Mejora en la calidad de vida

Impactos Negativos Ambientales y Sociales

1. No tirar Basuras
2. Utilizar los E.P.I Recomendados

Requerimientos de Salud y Seguridad

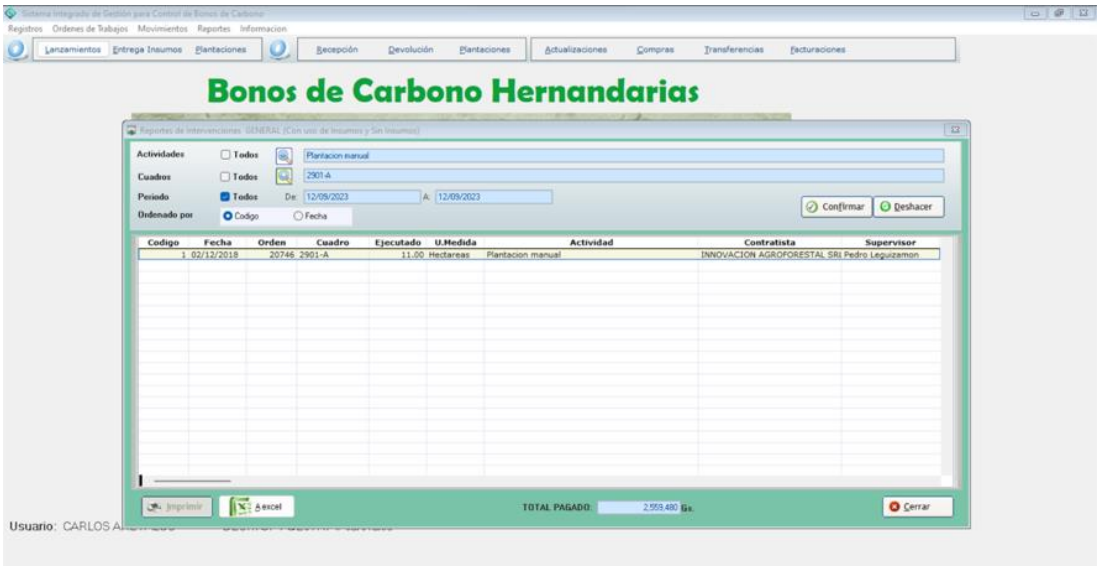
1. EPIs
2. Orden y Limpieza
3. Herramientas en buen Estado

DARIO ACOSTA
Firma Supervisor Aclaracion de Firma
Desarrollos Madereros S.A

CEBELIO NUÑEZ
Firma Supervisor Aclaracion de Firma
Contratista

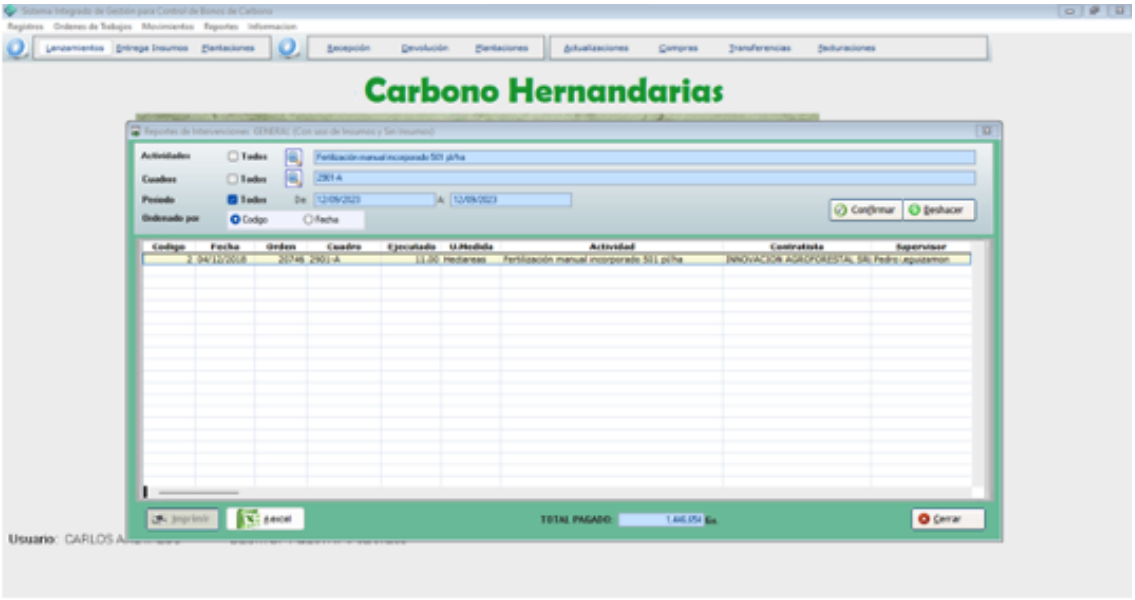
Source: DMSA, 2023.

Figure 42. Plantation Work Order.



Source: DMSA, 2023.

Figure 43. Fertilization work order.



Source: DMSA, 2023.

Step 1: Identification of Land Use Alternatives

Step 1 consists of identifying the most probable land use scenarios, which could be the baseline scenario, through the following substeps:

Substep 1a: Identification of Probable Land Use Alternatives in the Project Areas

In this section it is necessary to identify realistic and credible land use alternatives that would occur in the project areas in the absence of the proposed project activities.

In this sense, the following three scenarios are analyzed:

- Scenario 1: Continuation With the Activity Prior to the Proposed Project (Extensive Cattle Ranching)
- Scenario 2: Agriculture
- Scenario 3: Forest Crops For Timber Harvesting

The three economic activities are options that could be developed by the proponent on the selected plots. As required by the methodology, the determination of the most probable use of the land within the limits of the project

at the time of initiation depends on the prevailing use in the region, trends in land use and the barriers that condition it. These 3 scenarios comply with the requirements of the methodology[53],[54].

Other uses are ruled out in advance due to their low probability. We offer a couple of examples in this regard:

- Urban development of the land: since the plots subject to the project are in a rural environment and not adjacent to consolidated urban centers, this alternative is ruled out.
- Development of renewable energy projects: Paraguay is self-sufficient in electricity generation[55] from a source that is already renewable in origin, hydroelectric energy [56], thanks to very large projects developed in past decades [57].

In addition, the historical land use inferred from the Corine Land Cover analysis in the years 2013, 2018 and 2023 (see Figure 21 and Figure 35) shows that the main land covers in the project environment in both farms are limited to primary sector, agricultural and forestry activities. This information is consistent with DMSA's knowledge of the main activities in the environment, where it has operated for more than 20 years.

Next, the 3 scenarios will be analyzed.

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[53] https://www.ine.gov.py/Publicaciones/Biblioteca/Atlas%20Censal%20del%20Paraguay/13%20Atlas%20Alto%20Parana%20censo.pdf

[54] https://www.ine.gov.py/Publicaciones/Biblioteca/Atlas%20Censal%20del%20Paraguay/9%20Atlas%20Caazapa%20censo.pdf

[55] https://elperiodicodelaenergia.com/paraguay-es-el-unico-pais-del-mundo-con-generacion-electrica-100-renovable/

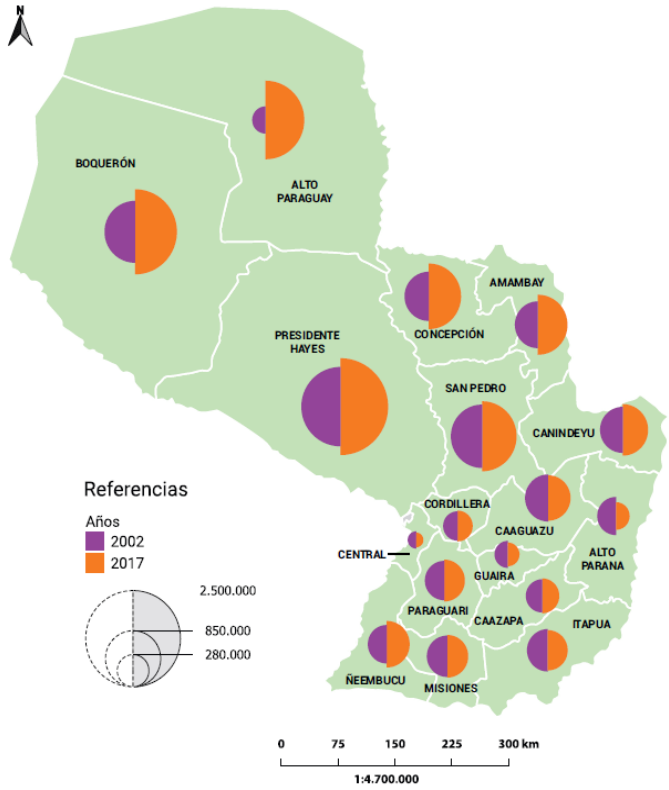
[56] https://www.ssme.gov.py/vmme/index.php?option=com_content&view=article&id=1216

[57] Itaipú y Yacyretá hydroelectric centrals.

Scenario 1: Continuation With the Activity Prior to the Proposed Project (Extensive Cattle Ranching)

Extensive livestock farming is the activity that existed before the execution of the project and the one that is most plausible that would continue to be carried out in this area in the absence of the current forestry project. This alternative is credible since it has been the historical activity carried out in the project area. The soils of this region are very poor and livestock production does not require large investments for the farmer to obtain economic returns. This activity is one of the main economic activities of Paraguay and the departments of Alto Paraná and Caazapá where the proposed project will be developed.

Figure 44. Livestock in Paraguay



Source: *Mapeando el Agronegocio en Paraguay publication*, Rosa de Luxemburgo Foundation (2018).

The previous Figure shows the evolution of livestock activity in Paraguay for 2012–2017[58] (most up-to-date data currently available). Across the country, 13.823.651 heads of cattle were registered in 2017, a number that continues to grow with a 47% expansion. Livestock farming is currently present throughout the national territory.

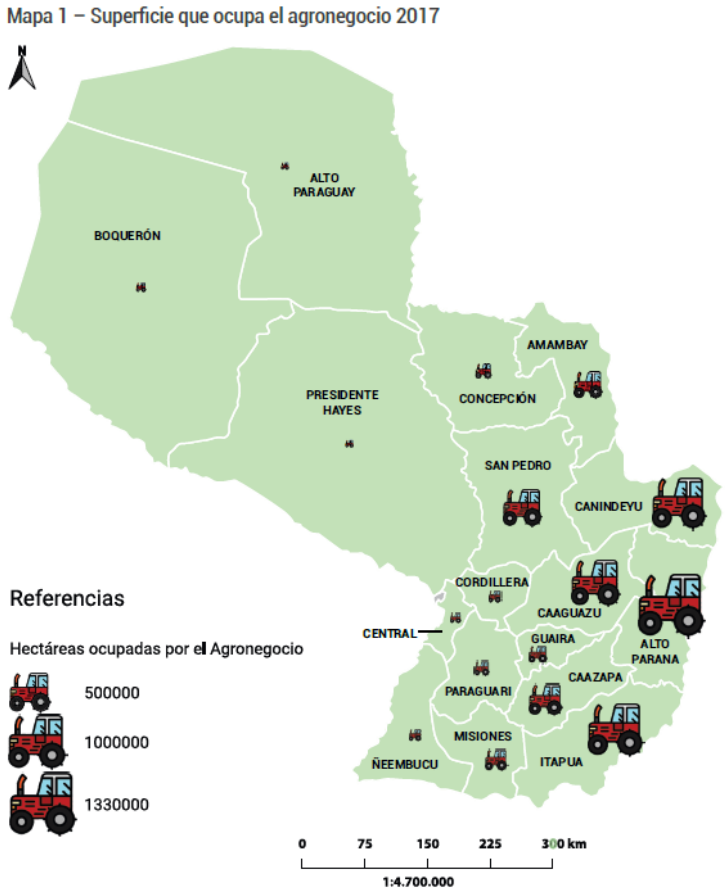
As can be seen, in the departments of Alto Paraná livestock activity decreased in the period analyzed in favor of agriculture, but it continues to be one of the main economic activities of the department with 203.418 heads of livestock. Regarding the department of Caazapá, livestock activity increased from 294.950 in 2002 to 327.899 in 2017, also remaining one of the main economic activities in the department.

Scenario 2: Agriculture

In the absence of the proposed project, this activity is credible, since agribusiness became the main economic activity in Paraguay, mainly in the western region of the country where the departments of Caazapá and Alto Paraná are located, where the proposed project will be carried out [59].

[58] https://www.baseis.org.py/wp-content/uploads/2019/03/2018Dic_Mapeando-el-agronegocio.pdf
[59] https://www.baseis.org.py/wp-content/uploads/2019/03/2018Dic_Mapeando-el-agronegocio.pdf

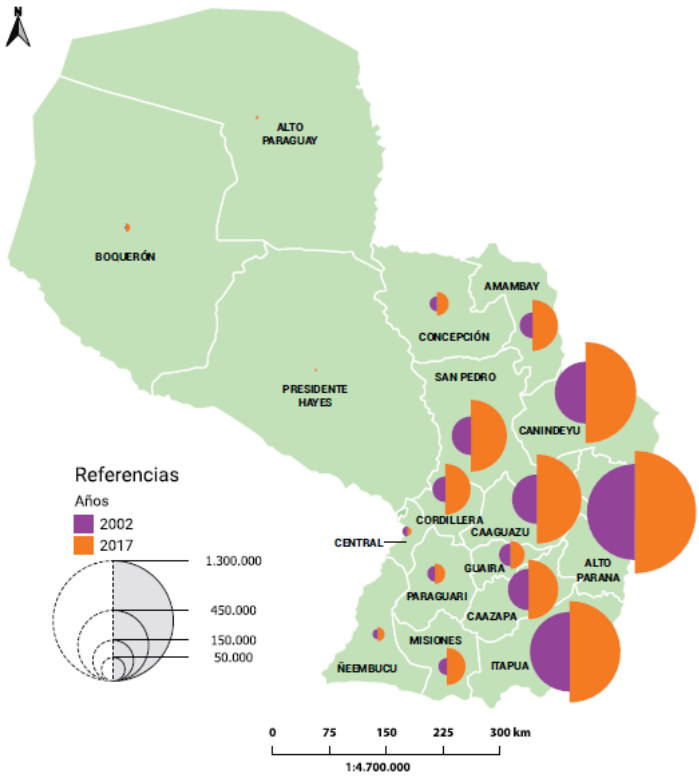
Figure 45. Agribusiness in Paraguay in 2017.



Source: *Mapeando el Agronegocio en Paraguay publication*, Rosa de Luxemburgo Foundation(2018).

In the department of Alto Paraná, agribusiness involves nearly 1.330.000 hectares, approximately 50% of the department's territory, where the largest area is dedicated to this type of activity. The department of Caazapá has about 500.000 hectares destined for agribusiness.

Figure 46. Comparison of the area occupied by agribusiness between 2002 – 2017.

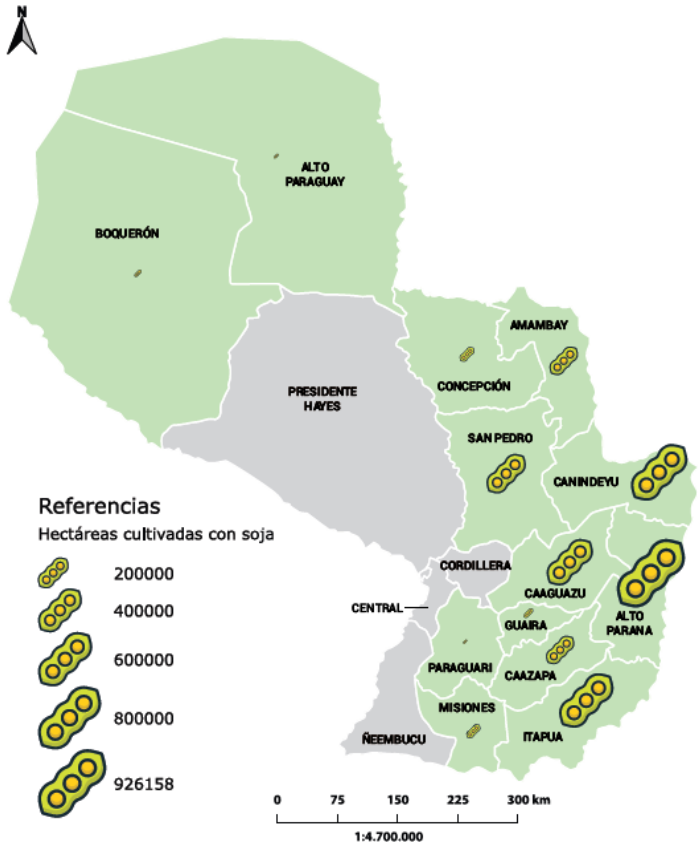


Source: *Mapeando el Agronegocio en Paraguay publication*, Rosa de Luxemburgo Foundation (2018).

In the department of Alto Paraná the agricultural activity had a significant increase in the period analyzed. It went from having 808.008 hectares in 2002 to 1.333.213 in 2017, representing an increase of 65%. Regarding the department of Caazapa, agricultural activity increased from 150.969 in 2002 to 304.769 in 2017, representing an increase of 102%.

In the possible crops that could be grown if the project were not carried out, the main product exported by Paraguay is soybeans. This type of crop is also the one that had the greatest increase in the period analyzed and the one that has the greatest presence in the departments under analysis.

Figure 47. Soy cultivated surface in 2017.

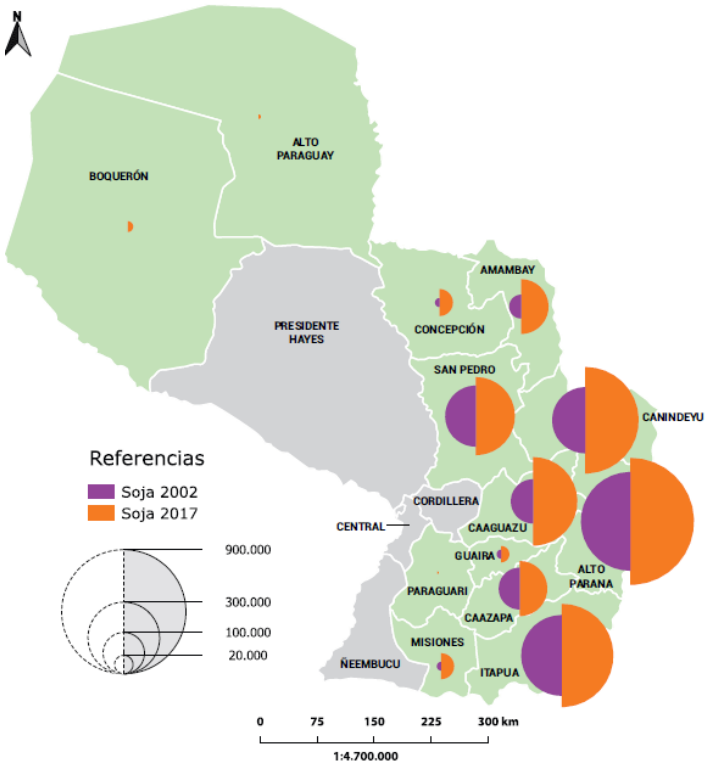


Source: *Mapeando el Agronegocio en Paraguay publication*, Rosa de Luxemburgo Foundation (2018).

In 2002, soybean cultivation was only present in the Departments that make up the Eastern Region[60]. In 2017, cultivated hectares are observed in 13 of the 17 Departments of the country, with 3.380.000 cultivated hectares that represent 8% of the country's surface. The department of Alto de Paraná has 926.158 hectares of soybeans cultivated, being the main department of the country. On the other hand, the department of Caazapá has 168.045 hectares, being the seventh department in the country with the largest number of hectares of soybeans cultivated.

[60] https://www.baseis.org.py/wp-content/uploads/2019/03/2018Dic_Mapeando-el-agronegocio.pdf

Figure 48. Comparison of hectares of soybeans cultivated 2002 – 2017.



Source: *Mapeando el Agronegocio en Paraguay publication*, Rosa de Luxemburgo Foundation (2018).

From the previous figure it can be deduced that the growth in the number of hectares planted with soybeans in both departments analyzed increased considerably in the study period. In Caazapá in 2002 the number of hectares planted with soybeans was 949.69, increasing by 77% in the period analyzed to reach 168.045 hectares in 2017. Regarding the department of Alto Paraná, the planted area was 574.362 in 2002, increasing by 61% in the analysis period to have a planted area of 926.158 hectares in 2017.

Scenario 3: Forest Crops for Timber Harvesting

Following the BCR0001 version 4.0 methodology and the BCR tool GUIDELINES. BASELINE AND ADDITIONALITY v1.3, it must be demonstrated that the proposed project will increase the establishment rate of forest crops, a situation that would not occur in the absence of the project, demonstrating that this is a result of the direct intervention of the project proponent.

The plots selected for the current project come from areas of grasslands used for livestock farming and degraded by this activity.

The sites selected both for the establishment of new plantations and for the already planted stands that are part of the project activity are of low forest productivity and had from the beginning the objective of certifying Verified Carbon Credits (VCC). Low forest productivity is basically due to lower chemical and physical fertility, which leads to lower growth rates compared to other sites where plantations are established for solid wood production.

This lower growth rate, with the consequent lower profitability of the forestry business, makes a wood production project unviable in the scope of the project.

For at least 23 years DMSA has owned the lands where the current forestation project will be carried out. DMSA is a forestry industrial company based in the area for 27 years. The only reason why forestry activity was never carried out on these plots is due to their low quality. It was only thanks to the expectations of the flow of funds from the sale of the Verified Carbon Credits (VCC) that DMSA decided to undertake this afforestation project, favoring the change in the use of the land it owns.

At the same time, it is important to keep in mind that a total of 61.516 plants of 11 native species will be planted in the plots, after thinning the eucalypt in the 6th year of their life, with the purpose of providing ecosystem benefits to biodiversity. and carbon capture. These trees will not suffer any type of thinning and clear felling nor will they provide any economic benefit beyond the carbon credits they can generate.

Table 13. Acquisition Date of the 16 Plots selected for the Current Project.

Zone	Document Date	Property	Registry	District
Tapytá	1996/07/23	7271	7533	San Juan Nep.
H-2	1999/02/04	13138	18046	Hernandarias
H-3	1998/10/21	1338	2243	Hernandarias
H-29	1998/11/9	13864	3331	Hernandarias

Zone	Document Date	Property	Registry	District
H - 45	2000/05/26	749	1382	Hernandarias
H - 45	2000/05/26	749	1380	Hernandarias
H - 45	2000/05/26	9355	15261	Hernandarias
H - 45	2000/05/26	1951	2786	Hernandarias
H - 45	2000/05/26	1950	2785	Hernandarias
H - 45	2000/05/26	2723	4437	Hernandarias
H - 45	2000/05/26	29703	30632	Hernandarias
H - 45	2000/05/26	29704	30633	Hernandarias
H - 45	2000/05/26	29702	30631	Hernandarias
H - 45,1	2000/05/26	2614	4338	Hernandarias
H - 45,1	2000/05/26	2626	4357	Hernandarias
H-49	2000/03/21	K13/3624	2996	Minga Guazú

Source: DMSA, 2023.

Result Sub-step 1a:

The list of probable land use alternatives that would occur in the project area in the absence of the GHG project activity are:

- Scenario 1: continuation with the activity prior to the proposed project (extensive cattle ranching)
- Scenario 2: agriculture
- Scenario 3: forest crops for timber harvesting

Sub-step 1b: Consistency of land use alternatives with applicable laws and regulations

The three scenarios identified in sub-step 1a comply with all national and regional legislation of Paraguay. The entire legal framework that regulates these activities is developed in detail in section 4 "Compliance with current legislation" of this report.

The three possible activities identified in sub-step 1a comply with all the National and Regional legislation of Paraguay, therefore it is not possible to eliminate any of the 3 identified alternatives.

Result Sub-step 1b:

- Scenario 1: Continuation of the Activity Prior to the Proposed Project: Extensive Cattle Ranching
- Scenario 2: Agriculture
- Scenario 3: Forest Crops for Timber Harvesting

3.4 Additionality

For the demonstration of additionality, the following steps indicated in the BCR0001 methodology version 4.0 and the BCR GUIDELINES. BASELINE AND ADDITIONALITY v1.3 will be applied, which is in accordance with BCR Standard v3.4, section 11.6.

Step 2: Investment Analysis

This step serves to determine which of the likely land use alternatives identified in step 1 is the most attractive in economic or financial terms.

Sub-step 2a: Determining the most appropriate method of analysis

An investment comparison analysis shall be performed to demonstrate that the project activity, without the revenues from the anticipated sale of Verified Carbon Credits (VCCs), is economically and/or financially less attractive than the other two alternatives identified in step 1.

Sub-step 2b option II: Investment comparison analysis

The most appropriate financial indicator to carry out a comparative analysis between the alternatives that were identified in step 1 is the Net Present Value Analysis (NPV) and the Internal Rate of Return. These indicators incorporate the time value of money in the determination of the net cash flows of the business or project, in order to be able to make correct comparisons between cash flows in different periods over time.

Sub-step 2c: Calculation and comparison of financial indicators

Next, a financial analysis will be performed on the three scenarios identified in step 1.

Scenario 1: Extensive Cattle Ranching

The following is an NPV and IRR analysis for this activity in the region where the proposed project is located. The calculations were made under the assumption that cattle ranching is extensive on natural fields. This assumption was selected because this is the way it is most developed in this region[61].

The profitability of livestock farming is around US$231 per hectare per year. In turn, the Internal Rate of Return is 13,3%. These values explain why this activity is constantly growing in the region. On an area of 172,76 hectares, the NPV is around 40.843 USD (see Table 13).

Scenario 2: Agriculture

For the economic and financial analysis of agriculture, a study of profitability of agricultural crops prepared by the National University of Asuncion-Faculty of Agricultural Sciences was used as a basis, where data from the 2016/2017 agricultural cycle were used [62].

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61 https://www.conacyt.gov.py/sites/default/files/upload_editores/u454/analisis_economico_y_financiero.pdf

62 https://www.conacyt.gov.py/sites/default/files/upload_editores/u454/analisis_economico_y_financiero.pdf

For the case study, the information of a typical crop of this document (Field Zone 9) was used, where the agricultural financial analysis was carried out on an area of 400 ha planted with soybeans. The total income was USD 324.000, which represents an income per hectare of USD 810 and a production of 2,55 t/ha. The average price for the year was USD 318/ha, which coincides with the average sales price for this same production cycle in DMSA.

Using the information mentioned above as a basis, for the area of 172,76 hectares we have a NPV with a rate of 4,16%, which is 65.540 USD and the IRR is 10,21%. This explains why agriculture is the main economic activity in the region.

Scenario 3: Forest Crops for Timber Harvesting

The financial results of forest plantations in the region with solid timber objectives in low productivity sites are analyzed. The following table shows the profitability for each scenario.

Table 14. NPV and IRR Comparative.

	Agriculture 1 Year Cycle	Cattle Ranching 3 Cycles of 9 Years	Forestry *Eucalyptus spp.* MS 9-year cycle
Indicators	Crop type (soybean) according to CONACYT[63]	Natural pasture	Use in low-productivity sites
NPV (USD, discount rate 4,16%)	65.540	40.843	22.747
IRR	10,2%	13,3%	4,8%

Source: DMSA, 2023.

As can be seen, logging in low productivity plots, as is the situation of the proposed project, is by far the least viable of all the alternatives to the point where it is only feasible to carry out thanks to the incentives of carbon credits. The Net Present Value is 22.747 USD and an Internal Rate of Return of 4,8%. Additionally, the project proposes the incorporation of native species that will not be harvested from the timber point of view, not undergoing any type of thinning or harvesting, in order to form a native forest and contribute to the improvement of ecosystem services in this way.

Step 3: Barrier analysis

Sub-step 3a: Identification of barriers to project implementation

The following are the main barriers facing forestry in general and this project in particular.

Investment Barrier

[63] https://www.conacyt.gov.py/sites/default/files/upload_editores/u454/analisis_economico_y_financiero.pdf

It is important to understand the socioeconomic context of Paraguay in order to carry out an analysis of the barriers to investment. While the national government has several lines of incentives and credits, short and medium term, for the habilitation of land for agriculture and for the habilitation and/or improvement of livestock farms, there are no credits to help the development of forestry activities[64]. This is due to the fact that credit terms do not contemplate the long period needed for a tree to reach sufficient height and diameter to be able to market its timber.

There are large local resources that cannot be applied to forestry projects because there is no forestry bank or fund capable of evaluating and supporting the execution of forestry projects that require terms of 12 to 20 years for their development, as well as adequate interest rates. There are only a few lines of credit from private banks with very high interest rates that do not make most projects profitable. There are also no financing alternatives for small producers in peasant settlements, because the importance of small forestry plantations that can be implemented under the agroforestry regime was never considered. In short, in Paraguay there are no internal financial entities, either public or private, that offer advantageous credits that are adapted to the financial flow of forestry projects in low priority soils. Finally, it is important to highlight the enormous difficulty of external financing for forestry projects in Paraguay.

On the other hand, agricultural and livestock activities do have a high credit and technical assistance facility to develop their activities. In addition to this, other types of aid have also boosted these activities, such as the opening of roads and power lines, which gave even more impetus to agricultural and livestock activities in past decades. These measures had an impact on the rapid advance of the agricultural and livestock frontier, which, according to estimates by the Dirección de Estadísticas y Censos Agropecuarios (1998) for the period 1972 to 1987, increased

64 https://www.conacyt.gov.py/sites/default/files/upload_editores/u454/Crecimiento_desarrollo_economoomico_Paraguay.pdf

from 953.000 to 3.995.600 hectares for agricultural crops and from 14.840.900 to 19.959.900 hectares for livestock grazing in those same 15 years.[65].

This transformation of land use often occurred at the expense of the forest area, which decreased from 23.929.000 hectares to 15.600.000 hectares during this time. [66]. On the other hand, both livestock and agricultural activities are not affected by the barrier of long-term investment recovery, which hinders forestry developments. This is not only due to the great governmental support that encourages and promotes livestock and agricultural activities, but also because they require less time to achieve a return on their investments, they are more attractive even to be financed by private banks.[67].

In conclusion, there is a clear investment barrier that works against forestry projects, even more so in low-quality lands such as the proposed project. The lack of public aid, the practically non-existence of external financing and the scarce and high rates of the only private credit lines are a strong obstacle to this type of project. It is also important to consider that the native species to be planted will not undergo any type of thinning or clear-cutting and therefore will not generate any type of commercial economic benefit from the use of the timber or timber by-products of these species. The only income in the case of native species will come from carbon credits. For this reason, this type of project would only be viable thanks to this type of incentive.

Institutional Barriers

The government of Paraguay does not grant the industrial forestry sector the same amount of programs for the promotion of its development as it does for livestock and agricultural activity. There is only a law to promote forestation and reforestation, No. 536/95[68] (see details of the Law in section 4.2 of this document). This law stipulates that the State will promote afforestation and reforestation on

[65] https://issuu.com/pyfinances/docs/estudio_2ode_2otendencias_2oy_2oper
[66] https://www.iadb.org/es/story/censo-agropecuario-del-paraguay-que-quien-donde-y-como
[67] https://cifca.agr.una.py/novedades/paraguay-ganaderia-y-su-crecimiento/
[68] https://www.ecolex.org/es/details/legislation/ley-no-53695-ley-de-fomento-a-la-forestacion-y-reforestacion-lex-faoc017512/

priority forestry lands, with high aptitude for the development of timber species, based on a Forestry Management Plan and with the established incentives. The current project does not benefit from these incentives because the lands where it is being carried out are of low quality.

As a result, the great comparative advantages of Paraguay's warm and humid climate and the high quality of its land are being used more for agricultural and livestock activities than for forestry. On the contrary, other countries with less climatic and soil advantages are taking advantage of the great benefits of Forestry and Forestry-Industrial Production for their economic and social development, even the number of AFOLU/ARR carbon sequestration projects is remarkable (examples: Chile: 9, Uruguay: 15, Bolivia: 7)[69]. These countries are characterized by having a State Policy for the Forestry Sector that duly takes advantage of the multiplier effect for production and the economy in general offered by forest plantations and their production chains, with the activation of the rural sector and then with the use of timber for industrialization, with the consequent generation of jobs and wealth.

Public policies have emphasized the exploitation of agricultural products for export as a way of contributing to short-term economic growth. This behavior is logical if two factors are taken into account: the fact that land in Paraguay, since the post-war period of 1865-1870, has remained almost entirely in the hands of the private sector, and that the profitability and short-term returns of agricultural activities are more attractive to landowners than forestry or native forest management, which are long and medium term.

Institutions were created, whose regulations regarding the use of forests were not in coordination with the regulations of Law 422/73[70]. Agricultural or cattle ranching activities were encouraged at the expense of land with forest cover. This

[69] Consultado en octubre de 2023 en los registros de los principales sellos (Verra, BioCarbon registry, GoldStandard)

[70] https://py.vlex.com/vid/ley-n-422-73-641255869#:~:text=Decl%C3%A1rase%20de%20inter%C3%A9s%20p%C3%BAblico%20el,el%20r%C3%A9gimen%20de%20esta%20Ley.

is the case of the Livestock Fund, which provides long-term credit incentives for the habilitation of forest-covered land for pastures, or the Agricultural Credit for Enabling, which grants credit to small rural producers and provides technical assistance for the habilitation of land for agriculture and the production of agricultural products, sometimes at the expense of forests.[71].

Until 2001, the Rural Welfare Institute (Law 852/1963[72]) had the power to expropriate forested lands, as these were considered, within its statute, as unproductive. This concept was reverted with the new agrarian statute Law 1863/2002[73] , and forests were included as productive. The National Development Bank, created to finance agricultural, livestock, forestry and industrial projects, also mainly finances the installation of agricultural activities at the expense of the forest.

In conclusion, forestry activity, even more so in areas of low productivity, faces great institutional barriers. There is a great scarcity of institutional incentives to help promote this activity.

On the other hand, both livestock and agricultural activities are strongly supported by all levels of government in Paraguay. The national government is making great institutional efforts to make these two activities the main economic engine of the country.

Technological Barriers

The three scenarios analyzed do not have any technological barriers. On the one hand, the extensive cattle ranching currently being carried out not only does not have any technological barriers, but, on the contrary, Paraguay has developed

[71] https://www.fao.org/forestry/11774-0945edb4df08508119 9c796f4a79dabf0.pdf
[72] https://www.bacn.gov.py/leyes-paraguayas/2375/ley-n-852-crea-el-instituto-de-bienestar-rural#:~:text=%2D%20Cr%C3%A9ase%20el%20Instituto%20de%20Bienestar,de%20los%20bienes%20del%20Estado.
[73] http://www.bacn.gov.py/leyes-paraguayas/3124/establece-el-estatuto-agrario

important technological advances that help to promote and encourage this type of activity.

For example, cattle are the only livestock at the national level with group traceability through the Regional Office Management Information System (SIGOR of the National Animal Health and Quality Service[74]), which works during vaccination campaigns. This system records data on owners, establishment of origin and destination, number, category and brand of bovine animals, allowing rapid access to information in the event of health events.

In addition, the country has made progress in establishing with the private sector an individual registry through Paraguay's Traceability System (Sistema de Trazabilidad del Paraguay (SITRAP in Spanish[75]). The purpose of this system is to trace, from farm to slaughter, both animals and their meat by-products in order to meet the requirements of certain export markets. By 2021, 313 cattle farms were registered in this system.

For the dairy sector, a private control system aimed at improving productivity was initiated, promoted by the Association of Milk Producers and Breeders of Dairy Breeds (APROLE), also linked to the Rural Association of Paraguay (ARP) as the SITRAP for beef cattle.

On the other hand, agriculture is one of the main economic activities in the region and in the country in general, so there are no technological restrictions for its development. Finally, an afforestation project without the incentives of carbon credits is also technologically feasible due to DMSA's more than 20 years of experience in forestry. DMSA has all the necessary machinery to develop this type of project in this area despite the difficulty of soil degradation.

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[74] https://www.senacsa.gov.py/index.php/buscador?search_paths%5B%5D=&query=ganaderia

[75] https://www.senacsa.gov.py/index.php/Temas-pecuarios/sitrap-sistema-de-trazabilidad-del-paraguay#:~:text=SITRAP%20(Sistema%20de%20Trazabilidad%20del,establecimientos%20que%20se%20encuentran%20inscriptos

Ecological Barriers

The Hernandarias District is characterized by an average annual rainfall of 1.867 mm, with a uniform distribution throughout the year. Maximum precipitation occurs between November (205 mm) and February (160 mm), and minimum precipitation occurs in July (122 mm) and August (97 mm).[76].

The scenario of continuity of the current activity, extensive cattle ranching, does not present any ecological barrier that would make it unfeasible. Although the soil where this activity is carried out is of low quality, the subtropical climate of the province helps to provide abundant pasture for livestock. Along the same lines, with adequate fertilizer inputs to compensate for the low soil quality, and given that agricultural plantations do not require very deep soils, an agricultural project would not suffer from major ecological barriers either. In fact, this activity is one of the main activities in the region, and would not have any impediments to be carried out in the plots selected for the project.

On the other hand, a forestry project would face an ecological barrier due to the low quality and depth of the soil in Hernandarias. In fact, soil degradation in Tapytá has prevented DMSA from developing in the past any type of forestry activity on the plots destined for the carbon credit project due to the low profitability it would generate.

As additional information, the Hernandarias area is one of the areas of greatest economic activity in the country, with special relevance of the livestock and agriculture sectors, which led to large-scale deforestation in the past decades. The forest formations that can be found are of secondary character, so one of the important components of the forestry project has been the identification, preservation and protection to promote Natural Recovery, which has been under development for 20 years since the company acquired this heritage.

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[76] https://www.stp.gov.py/v1/wp-content/uploads/2020/10/Alto-Paran%C3%A1-Evidencias-cient%C3%ADficas-e-impactos-econ%C3%B3micos-del-cambio-clim%C3%A1tico.pdf

In the District of San Juan Nepomuceno, the average annual rainfall is 1.856 mm, with maximum peaks in October (208 mm), and minimum peaks in July (121 mm) and August (98 mm)[77]. From a biogeographical point of view, the ranch located in San Juan Nepomuceno (Tapytá) is part of the Central Forest ecoregion, which represents 24% of the surface area of the Eastern Region of Paraguay, characterized by forest formations interspersed with savanna-like formations (natural fields).

In conclusion, while livestock and agricultural activities do not face any type of ecological barrier to their development, a forestry project in an area of low soil quality such as that of the lots where the proposed project activity is to be located faces a strong ecological barrier that compromises its timber productivity and can only be overcome thanks to the economic incentives of carbon credits.

Barriers Due to Local Traditions

Both livestock and agriculture do not suffer from any barriers related to local tradition. Livestock farming has been one of the most representative and historical activities in Paraguay and in the regions where the proposed project will be developed for at least 100 years. In recent decades, soybean agriculture has become one of the main economic engines of Paraguay and of the regions where the project will be developed (see Figure 15 y Figure 16). This implies that both activities have a great variety and number of qualified professionals who know the trade and carry it out with great efficiency.

On the other hand, although industrial forestry activities for timber commercialization can be considered part of the local tradition in the regions where the project will be developed (on a much smaller scale than cattle ranching and agriculture), it is important to highlight that the proposed project will include the planting of native species that will not undergo any type of thinning or clear-cutting, with the objective that once the project is completed, a native forest will

[77] http://scielo.iics.una.py/scielo.php?script=sci_arttext&pid=S2222-145X2018000100042

be left in place for perpetuity. To our knowledge, there is no similar project in the entire Hernandarias and Tapytá region, so it is not part of the local tradition.

Barriers Due to Social Conditions

None of the three scenarios face barriers due to social conditions in the area. There are no social conflicts between stakeholders and local communities in the regions where the project will be developed, with whom DMSA maintains excellent ongoing collaboration. In turn, skilled labor and a high level of community organization can be found in these regions for any of the three identified activities because cattle ranching and agriculture are the main economic activities in the region, and forestry, although far from the other two, also has some roots in the regions.[78][79] .

Barriers Due Land Tenure, Ownership, Inheritance, and Property Rights

DMSA is the sole holder and owner of the land where the project activities are to be carried out and where cattle ranching was taking place. The Tapytá lands have been owned by DMSA since 1996, and the Hernandarias lands since 1998-2000 (depending on the specific parcel, as shown on Table 13). Full details on land tenure can be found in section 5.4 "Land tenure" of this document.

Barriers Due to Markets, Transport and Storage

Livestock and agriculture do not have barriers related to markets, or transport and storage logistics. Both activities are the main activities in Paraguay and in the region, so the entire transport and storage system is highly organized and has a very large market in which to place its products.[80].

On the other hand, forestry does not face barriers with respect to transportation and storage, since DMSA has been carrying out this activity for more than 20 years.

78https://repositorio.cepal.org/server/api/core/bitstreams/7d9fb18f-1be1-4e0e-9125-0e3de35b5bc7/content
79 https://pomeramaderas.com/sustentabilidad/
80 https://cifca.agr.una.py/novedades/paraguay-ganaderia-y-su-crecimiento/

However, it can be stated that there is a barrier related to markets: given the specifications of domestic and foreign demand, it is of vital importance that sustainable forest management is guaranteed in order to access these markets, which implies a considerable effort to improve forest management processes. DMSA has been FSC certified since 2006, guaranteeing this aspect.

Fire-Related Barriers

Both the Livestock and Agriculture scenarios do not have a major barrier related to fires. It is rare that they occur in this type of activities[81].

To analyze this hypothesis in the project environment, an analysis of the area burned between 2015 and 2020 (both included) has been carried out using the ESA Fire Climate Change Initiative (Fire_cci) mapping product: MODIS Fire_cci Burned Area Pixel product, version 5.1.[82], filtering the data by an area of about 100 km2 around the project lots.

This analysis shows that about 53% of the burned area corresponds to forest type land cover, and only about 8% and 4% to crop and pasture type land cover, respectively. Taking into account the representativeness in terms of surface area of agricultural and livestock activity over the national territory (about 13,5%[83] and 39,8%[84], respectively), this shows a low fire damage in general on areas with these coverages.

[81] https://revistascientificas.una.py/index.php/rdgic/article/view/976

[82] Padilla Parellada, M. (2018): ESA Fire Climate Change Initiative (Fire_cci): MODIS Fire_cci Burned Area Pixel product, version 5.1. Centre for Environmental Data Analysis, 01 November 2018. https://doi.org/10.5285/58f00d8814064b79a0c49662ad3af537
Related publication: Lizundia-Loiola, J., Otón, G., Ramo, R., Chuvieco, E. (2020): A spatio-temporal active-fire clustering approach for global burned area mapping at 250m from MODIS data. Remote Sensing of Environment, 236, 111493. https://doi.org/10.1016/j.rse.2019.111493

[83] https://www.ine.gov.py/Publicaciones/Biblioteca/documento/4ec5_Compendio%20Estadistico%20del%20Py%202020%20(19%20mayo%202022).pdf

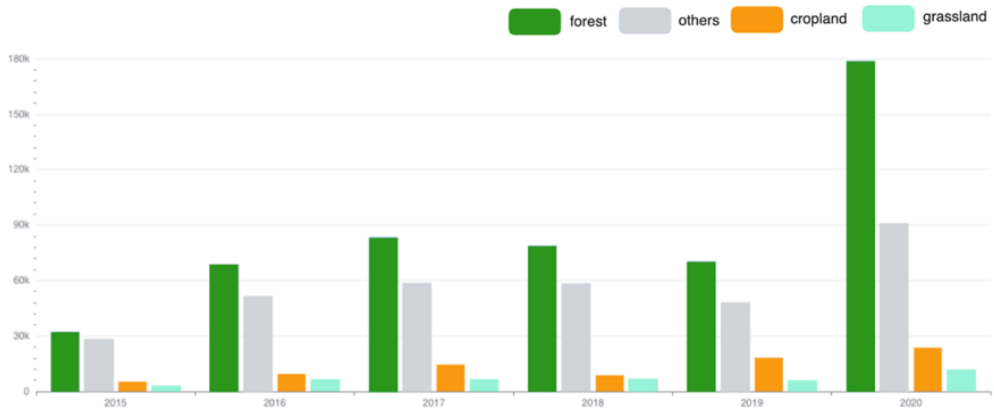
[84] https://carnesostenible.org.py/paraguay/

Table 15. Relationship of analyzed land cover groups and percentage of area with ESA Fire Climate Change Initiative product cover classes.

Group	Land Cover Classes (Fire_cci)	Total Burned Area (%)
Croplands	10, 20, 30	8,26
Grasslands	130	4,02
Forest	50, 60, 70, 80, 90, 100, 170	53,11
Others	40, 110, 120, 140, 150, 180	34,61

Source: Own elaboration based on Fire_cci: MODIS Fire_cci Burned Area Pixel product, v 5.1[85]

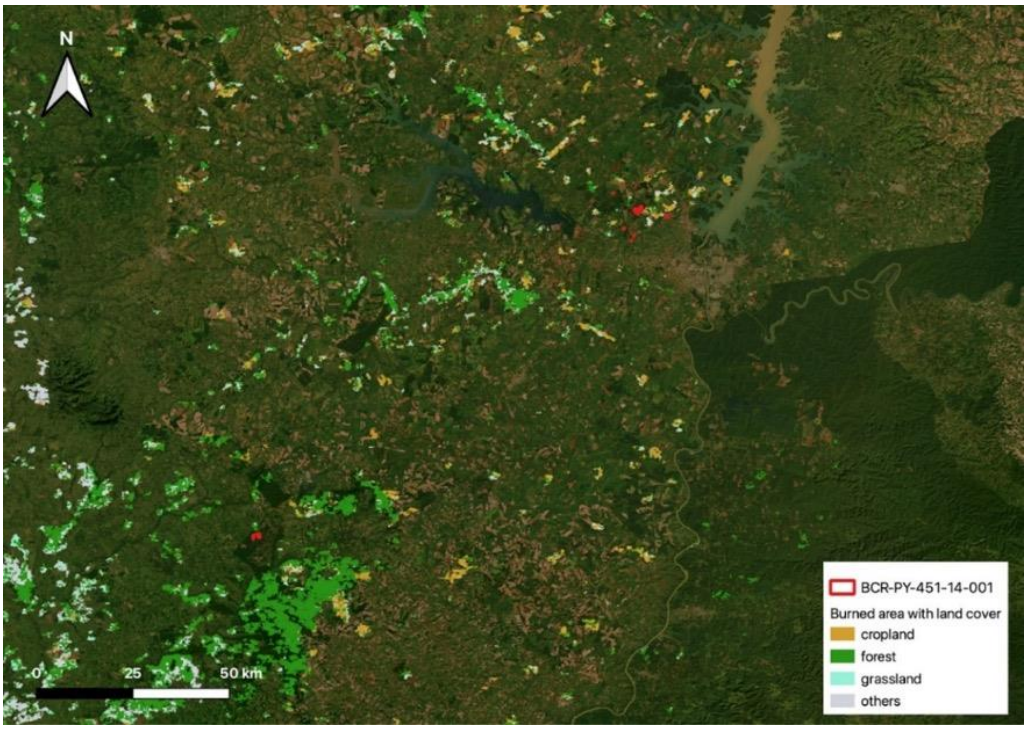
Figure 49. Burnt area around the project between 2015 and 2020 (hectares as a function of land cover).



[85] Padilla Parellada, M. (2018): ESA Fire Climate Change Initiative (Fire_cci): MODIS Fire_cci Burned Area Pixel product, version 5.1. Centre for Environmental Data Analysis, 01 November 2018. https://doi.org/10.5285/58f00d8814064b79a0c49662ad3af537.
Related publication: Lizundia-Loiola, J., Otón, G., Ramo, R., Chuvieco, E. (2020): A spatio-temporal active-fire clustering approach for global burned area mapping at 250m from MODIS data. Remote Sensing of Environment, 236, 111493. https://doi.org/10.1016/j.rse.2019.111493

Source: Own elaboration based on ESA Fire Climate Change Initiative (Fire_cci): MODIS Fire_cci Burned Area Pixel product, version 5.1.

Figure 50. Burnt area around the project between 2015 and 2020 based on land cover.



Source: Own elaboration based on ESA Fire Climate Change Initiative (Fire_cci): MODIS Fire_cci Burned Area Pixel product, version 5.1[86]. ArcGIS World Imagery base mapping. Datum WGS84.

On the other hand, it is possible that fires may occur in the forest plantations. The threat of fire represents an important barrier for this type of project because the planted trees could be severely damaged.[87]. However, DMSA has the conviction and solvency to maintain the project for the entire accreditation period. This

86 Padilla Parellada, M. (2018): ESA Fire Climate Change Initiative (Fire_cci): MODIS Fire_cci Burned Area Pixel product, version 5.1. Centre for Environmental Data Analysis, 01 November 2018. https://doi.org/10.5285/58f00d8814064b79a0c49662ad3af537.
Related publication: Lizundia-Loiola, J., Otón, G., Ramo, R., Chuvieco, E. (2020): A spatio-temporal active-fire clustering approach for global burned area mapping at 250m from MODIS data. Remote Sensing of Environment, 236, 111493. https://doi.org/10.1016/j.rse.2019.111493

87 https://news.un.org/es/story/2022/02/1504472

implies that, should a fire occur on the project area, the entire affected area will be replanted.

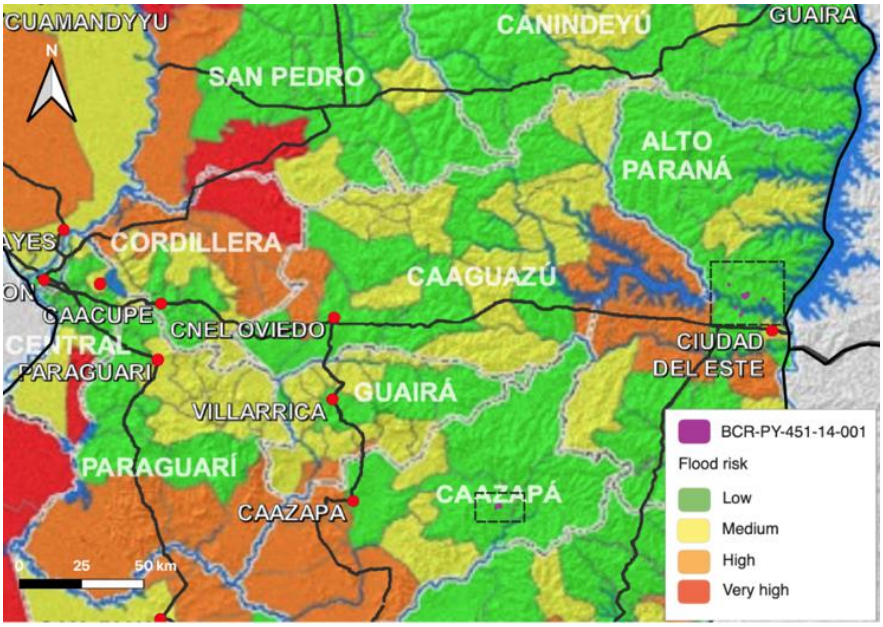
The identification of the fire risk for the project is duly detailed in section 7 "Risk Management" of this report, and section 7.1 details the procedure for fire prevention and firefighting in the event of fire.

Flood-Related Barriers

According to the Atlas of Disaster Risks prepared by the Secretariat of National Emergencies[88], The combined risk of flooding due to excess rainfall and overflowing of the Paraguay and Paraná rivers by districts is low within the project area.

88 https://www.sen.gov.py/application/files/9015/9862/5498/Atlas_de_Riesgos_de_Desastres_de_la_Republica_del_Paraguay_2018.pdf

Figure 51. Approximate location of the BCR-PY-451-14-001 project lots with respect to the combined flood risk map (excess rainfall and overflow of the Paraguay and Paraná rivers) by districts[89].



Source: Disaster Risk Atlas of Paraguay, 2018. Datum WGS84.

Figure 38 and Figure 39 indicate that the infiltration capacity of the soils of both project sites, given their permeability, is mainly moderate to highly drained; with respect to surface drainage, which is determined by the topography and guarantees slopes of 3% to 15%.[90].

In addition, DMSA protects and keeps clean the natural drainages in the area, which further reduces the possibility of the risk of flooding or waterlogging.

On the other hand, in the plots around Hernandarias, which a priori could be more susceptible to this type of event given their proximity to the Aña Cuá stream and

[89] Figure 126 of the Disaster Risk Atlas of Paraguay. https://www.sen.gov.py/application/files/9015/9862/5498/Atlas_de_Riesgos_de_Desastres_de_la_Republica_del_Paraguay_2018.pdf.

[90] https://imagoteca.com.py/republica-del-paraguay-mapa-de-reconocimiento-de-suelos-de-la-region-oriental/

the Acaray river into which the former flows (see hydrology map in section 2.5.), the risk of flooding is equally low. In addition, downstream this river flows into the reservoir of an important hydroelectric dam whose water level is continuously monitored and regulated.

The rest of the parcels in the project area are not located in the immediate vicinity of rivers, lakes or seas whose fluctuations could cause flooding. There are also no historical records of flooding in the project area[91].

Therefore, the risk of flooding in the project area is a non-existent barrier, not impeding any of the land use alternatives proposed.

Consistent with the above, each of the barriers for the three scenarios analyzed is classified in the following categories according to their impact: Very low, Low, Medium, High and Very high.

Table 16. Sub-step 3b: Degree to which the Identified Barriers Affect the Project Alternatives.

Barrier	Scenario 1: Continuation of Pre-Project Land Use - Cattle Ranching	Scenario 2: Agriculture	Scenario 3: Afforestation without Carbon Credit Incentives
Investment Barriers	Very low	Low	High
Institutional Barriers	Low	Low	High
Technological Barriers	Very low	Very low	Very low
Ecological Barriers	Very low	Low	High
Local Traditions Barriers	Very low	Very low	Medium

[91] https://www.sen.gov.py/application/files/9015/9862/5498/Atlas_de_Riesgos_de_Desastres_de_la_Republica_del_Paraguay_2018.pdf

Barrier	Scenario 1: Continuation of Pre-Project Land Use - Cattle Ranching	Scenario 2: Agriculture	Scenario 3: Afforestation without Carbon Credit Incentives
Social Conditions Barriers	Very low	Very low	Very low
Land Tenure Barriers	Very low	Very low	Very low
Market, Transport, and Storage Barriers	Low	Low	Medium
Fire-Related Barriers	Low	Low	Very high
Flood-Related Barriers	Low	Low	Low

Source: DMSA, 2023.

The BCR GUIDELINES. BASELINE AND ADDITIONALITY v1.3 in its steps 2 and 3 establish that the identified barriers constitute sufficient evidence to demonstrate additionality of the project if they prevent the project proponents from carrying out the project without the incentives of carbon credits. Therefore, for the demonstration of additionality it is necessary to show that the identified barriers do not affect at least one of the alternatives to the proposed project.

In the case analyzed, it can be seen that both the scenario of continuing with the current extensive livestock farming activity and the scenario of carrying out agriculture on these plots do not suffer the effects of any of the identified barriers. On the other hand, the proposed forestry project in a low quality zone is only viable thanks to the incentive of carbon credits and therefore the project is additional.

Step 4. Impact of Project Registration

In a fragile and volatile economy such as Paraguay's, where foreign investment is very low[92], institutional supporto for the forestry industry is almost non-existent. Additionaly, having Access to credits for the development of these types of projects is extremely complex. The carbon credits that would be granted by the project

[92] https://datos.bancomundial.org/indicator/BN.KLT.DINV.CD?locations=PY

when registered in BioCarbon Registry serve as an incentive to break down the barriers identified in the previous steps. This is due not only to the extra income that would be generated by the sale of carbon credits, but also to the fact that this income, being in dollars, provides stability in the projection of future income that forestry alone cannot provide because most of Desarrollos Madereros S.A.'s income is in the local currency, the Guaraní, which does not have the security and stability of the dollar.

At the same time, the carbon credits serve as an incentive for forestry in areas that would not normally be forested. Desarrollos Madereros S.A. owns large tracts of land in different locations in Paraguay. The extra income from the sale of the carbon credits and the stability they provide because they are priced in dollars will be used to develop more projects similar to this one in the near future.

Thus, thanks to the income from the sale of the carbon credits, the investment barriers and the ecological barrier suffered by the plots selected for the proposed project activity have been broken down. Therefore, step 4 is fulfilled, and the proposed project is additional.

It is also important to mention that DMSA's decision to carry out this project transcends the net economic gain it may generate and also responds to the corporate responsibility of DMSA, whose board shares the firm conviction that the economic activities carried out by the company are compatible with contributing to climate change mitigation. For this reason, the current project's objective is to leave a native forest over the entire project area at the end of the project. Therefore, the project will be carried out and maintained throughout the 40 years, regardless of the extra profit that could be made by carrying out livestock or agricultural activities in the project area.

3.5 Uncertainty Management

In the absence of scientifically supported data for itself and the region, the project follows the IPCC GPG methods for LULUCF, GPG 2003, and the modalities and procedures for project A/R activities to estimate net GHG removals by sinks, leakage, actual net GHG removals by sinks, and net anthropogenic removals by

sinks. It is important to note that the government of Paraguay uses these same data for the development of its recurrent national greenhouse gas inventory[93].

Following the BCR Version 3.4 section and 12.1 standard and BCR0001 V4.0 section 15 methodology, a discount factor of 20% has been applied to the current project in the catch estimate, which is justified below:

Equations and parameters used in the estimation of eucalypt catches:

- Average annual trunk volume increase (m^3/ha-year), source: PlaForNEA simulator with input parameters calibrated based on Pomera Maderas' experience and monitoring data.
- Density of dry wood (t/m^3), source: 2006 IPCC Table 4.13 for *Eucalyptus robusta* (America)
- BEF2 (dimensionless=total aboveground biomass/trunk biomass), source: IPCC 2005 Table 3A.1.10. lowest value for broadleaves species in tropical regions.
- R:S (dimensionless=root biomass/total aboveground biomass), source: IPCC 2005 3.A.1.8
- Carbon as fraction of dry organic matter, source: IPCC 2006 Table 4.3

PlaForNea was used to make ex ante projections of plantation growth and volume, i.e. to obtain the IMA, and although the simulator is from another country, its use was fed with parameters calibrated with field data. Likewise, considering that the country does not have its own biomass data, the IPCC parameters of wood density and root to shoot justify the use of the 20% discount factor (*BCR0001 v4.0, table 3: the item "IPCC density values and factor (R:S) for below-ground biomass" has a discount factor of 20%*).

Equations and parameters used in the estimation of catches of native plants:

[93] https://www.mades.gov.py/2020/05/07/inventario-nacional-de-gases-de-efecto-invernadero-ingei-del-paraguay/

- Average annual trunk volume increase (m^3/ha-year), source: Scientific article "Growth in height and diameter and mortality in plantations of native species of the yungas in Valle Morado, Salta".
- Density of dry wood (t/m^3): The native species mix wood density was calculated as the average of the value for the American species of the same genera of the 11 native species used in the project as listed in 2006 IPCC Table 4.13: *Enterolobium (E. cyclocarpum* 0.34, *E. maximum* 0.4, *E. schomburgkii* 0.78), *Eugenia (E. stahlii* 0.73), *Cordia (C. alliodora* 0.48, *C. bicolor* 0.49, *C. gerascanthus* 0.74, *C. goeldiana* 0.48, *C. sagotii* 0.5), *Cedrela (C. odorata* 0.42, *C. sp.* 0.40-0.46), *Inga (I. alba* 0.62, *I. edulis* 0.51, *I. paraensis* 0.82), *Rollinia (R. exsucca* 0.52), *Pterogyne (P. nitens* 0.66), and *Apuleia (A. leiocarpa* 0.7) (t dm/m3 fresh volume). No species of *Handroanthus, Balfourodendron* or *Peltophorum* were listed, so these values were obtained from an open data publishing platform[94] and a third source[95].
- BEF2 (dimensionless=total aboveground biomass/trunk biomass), source: 2005 IPCC Table 3A.1.10. lowest value for broadleaves species in tropical regions.
- R:S (dimensionless=root biomass/total aboveground biomass), source: CDM AR-TOOL14
- Carbon as fraction of dry organic matter, source: 2006 IPCC Table 4.3

Considering all of the above, we are in the case described in row 10 of Table 3 of BCR0001 V4.0 methodology, and therefore the discount factor of 20% should be applied. However, if new sources of knowledge are developed, such as scientific articles on the species used with local data, and their data are applied in the next monitoring, this discount factor value may be reduced.

In the context of the development of this project over the next 40 years the main sources of uncertainty related to carbon stock changes in the living biomass pool include: natural factors such as fire and pest outbreaks; stand variables such as variation in yield tables, allometric equation, biomass expansion factor (BEF2), wood density, carbon fraction; and measurement errors. Considering all this, as

[94] Zanne, Amy E. et al. (2009). Data from: Towards a worldwide wood economics spectrum [Dataset]. Dryad.
[95] Atencia, M. E. (2003). *Densidad de maderas (kg/m3) ordenadas por nombre común*. Buenos Aires, Argentina: INTI/CITEMA. https://www.inti.gob.ar/publicaciones/descargac/366

mentioned above, new uncertainty estimates will be developed for future monitoring.

At all times the data to be used for the measurement of GHG emission reductions in the project scenario will follow the "conservative approach" principle. In turn, for the verification of the corporate GHG inventory, a level of assurance and materiality of 95% will be guaranteed.

To meet the objective of maintaining the 95% level of accuracy and materiality, DMSA adopts the following procedures:

Equipment for Measurements:

State-of-the-art equipment will be used. All of them will be calibrated before each measurement. At the same time, we will not work with equipment older than 5 years.

The equipment to be used are:

- Metallic Diametric Tape: Metric measuring system, measuring accuracy is +/-0,5% indicated by the manufacturer; designed to measure the diameter of the trees, obtaining a DBH as accurate as possible. It allows to take measurements in centimeters longitudinally and circumferentially and/or in diameter in centimeters. It is to be used for the measurement of Diameter Breast Height.
- Vertex 4: is a digital isometric that has an accuracy range at 90 meters of +/- 4cm that will be used to measure the height and distance of trees.
- High-precision GPS: sampling points pre-created using ArcGIS software (v 10.5) are used. It also serves to delimit the project area and the strata. This instrument has an accuracy of +/- 3,65 m.
- Measuring tapes: used to measure distances for the installation of sampling plots, with an accuracy of 1 cm.

It is important to mention that the measurement of the perimeter of the polygon of the project area was performed using this GPS and not by satellite images, so the accuracy analyzed in this sense corresponds to the GPS instrument. As a

conservative criterion, the lot areas in hectares are rounded down to two decimal places.

On the other hand, estimates of the amount of CO_2 captured by the project are rounded down to the nearest unit (tons of CO_2), given the order of magnitude of the captures and the usual range of precision verified in the publicly available information for projects of this nature and scale.

Thus, the transposition of tCO_2 to VCC is direct, since it starts from quantities rounded down to the unit, so that 153.133 tCO_2 correspond to 153.133 VCC.

Measurement Errors Mitigation

The most common errors in measurements are usually caused by:

- Poorly calibrated or outdated equipment
- Human errors when performing a measurement and/or when transcribing the data from the spreadsheet to digital format.

To reduce as much as possible the occurrence of this type of errors, before carrying out any measurement task, the good condition and calibration of the equipment will be corroborated, which in no case can be older than 5 years. The person responsible for monitoring this is the R&D manager. The team that collects the data in the field is composed of a minimum of 3 duly instructed and trained technical operators. The data are collected on templates that are then digitally transcribed. In case of inconsistency of data between the 2 formats, the physical template will prevail.

To avoid human error, a follow-up and review of all data recording sheets in the field will be carried out. This will be done by the head of R&D, who will go to the field where the measurements were taken and randomly perform his own measurements (following the same protocol and with the same equipment) covering between 10% - 20% of the sampling, to corroborate the data. There should not be a deviation greater than 5%. If there is an error that exceeds 5%, the entire measurement shall be redone from scratch, complying with the requirements of section 16.5.1 of the BCR 0001 Version 4.0 methodology. This process shall be carried out within 5 days of the delivery of the spreadsheet.

Finally, the land cover analysis based on Corine Land Cover and the use of satellite images included the confusion matrix and the metrics of the methodology used, which yielded an analysis accuracy greater than 95% (see Figure 18, Figure 19 y Figure 20).

3.6 Leakage and Non-Permanence

According to BCR0001 methodology version 4.0, section 16.3, the measurement of project leakage is performed following the A/R Methodological Tool 15 Version 02.0 "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities".

According to Methodology AR-ACM0003 and Tool 15 "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in the F/R CDM project activity" v02.0, leakage emissions due to displacement of agricultural activities should only be considered if this leads to an increase in GHG emissions relative to the GHG emissions attributable to the activity as it exists within the project boundary.

In the proposed project, the extensive cattle ranching developed in the selected plots was not owned by Desarrollos Madereros S.A. but belonged to a neighbor in the area who had been authorized access to these lands.

Prior to the start of project activities, the existing contract between DMSA and a third-party owner of the cattle on the plots was terminated. Once the contract was terminated, the cattle were sold in their entirety for slaughter.

According to AR-TOOL15 "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in a CDM F/R project activity" v.02.0, the leakage emission attributable to displacement of agricultural activities due to the implementation of a CDM F/R project activity is estimated as the decrease in carbon stocks in the affected carbon pools of the land receiving the displaced activity. The leakage emission attributable to displacement of grazing activities under the following conditions is considered negligible and is therefore accounted for as zero:

$LEAKAGE_t = 0$

a. Animals are displaced to existing grazing fields and the total number of animals in the receiving grazing fields (displaced and existing) does not exceed their carrying capacity.
b. Animals are moved to existing grazing fields and the total number of animals moved does not exceed the carrying capacity of the receiving grazing field.
c. The animals move onto farmland that has been abandoned in the last five years.
d. The animals move to forested land and there is no logging or decrease in tree and shrub canopy cover due to the movement of the animals.
e. The animals are moved to the zero-grazing system.

Alternative e) is the valid alternative for this project. All existing cattle prior to the start of the project were slaughtered within one month of the end of the contract. ANNEX 3 includes 2 receipts for the sale of the cattle, therefore the leakage is considered to be zero.

On the other hand, the mitigation measures that DMSA identified for the medium and high risks, as well as their monitoring, has been developed following the BCR Risks and Permanence V 1.1 tool, in section 7.1 of the current document, being in accordance with the requirements of BCR Standard v3.4, section 12.3.

3.7 Mitigation Results

All calculations were performed following the requirements of the BCR0001 methodology version 4.0 as well as those of all complementary tools required by the methodology. The mitigation results obtained as a consequence of the execution of the project activities are reliable and verifiable within the framework of ISO 14064-3:2019.

3.7.1 Eligible Areas within GHG Project Boundaries (AFOLU Sector Projects)

Methodology BCR0001 version 4.0 requires that, in order to demonstrate land eligibility, GHG project holders must conduct a multi-temporal analysis of satellite imagery, through which land use land cover changes are determined, following the

land cover survey update methodologies of the country in which the project activities are proposed.

The current project is eligible under the scope of BCR Standard v 3.4 because its main objective is to reforest an area of degraded land where the planted trees will absorb carbon dioxide from the atmosphere to contribute to national and international climate change mitigation goals.

Through Article 42 of Law 422/1973 Paraguay defines a forest as "natural ecosystem with biological diversity, intervened or not, regenerated and/or restored by natural succession or forestry techniques of enrichment with native species, which produces goods, provides environmental and social services". On the other hand, the definition of forest marked in 2018 by Decree 175, which regulates Article 42 of the aforementioned Law 422/1973[96] , points to the following definition of forest specifying the parameters of area, tree height and coverage within the ranges given by the Kyoto Protocol:

- Eastern Region of Paraguay, where this project is located: minimum area of 1 hectare (1 ha), with a tree height equal to or greater than five meters (5 m) reaching a minimum canopy cover in its natural state of at least thirty percent (30%).

They are classified into three types: Production Forests, Protected Forests and Special Forests.

Therefore, the selected plots comply with the requirements of the methodology BCR0001 version 4.0 section 6a where the selected plots do not correspond to the forest category (according to the national definition adopted by the host country) nor to natural vegetation covers other than forest, at the beginning of the activities nor 5 years prior to the project start date. This was demonstrated through the

[96] https://py.vlex.com/vid/ley-n-422-73-641255869#:~:text=Decl%C3%A1rase%20de%20inter%C3%A9s%20p%C3%BAblico%20el,el%20r%C3%A9gimen%20de%20esta%20Ley.

application of the Corine Land Cover methodology and is detailed in section 3.1.1 "Conditions of Applicability" of this report.

3.7.2 Stratification (Projects in the AFOLU Sector)

The distribution of biomass in the project areas is heterogeneous in relation to the types and combinations of species, density and planting distances, and also with respect to the year of planting. Due to the existence of this variation, it has been decided to divide the plantations into sub-populations called strata, so that the variables of interest reduce their variability, since they will have a marked influence on the changes in the stock of biomass. Stratification eliminates sources of variation that can mask the inventory results, so that the variability within strata is less than the variability of the entire population. It will also be possible to obtain more precise estimators thanks to stratification. Stratification also facilitates data collection and data processing by stratum and is also convenient for planning and conducting field work.

The variables considered to determine the number of strata were the types and combinations of species, density, planting distances and year of planting. On the other hand, topography and soil type are considered indirectly with the species planted given their linkage. For the genus *Eucalyptus, the* following three species were considered: *Eucalyptus grandis*, *Eucalyptus grandis x urophylla*, *Eucalyptus grandis x camaldulensis,* hereafter referred to as ***Eucalyptus spp.*** in this document*;* and a mix of eleven native species detailed in Table 1.
The following table details the 8 strata that make up the project according to the combination of these variables.

Table 17. Stratification Eucalyptus + Native Species.

Stratum	Year planted	Planting Density of Each Species			Eucalyptus Species	Area (ha)	No. of Temporary Sample Plots	Location
		Pl/ha Eucalypt	Pl/ha Eucalypt **	Pl/ha Natives				
1	2018	501	251	357	*Eucalyptus grandis x urophylla*	13,43	2	Hernandarias
2	2019	501	251	357	*Eucalyptus grandis*	32,14	4	Hernandarias
3	2019	501	251	357	*Eucalyptus grandis x camaldulensis*	17,62	3	Hernandarias and Tapytá
4	2019	501	251	357	*Eucalyptus grandis x urophylla*	52,71	8	Hernandarias and Tapytá
5	2020	501	251	357	*Eucalyptus grandis x urophylla*	3,02	1	Hernandarias
6	2022	501	251	357	*Eucalyptus grandis x urophylla*	17,53	2	Tapytá
7	2023	833	400	313	*Eucalyptus grandis*	11,83	2	Hernandarias
8	2023	833	400	313	*Eucalyptus grandis x urophylla*	24,48	5	Hernandarias
Total						**172,76**	**27**	

* (from planting until the first thinning in year 6 after the year of planting)

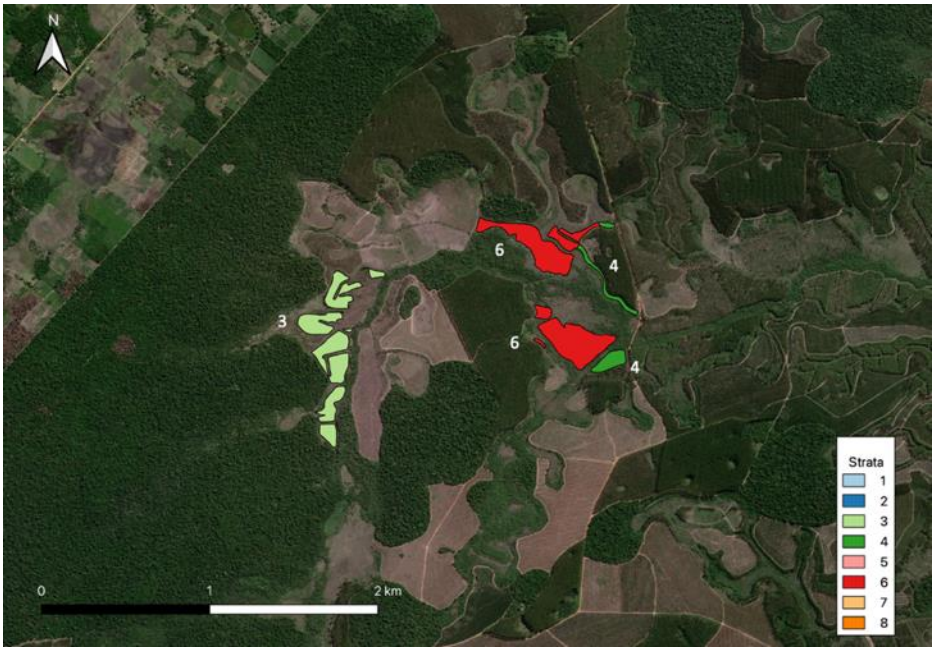
** (from thinning to year 10 after planting year)

Source: DMSA, 2023.

Figure 52. Detail of stratification in the Hernandarias area.

Source: DMSA, 2023. ArcGIS World Imagery base mapping. Datum WGS84.

Figure 53. Detail of stratification in the Tapytá environment.



Source: DMSA, 2023. ArcGIS World Imagery base mapping. Datum WGS84.

3.7.3 GHG Emissions Reduction/Removal in the Baseline Scenario

In order to consider GHG removals, in the baseline scenario, the cover in the project area must be considered. According to the methodological tool, TOOL 14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R Project Activities" version 04.2 carbon removals in the baseline scenario can be counted as zero, if the following conditions are met:

1. Trees existing prior to the establishment of the project are not harvested, felled or removed during the crediting period of the project activity.

2. Trees existing prior to establishment of the project do not suffer mortality due to competition from trees planted in the project, or damage due to implementation of the project activity, at any time during the crediting period of the project activity.

3. Trees present before the start of the project activity are not included with the project trees in the monitoring (and quantification) of carbon stocks.

If these conditions are met, removals in the baseline scenario can be calculated as follows:

$$\Delta C_{BSL,t} = \Delta C_{TREE_{BSL,t}} + \Delta C_{SHRUB_{BSL,t}} + \Delta C_{DW_{BSL,t}} + \Delta C_{LI_{BSL,t}}$$

Where,

$\Delta C_{BSL,t} =$ Net GHG removals by sinks in the baseline in year t; t CO_2-e

$\Delta C_{TREE_{BSL,t}} =$ Change in baseline carbon stock in tree biomass within the project boundary in year t, estimated with TOOL 14 "Estimation of Carbon Stocks and Carbon Stock Change of Trees and Shrubs in A/R Project Activities" version 04.2; t CO_2-e

$\Delta C_{SHRUB_{BSL,t}} =$ Change in baseline carbon stock in the shrub biomass within the project boundary in year t estimated with TOOL 14 "Estimation of Carbon Stocks and Carbon Stock Change of Trees and Shrubs in A/R Project Activities" version 04.2; t CO_2-e

$\Delta C_{DW_{BSL,t}} =$ Carbon stock change in the baseline dead wood biomass within the project boundary in year t, as presented in the tool "TOOL 12 Methodological Tool: Estimation of Carbon Stocks and Carbon Stock Change in Dead Wood and Litterfall in F/R CDM Project Activities Version 3.1"; t CO_2-e

$\Delta C_{LI_{BSL,t}} =$ Baseline carbon stock change in litter biomass within the project boundary in year t, as presented in the tool "TOOL 12 Methodological Tool: Estimation of Carbon Stocks and Carbon Stock Change in Dead Wood and Litter Carbon Stocks in F/R CDM Project Activities Version 3.1"; t CO_2-e

As demonstrated in the previous sections, the baseline is the continuation of extensive cattle ranching, which is the historical land use. In the absence of the proposed project activity, this area would remain low-quality land with some scattered grasses and shrubs. As for existing trees in the project area, they are very few and far between. These few trees present in the project area will not be felled, cleared, or removed. They will not suffer mortality due to competition with trees planted in the project, nor damage due to the implementation of the project activity, and they will not be inventoried along with the project trees in the monitoring of carbon stocks, but will be monitored for their continued existence, consistent with the baseline scenario, all throughout the crediting period of the project activity. In conclusion, carbon stocks and carbon stock changes can be considered zero, so carbon stock changes in aboveground biomass carbon stocks of non-tree vegetation could be conservatively assumed to be zero in the baseline scenario.

In addition, the carbon stock of dead wood and litter will not increase in the baseline scenario. Finally, the carbon stock change in soil organic carbon can be conservatively considered to be zero, as it is unlikely to increase in the extensive baseline.

In conclusion and based on the IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry (2003), considering that the identified baseline scenario activity has been the same for at least 15 years, net GHG removals by sinks in the baseline are assumed to be zero.

$$\Delta C_{BSL,t} = \mathbf{0}$$

3.7.4 GHG Emissions Reduction/Removal in the Project Scenario

For the calculation of actual net GHG removal by sink the BCR0001 methodology version 4.0 in section 16.2 states that: "GHG emissions resulting from the removal of herbaceous vegetation, fossil fuel combustion, fertilizer application, use of firewood, decomposition of leaf litter and fine tree roots, construction of access roads within the project boundaries and transportation attributable to the project activity shall be considered insignificant and therefore accounted for as zero."

According to BCR0001 methodology version 4.0 in section 16.2 The change in carbon stocks in the project, which occurs in the selected carbon pools in year t will be calculated as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_t - GHG_{E,t}$$

Where,

$\Delta C_{ACTUAL,t} =$ Actual net removals of GHGs by sinks, in year t; t CO_2-e

$\Delta C_t =$ Change in project carbon pools, occurring in the selected carbon pools, in year t; t CO_2-e

$GHG_{E,t} =$ Increase in non-CO2 greenhouse gas emissions within project boundaries as a result of the implementation of the A/R CDM project activity, in year t, calculated with the tool "Estimation of non-CO2 greenhouse gas emissions resulting from biomass combustion attributable to an A/R CDM project activity"; version 4.0.0

No biomass combustion is to be performed in the proposed project according to the criteria of TOOL 8 "Estimation of non-CO2 greenhouse gas emissions resulting from biomass combustion attributable to an A/R CDM project activity"; version 4.0.0.0 Therefore, project emissions are estimated to be zero.

$$GHG_{E,t} = \mathbf{0}$$

Therefore, actual net GHG removals by sinks will be calculated as follows:

$$\Delta C_{P,t} = \Delta C_{TREE_{PROJ,t}} + \Delta C_{SHRUB_{PROJ,t}} + \Delta C_{DW_{PROJ,t}} + \Delta C_{LI_{PROJ,t}} + \Delta SOC_{A,t}$$

Where,

$\Delta C_{P,t} =$ Change in project carbon pools, occurring in selected carbon pools, in year t; t CO_2-e

$\Delta C_{TREE_{PROJ,t}} =$ Change in carbon stocks in tree biomass in the project in year t estimated using TOOL14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in F/R CDM project activities", version 4.2; t CO_2-e

$\Delta C_{SHRUB_{PROJ,t}} =$ Change in carbon stocks in shrub biomass in the project in year t estimated using TOOL 14 "estimation of carbon stocks and change in carbon stocks of trees and shrubs in the F/R CDM project activities" version 4.2; t CO_2-e

$\Delta C_{DW_{PROJ,t}} =$ Change in the baseline carbon stock in dead wood biomass within the project boundary in year t, as presented in the tool "TOOL 12 Methodological Tool: Estimation of Carbon Stocks and Carbon Stock Change in Dead Wood and Litterfall in F/R CDM Project Activities Version 3.1"; t CO_2-e

$\Delta C_{LI_{PROJ,t}} =$ Baseline carbon stock change in litter biomass within the project boundary in year t, as presented in the tool "TOOL 12 Methodological Tool: Estimation of Carbon Stocks and Carbon Stock Change in Dead Wood and Litter Carbon Stocks in F/R CDM Project Activities Version 3.1"; t CO_2-e

$\Delta SOC_{A,t} =$ Carbon stock changes in soil organic carbon, in year t, in areas that meet the applicability conditions of TOOL 16 "Tool for estimating the change in soil organic carbon stocks due to the implementation of F/R CDM project activities version 1.1.0, and estimated with the same tool; t CO_2-e

As mentioned in the previous sections of this document, dead wood, litter and soil organic carbon are not measured as carbon stocks. Therefore, it is only necessary to calculate $\Delta C_{TREE_{PROJ,t}}$ to obtain the change in the carbon stock project that occurs in the selected carbon pools.

According to methodology BCR0001 version 4.0 section 16.4 net GHG removals by sinks are calculated as follows:

$$\Delta C_{PROJ,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_{,t}$$

Where,

$\Delta C_{PROJ,t} =$ Net GHG removals by sinks, year t, t CO2-e

$\Delta C_{ACTUAL,t} =$ GHG removals by sinks, in year t; t CO2-e

$\Delta C_{BSL,t} =$ GHG removals at baseline, in year t; t CO2-e

$LK_{,t} =$ GHG removals due to leakage, in year t; t CO2-e

As demonstrated above, both baseline GHG removals and GHG removals due to leakage are considered zero in the current project. Therefore, it only remains to calculate GHG removals by sinks.

Above- and below-ground carbon stocks

According to Tool 14 "Estimation of carbon stocks and carbon stock change of trees and shrubs in a F/R CDM project activity", v. 04.2, section 7, the change in tree carbon stocks in one year (annual change) between two successive verifications is estimated assuming a linear change. The change in tree carbon stocks in one year is estimated as follows:

$$\Delta C_{TREE,t} = \frac{C_{TREE,t2} - C_{TREE,t1}}{T} * 1\ year$$

Where,

$\Delta C_{TREE,t} =$ Change in carbon stocks of trees within the project boundaries in year t; t CO_2-e

$C_{TREE,t1} =$ Carbon stock change of trees within the project boundary in year t1; t CO_2-e

$C_{TREE,t2} =$ Carbon stock change of trees within the project boundary in year t2; t CO_2-e

T= time elapsed between two successive estimates (T= t2 -t1): year

According to the tool, carbon stocks in trees at a given time can be estimated using one or a combination of four methods:

a. Estimation by measurement of sample plots;
b. Estimation through modeling of tree growth and stand development;
c. Estimation by canopy cover ratio;
d. Updating of previous stocks through independent measurements of change.

For the present project, the calculations will be carried out following the method of estimation by measurement of sample plots (alternative a).

GHG Emissions Reduction/Removal in the Ex-Post Project Scenario

The ex-post estimates will be based on method (a) of the applicable tool which is "Estimation by measurement of sample plots" and more specifically on option (a) of this method: Stratified random sampling according to this method, the average carbon stocks in trees within the tree biomass estimation strata and the associated uncertainty will be estimated as follows:

$$C_{TREE} = \frac{44}{12} * CF_{TREE} * B_{TREE}$$

$$B_{TREE} = A * b_{TREE}$$

$$b_{TREE} = \sum_{i=1}^{m} w_i b_{TREE,i}$$

$$u_c = \frac{t_{val} X \sqrt{\sum_{i=1}^{m} w_i \, x \frac{s_j^2}{n_t}}}{b_{TREE}}$$

Where,

C_{TREE} = Carbon stocks in trees in the tree biomass estimation strata; t CO_2-e

CF_{TREE} = Carbon fraction of tree biomass; t C (td.m.)$^{-1}$ default value 0,47

B_{TREE} = Tree biomass in tree biomass estimation strata; t d.m.

A = Sum of the areas of the tree biomass estimation strata; ha

b_{TREE} = Average tree biomass per hectare in tree biomass estimation strata

w_i = Ratio of the area of stratum i to the sum of the areas of the tree biomass estimation strata (i.e., wi = Ai/A); dimensionless

$b_{TREE,i}$ = Average tree biomass per hectare in stratum i; t d.m. ha^{-1}

u_c = Uncertainty in C_{TREE} (complying with BCR0001 V4.0 methodology, section 15, a 20% uncertainty discount factor should be applied to the current project).

t_{val} = Two-sided student's t-value for a 90% confidence level and degrees of freedom equal to n -M, where n is the total number of sample plots within the tree biomass estimation strata and M is the total number of three biomass estimation strata.

s_j^2 = Variance of tree biomass per hectare in all sample plots of stratum i; (t d.m.ha)$^{-12}$

n_i = Number of sampling plots in stratum i

The mean tree biomass per hectare in a stratum and the associated variance are estimated as follows:

$$b_{TREE,i} = \frac{\sum_{p=1}^{n_1} b_{TREE,p,i}}{n_i}$$

$$s_j^2 = \frac{n_i X \sum_{p=1}^{n_1} b_{TREE,p,i}^2 - \left(\sum_{p=1}^{n_i} b_{TREE,p,i}\right)^2}{n_i X (n_i - 1)}$$

Where,

$b_{TREE,i}$ = Average tree biomass per hectare in stratum i; t d.m. ha^{-1}

$b_{TREE,p,i}$ = Tree biomass per hectare in plot p of stratum i; t d.m. ha^{-1}

s_j^2 = Variance of tree biomass per hectare in all sample plots of stratum i; (t d.m.ha)$^{-12}$

n_i = Number of sample plots in stratum i

Finally, according to Appendix 1 (Plot biomass measurement methods) of the tool, the plot biomass value shall be determined as follows:

$$b_{TREE,p,i} = \frac{B_{TREE,p,i}}{A_{plot,i}}$$

$$B_{TREE,p,i} = \sum_j TREE_{,j,p,i}$$

$$B_{TREE,j,p,i} = \sum_l B_{TREE,l,j,p,i}$$

Where,

$b_{TREE,p,i}$ = tree biomass per hectare in plot p of stratum i; t d.m. ha^{-1}

$B_{TREE,p,i}$ = tree biomass in the sample plot or stratum i; t m.d.

$A_{plot,i}$ = size of the sample plot of stratum i; ha

$B_{TREE,j,p,i}$ = biomass of trees of species j in the sample plot or stratum i; t d.m.

$B_{TREE,l,j,p,i}$ = biomass of trees of species j in the sample plot or stratum i; t d.m.

With,

$$B_{TREE,l,j,p,i} = f_j\left(x_{1,l}, x_{2,l}, x_{3,l} \ldots\right) * (1 + R_j)$$

$$B_{TREE,l,j,p,i} = V_{TREE,j}\left(x_{1,l}, x_{2,l}, x_{3,l} \ldots\right) * D_j * BEF_{2,j} * (1 + R_j)$$

Where,

$B_{TREE,l,j,p,i}$ = Biomass of tree l of species j in sample plot p of stratum i; t d.m.

$f_j(x_{1,l}, x_{2,l}, x_{3,l} \ldots)$ =Aerial biomass of the tree obtained by the allometric equation for species j that relates the measurements of tree l to the aerial biomass of the tree; t d.m

R_j= Root-shoot ratio for tree species j; dimensionless

$V_{TREE,j}(x_{1,l}, x_{2,l}, x_{3,l} \ldots)$ =Volume of the trunk of tree l of species j in sample plot p of stratum i, estimated from the tree dimension as input to a volume table or volume equation; m^3

D_j= Density (overbark) of tree species j; t d.m-3 Values are taken from Table 4.13 of the 2006 IPCC Guide to Greenhouse Gas Inventories.

$BEF_{2,j}$ = Biomass expansion factor for the conversion of tree trunk biomass to aboveground tree biomass, for tree species j; dimensionless.

This project will plant *Eucalyptus spp.* and native species. Desarrollos Madereros S.A. is an industrial forestry company with more than 20 years of experience in planting *Eucalyptus spp.* in the region where the project will be developed.

Due to the lack of local scientific data to model eucalypt growth in Paraguay, DMSA uses a scientifically valid software called PlaForNea[97] version 2017. In conjunction with the permanent sampling plots, the software and the experience of more than 20 years in this activity, the growth models have proven to have a high accuracy in line with reality.

PlaForNea version 2017 is a simulator that allows estimating the growth of the main forest species planted in the Argentine Mesopotamia, such as *Pinus loblolly,*

[97] http://www.plafornea.com.ar/

Eucalyptus grandis, Pinus elliottii, Pinus taeda and *Araucaria angustifolia*. The areas for which the models were adjusted correspond to the departments of Alto Paraná Department and Caazapá Department.

Regarding native species, the levels of knowledge and scientific development in Paraguay and the Region in relation to the growth of forest plantations with these species are scarce. However, there are some scientific publications, which allowed us to make a conservative ex ante estimate that we are confident will have a high level of accuracy (Arturi, M. F *et al.,* 2008)[98] . Nevertheless, it is planned during the accreditation period of the project, in alliance with local Universities and Researchers, to install permanent measurement plots that will allow us to measure growth, and if necessary, to make corrections on the growth estimates.

The default values and parameters necessary to make the ex-ante and ex-post calculations of the project scenario were selected, these values correspond to the "humid subtropical" climatic classification according to Koppen - Geiger[99] , from the Figure 9 of the additional information section of the project. The fixed values and parameters or default values described below are: wood density, biomass expansion factor, carbon fraction and root/shoot ratio of tree species

Data/Parameter	**Wood Density**
Unit	t/m^3
Description	Basic density (expressed in tons per cubic meter of kiln-dried wood)
Data source	IPCC, 2006[100] Chapter 4 Forest, Table 4.13.
Values applied	*Eucalyptus robusta*: 0,51 t/m^3 Natives Mix: 0,64 t/m^3

[98] Arturi, M. F., Goya, J. F., & Balducci, E. D. (2008). Height and diameter growth and mortality in plantations of Yungas native species in Valle Morado Salta. XIII Jornadas Técnicas Forestales y Ambientales, Facultad de Ciencias Forestales UNaM - EEA Montecarlo INTA, Eldorado Misiones, Argentina.

[99] Beck, H. E., Zimmermann, N. E., McVicar, T. R., Vergopolan, N., Berg, A., & Wood, E. F. - "Present and future Köppen-Geiger climate classification maps at 1-km resolution". *Nature Scientific Data*.

[100] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf

Data/Parameter	Wood Density
Selection of data or measurement methods and procedures	Table 4.13 corresponding to *Eucalyptus robusta* (America) and the list of species mentioned below in Additional comments.
Purpose of the data	GHG calculations ex - ante project scenario GHG calculations ex-post project scenario
Additional comments	The native species mix wood density was calculated as the average of the value for the American species of the same genera of the 11 native species used in the project as listed in 2006 IPCC Table 4.13: *Enterolobium (E. cyclocarpum 0.34, E. maximum 0.4, E. schomburgkii 0.78), Eugenia (E. stahlii 0.73), Cordia (C. alliodora 0.48, C. bicolor 0.49, C. gerascanthus 0.74, C. goeldiana 0.48, C. sagotii 0.5), Cedrela (C. odorata 0.42, C. sp. 0.40-0.46), Inga (I. alba 0.62, I. edulis 0.51, I. paraensis 0.82), Rollinia (R. exsucca 0.52), Pterogyne (P. nitens 0.66),* and *Apuleia (A. leiocarpa 0.7)* (t dm/m3 fresh volume). No species of *Handroanthus, Balfourodendron or Peltophorum* were listed, so these values were obtained from an open data publishing platform[97] and another source[98].

Data/Parameter	BEF - Biomass Expansion Factor
Unit	dimensionless
Description	Multiplication factor, which extends the growing stock from tree stems to above-ground tree biomass of the tree canopy.
Data source	IPCC, 2005. Chapter 3[101] .
Values applied	*Eucalyptus spp.* in tropical forests: 2

[101] https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf

Data/Parameter	BEF - Biomass Expansion Factor
	Native species mix. There are no official data for these native species in particular, so for conservative purposes, the lowest broadleaf value of 2.0 was selected.
Selection of the data or measurement methods and procedures	3A.1.10 by the default tables in ANNEX 3A.1 Biomass of Section 3.2 Forest Land of the 2005 IPCC Guidelines for National Greenhouse Gas Inventories.
Purpose of the data	GHG calculations ex - ante project scenario GHG calculations ex - post project scenario
Additional comments	Not applicable

Data/Parameter	Carbon Fraction
Unit	dimensionless
Description	Factor to find the Carbon ratio
Data source	"Estimation of carbon stocks and carbon stock change of trees and shrubs in F/R CDM project activities" v. 04.2.
Values applied	0,47
Selection of the data or measurement methods and procedures	Value applied to all species
Purpose of the data	GHG calculations ex - ante project scenario GHG calculations ex - post project scenario
Additional comments	Not applicable
Data/Parameter	**Root/Shoot Ratio (Root/Shoot Ratio from Aboveground Biomass)**
Unit	Dimensionless
Description	Root/shoot ratio value of tree species
Data source	Eucalypt: Table 3A.1.8 by IPPC ANNEX 3A.1 Biomass default tables for section 3.2 Forest Land of the IPCC

Data/Parameter	Carbon Fraction
	Guidelines, 2006[102] . Natives mix: CDM AR-TOOL14
Values applied	Eucalypt plantation/forest • 0,29; b<50 t.d.m/ha • 0,15; 50 - 150 t.d.m/ha • 0,10; b> - 150 t.d.m/ha Native species (Tropical/sub-tropical forest then Primary tropical/subtropical moist forest): calculated with the following formula The value of R_j is estimated as $R_j = \frac{e^{(-1.085+0.9256\times\ln b)}}{b}$ where b is the above-ground tree biomass per hectare (in t d.m. ha^{-1}), unless transparent and verifiable information can be provided to justify a different value.
Selection of the data or measurement methods and procedures	The IPCC Guidelines[103] suggest a mean root-shoot ratio in intervals depending on aboveground biomass. Table 3.A.1.8 of the 2006 IPCC guidelines was used for this purpose. With respect to native species, it is important to note that there are no official data for Paraguay, nor is there a specific value in the IPCC (2005) tables; therefore, in order to make conservative calculations, the value was calculated with the CDM AR-TOOL14.
Purpose of the data	GHG calculations ex - ante project scenario GHG calculations ex - post project scenario
Additional comments	Not applicable

Change in Carbon Stocks in Shrub Biomass in the Project

Regarding the change in carbon stocks in shrub biomass in the project, given that the baseline scenario is the continuation of extensive cattle ranching in the pastures, this landscape has very few and scattered shrubs. In addition, these

[102] https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf
[103] https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf

shrubs present in the project area will not be harvested, cleared, or removed. They will not suffer mortality due to competition from trees planted in the project, nor will they suffer damage due to the implementation of the project activity. Therefore, the change in shrub biomass stock on the project is zero.

$\Delta C_{SHRUB_{BSL}t} = \mathbf{0}$

Emissions From Soil Preparation

Two types of tractors were used to prepare the land, using approximately the following amount of gas oil:

- Tractor with harrow = 20 l/ha
- Tractor with ridges = 5,5 l/ha

Using the IPCC CO emission factor$_2$ for diesel = 2.6972 kg CO_2 /l of diesel.

Given the total area of the project, emissions from soil preparation were = 9,66 tCO_2

Complying with BCR0001 Methodology version 4.0 and ISO 14064-2:2019, because emissions from site preparation are less than 10% of the total emissions reduction, they are considered non-significant and therefore equal to zero.

Leakages

As demonstrated in Section 3.6 of this report, leakage is zero for the proposed project.

$$LK_t = \mathbf{0}$$

Project GHG Removals

Considering that the baseline emissions, leakage emissions and land preparation emissions are zero, the amount of GHG removal from the project can be estimated ex-ante.

Since the plantations of the current project were developed progressively (see section 2.2 "project activities" of this document), the volume growth is adjusted according to the years since planting. Therefore, the projections of volume increase for the native species mix and eucalypt are obtained (the current project will carry out 2 cycles of 10 years and a last one without harvest for this species). It is important to note that, since the third eucalypt cycle will be planted once the native trees already have considerable height, its projected volume will have a slower increase than the first two cycles (Table 18).

When monitoring is carried out to verify the plantations for the delivery of carbon credits, allometric equations will be applied (see section 14 "monitoring" of this document) specific to the planted species that will provide a greater degree of accuracy. It is important to highlight that according to more than 20 years of experience of DMSA in this type of plantations and applying this type of software, the difference between the projected and the reality is less than 5%.

Table 18. Projections of Trunk Volume with Bark Per Tree for Eucalyptus spp. by Growth Cycle for Different Strata.

Age (Years Since Planting)	**Volume x Eucalypt Tree (m^3) in Strata 1-6**	**Volume x Eucalypt Tree (m^3) in Strata 7-8**
1	0,000	0,000
2	0,050	0,030
3	0,100	0,086
4	0,170	0,155
5	0,240	0,227
6	0,360	0,411
7	0,460	0,513
8	0,580	0,609
9	0,700	0,696
10	0,820	0,779
11	0,000	0,000
12	0,050	0,050
13	0,100	0,100
14	0,170	0,170
15	0,240	0,240
16	0,360	0,360

Age (Years Since Planting)	Volume x Eucalypt Tree (m^3) in Strata 1-6	Volume x Eucalypt Tree (m^3) in Strata 7-8
17	0,460	0,460
18	0,580	0,580
19	0,700	0,700
20	0,820	0,820
21	0,000	0,000
22	0,045	0,043
23	0,112	0,104
24	0,191	0,175
25	0,274	0,249
26	0,359	0,324
27	0,444	0,399
28	0,529	0,473
29	0,612	0,564
30	0,694	0,654
31	0,780	0,744
32	0,864	0,832
33	0,945	0,917
34	1,024	1,000
35	1,101	1,080
36	1,175	1,157
37	1,246	1,231
38	1,315	1,302
39	1,380	1,370
40	1,443	1,434

Source: DMSA using PlaForNea software, 2023.

Table 19. Projections of Trunk Volume with Bark Per Tree for Native Species, by Growth Cycle of These Species.

Age (years since planting)	Volume x tree Native (m^3)
1	0,000
2	0,000
3	0,001
4	0,002
5	0,004
6	0,006

Age (years since planting)	Volume x tree Native (m^3)
7	0,010
8	0,014
9	0,020
10	0,026
11	0,034
12	0,043
13	0,053
14	0,065
15	0,077
16	0,091
17	0,106
18	0,122
19	0,139
20	0,157
21	0,176
22	0,196
23	0,217
24	0,239
25	0,268
26	0,293
27	0,319
28	0,345
29	0,374
30	0,404
31	0,436
32	0,470
33	0,506
34	0,544

Source: DMSA, 2023.

The volume value of each individual log with bark is multiplied by the number of trees planted per hectare to obtain the volume per hectare of wood in logs. For conservative reasons, a mortality rate calculated based on data on the behavior of this species in the area where the project is being carried out was applied to the number of trees per hectare (see the estimated mortality rate in the DMSA Emission Reduction PD spreadsheet).

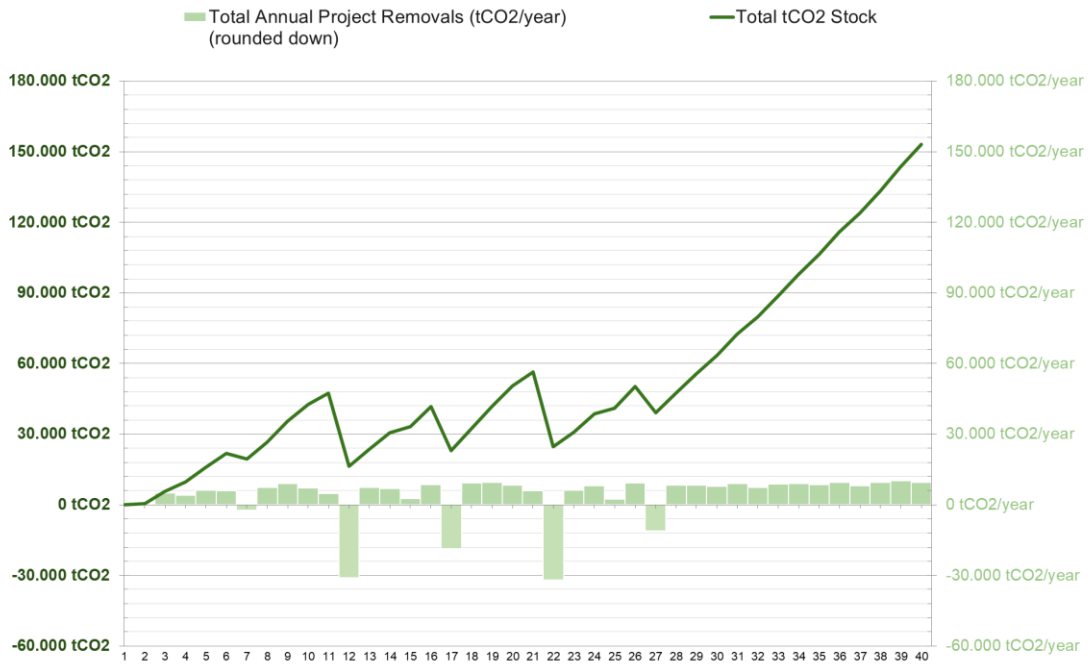
Therefore, for the plantations carried out between 2018 and 2022 between years 1 and 6 of the project life, the number of trees per hectare will be 501 at the beginning and will decrease according to the mortality rate applied. In the sixth year, the eucalypt trees will be thinned, so the number of plants per hectare will decrease from year 7 to 251, where it will remain constant until the full harvest. Regarding the plantations that will be carried out during the year 2023, the density of trees per hectare is 833 and then it will decrease according to the mortality rate between years 1 to 6 of life. From the seventh year of life, thinning will be carried out and the density will decrease to 400 trees per hectare, where it remains constant. These variations in tree density per hectare are contemplated in the calculations (see spreadsheet "Total Emission Reduction" in the ex-post calculations).

On the other hand, native species will be planted progressively after thinning. These trees will not be thinned or harvested.

Steps for Carbon Calculation from Volume (m^3)

- To obtain the total biomass from the volume of the trunk, the volume of the trunk with bark is multiplied by the basic wood density for *Eucalyptus spp.* For conservative reasons, the lowest value of the range offered is used.
- Once this value is obtained, it is multiplied by the biomass expansion factor. For conservative reasons the lowest value for a tropical forest is used (these parameters and default values are described in the boxes above).
- To obtain the amount of carbon in the aerial biomass, the weight of aerial biomass (t d.m.) is multiplied by the default carbon factor (0,47).
- Subsequently, the amount of carbon corresponding to the subway tree biomass in roots would be calculated. To obtain it, the aboveground biomass carbon would be multiplied by the Root to Shoot index (these parameters and values for defects were described in the previous points).
- The amount of carbon captured above ground (aboveground biomass) and below ground (belowground biomass) is then summed to obtain the amount of carbon dioxide removed per hectare.
- Finally, the total carbon per hectare is multiplied by the carbon/CO_2 ratio index (44/12) and the amount of carbon dioxide removed per hectare is obtained. Therefore, the net result of GHG emissions reduction in the scenario with project will be as follows.

Figure 54. Evolution of carbon dioxide sequestration throughout the project.



Source: Cambium Earth, 2023.

The following table shows the ex-ante calculations, which are the GHG reductions over the project quantification period once the uncertainty discount has been applied:

Table 20. Ex-Ante Projections of CO_2 Removals.

Year	GHG Removals in the Baseline Scenario, Cattle (tCO_2e)	GHG Removals in the Project Scenario Before Applying Uncertainty Discount (tCO_2e)	GHG Emissions Attributable to Leakages (tCO_2e)	Net GHG Removals After Applying Uncertainty Discount (20%), Rounded Down (tCO_2e)
1	0	-	0	-
2	0	753,72	0	602
3	0	6.273,07	0	5.018
4	0	5.047,41	0	4.037
5	0	7.825,52	0	6.260
6	0	7.390,37	0	5.912
7	0	-3.081,32	0	-2.465
8	0	9.077,21	0	7.261
9	0	11.146,33	0	8.917
10	0	8.936,85	0	7.149
11	0	6.002,16	0	4.801
12	0	-38.893,35	0	-31.114
13	0	9.244,13	0	7.395
14	0	8.622,94	0	6.898
15	0	3.244,65	0	2.595
16	0	10.589,72	0	8.471
17	0	-23.311,42	0	-18.649
18	0	11.722,00	0	9.377
19	0	11.988,55	0	9.590
20	0	10.505,37	0	8.404
21	0	7.520,41	0	6.016
22	0	-39.894,66	0	-31.915
23	0	7.720,10	0	6.176
24	0	9.955,40	0	7.964
25	0	2.896,52	0	2.317
26	0	11.491,00	0	9.192
27	0	-13.860,16	0	-11.088
28	0	10.332,51	0	8.266
29	0	10.417,04	0	8.333
30	0	9.848,63	0	7.878
31	0	11.266,56	0	9.013
32	0	9.198,24	0	7.358
33	0	11.019,76	0	8.815
34	0	11.409,41	0	9.127

Year	GHG Removals in the Baseline Scenario, Cattle (tCO_2e)	GHG Removals in the Project Scenario Before Applying Uncertainty Discount (tCO_2e)	GHG Emissions Attributable to Leakages (tCO_2e)	Net GHG Removals After Applying Uncertainty Discount (20%), Rounded Down (tCO_2e)
35	0	10.633,67	0	8.506
36	0	11.985,79	0	9.588
37	0	10.043,67	0	8.034
38	0	11.806,52	0	9.445
39	0	12.662,05	0	10.129
40	0	11.901,15	0	9.520
Total				**153.133**

Total, GHG removals: 153.133

Annual average (40 years): 3.828 tCO_2 /year

Source: Cambium Earth, 2023

It is important to note that according to BCR Standard v 3.4 in section 14.1.1 "Reversal risk" establishes that projects in the AFOLU sector, once the GHG removals are registered, a reserve of 20% of the total GHG emission reductions quantified for each verified period will be automatically discounted and maintained, in order to cover a potential materialization of the identified risks. Overall, out of the total of 153.133 VCC generated in the project, the 20% to be allocated to the reserve accounts (10% to the BCR General Reserve account and 10% to the project reserve account) would be 30.627 VCC in total, leaving 122.506 to be commercialized by the project proponent. In accordance with point 13.1.1 of the BCR Standard, half of the retained Verified Carbon Credits - those corresponding to the project reserve account - may be released and placed on the market in the subsequent verifications if the risks have not materialized, and the GHG project continues under the BCR Standard and active in the BioCarbon Registry system.

4 Compliance With Applicable Legislation

Legal Framework of the Project Proponent Desarrollos Madereros S.A.

The identification and compilation of the Applicable Legal Norms and the Commitments assumed consists of a systematic process of formal review in official information media, external and internal to Desarrollos Madereros S.A. (DMSA), in which all the legal norms of National, Departmental and Municipal scope are published. Additional sources of identification may include municipal legal instruments, meetings and communiqués from public agencies, the results of litigation in which the company is a party, reports from technical commissions and any other background information that is formally provided to DMSA.

On the other hand, whenever corporate rules are issued or commitments are assumed with third parties, they are reported to the Legal and Regulatory Affairs Management of the Corporate so that they can be evaluated and eventually, if they have obligations, incorporated into the DMSA Legal Registry.

The review and update of legal requirements and other commitments is performed by DMSA Legal and Regulatory Affairs. The Legal and Regulatory Affairs Department at DMSA, has within its tasks agreed with the company the obligation in each quarter of the current year, to survey the main legislations that affect the activities, products or services developed by the organization.

- If applicable, a report is prepared for communication to DMSA. If there are changes in the legislation, a system of importance evaluation (green, yellow and red) is elaborated.

- Green implies that the changes have no effect on the activity. Yellow represents a change that slightly affects the operating activity. Red represents a significant change.

- In the event of a change that applies to the yellow and red categories, a legal mitigation plan is executed where DMSA Legal and Regulatory Affairs form a specialized team, in order to provide the application guidelines. These changes are included in the Paraguay DMSA Legal Registry document, keeping it updated at all times.

Table 21. Modification History of the DMSA Legal Registry.

Version	Date	Description and/or Modified Items
1	03-2005	Original Emission. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody.
3	05-2008	General Revision. The National Forest Service becomes the National Forest Institute (INFONA). Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody.
4	03-2011	General Overhaul. No new updates. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody.
5	03-2015	General Overhaul. No new updates. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody.
6	03-2017	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Pre-verification is performed, and according to the Carbon Credits Project.
7	03-2018	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Prior verification is carried out, and in accordance with the Carbon Credits Project. The Ministry of Environment and Sustainable Development (MADES) has its origin in what was the Secretariat of Environment created in 2000 by law 1561/00, in 2018 it reached the rank of ministry.
8	03-2019	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Pre-verification is performed, and according to the Carbon Credits Project.
9	03-2020	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Pre-verification is performed, and according to the Carbon Credits Project.
10	03-2021	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Pre-verification is performed, and according to the Carbon Credits Project.

Version	Date	Description and/or Modified Items
11	03-2022	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Pre-verification is performed, and according to the Carbon Credits Project.
12	03-2023	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. No new updates. Pre-verification is performed, and according to the Carbon Credits Project.
13	10-2023	General Review. Requirement Principle 1 of the FSC Standard for Forest Management and Chain of Custody. Law No. 7190 on Carbon Credits in Paraguay is incorporated.

Source: DMSA, 2023.

The issuance of Paraguay's Legal Registration document DMSA, gives prior origin to the Forest Management Certification FM/COC of FSC Standard 01. It is mandatory compliance with Principle 1 of the standard.

During FSC Certification, Monitoring and Recertification Audits, compliance with legal requirements is audited by Desarrollos Madereros S.A.; and as the company that owns the forest plantations, it has been reviewed and documented by SGS Societe Generale de Surveillance S.A., since in order to register the plantations and obtain FSC certification, the plantations must demonstrate good practices.

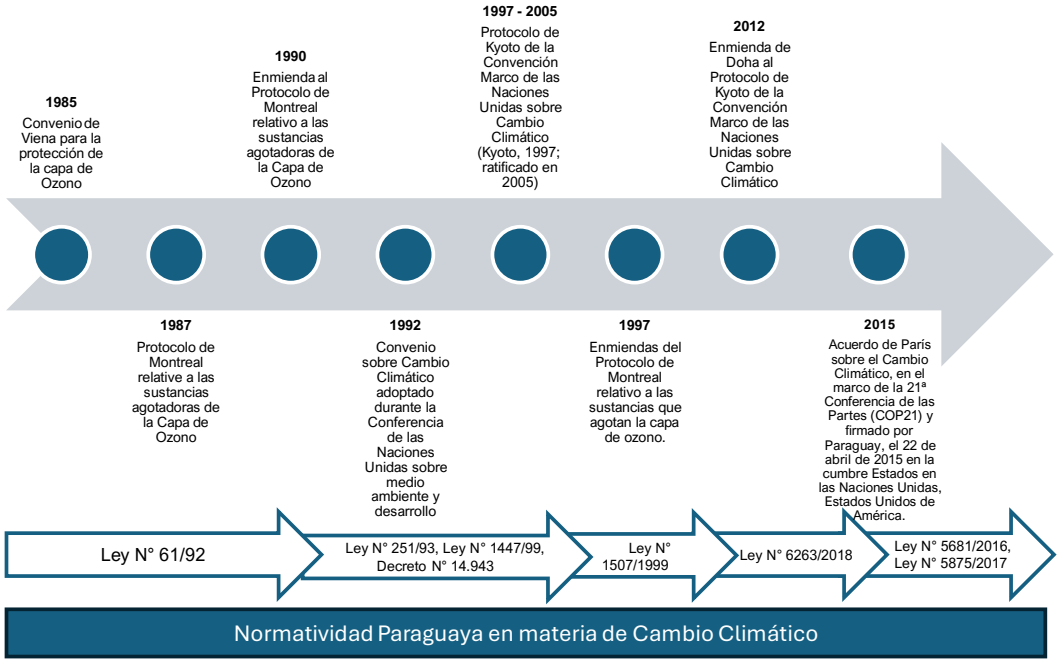
In 2018 DMSA decided to address a carbon credit project. Therefore, the review of the Legal Registry of Paraguay DMSA was incorporated all laws, regulations referred to the implementation of the Carbon Credits Project in Paraguay.

Annually, after the FM/COC Forest Management audit of FSC Standard 01, a General Review of the document is carried out. The same review shall be carried out at each Verification.

Context: Climate Change in Paraguay

Figure 55 summarizes the historical milestones and international treaties to which the Republic of Paraguay has committed itself in recent decades, through the creation of laws in the fight against climate change and in accordance with these commitments.

Figure 55. Regulations of the Republic of Paraguay in accordance with international commitments to combat climate change.



Source: DMSA, 2023.

Legal Framework for Environmental and Forestry Regulations in Paraguay

There is a set of decrees and laws that regulate forestry activities. Each environmental determinant was verified by reviewing official information and it was established that the current project is not included in any environmental compensation plan or its areas of influence, nor does it have any environmental restrictions, as shown in detail in the project's legal content tables.

The project proponents and beneficiaries undertake to fully comply with the established and applicable legal regulations.

The following is a list of the main related regulations, together with details of their implementation in the present project.

Finally, the laws that regulate economic incentives for reforestation in Paraguay, which the project is NOT applying, are listed in Table 23.

Table 22. Compliance with the environmental and forestry legal framework of the project in Paraguay.

Law	Description	Compliance Within the Framework of the Project
Forestry Law No. 422/73[104]	**Regulated by** Decree No. 11.681/75[105] which approves the Regulations of Law No. 422, Forestry Law, provides that the Ministry of Agriculture and Livestock is responsible for the State's forestry administration through the National Forest Service. The work programs of the National Forest Service will be carried out throughout the country by the Head of the Forestry Districts and Forestry Centers, whose heads or directors are directly responsible to the Director of the National Forest Service, or by the auxiliary unit that will operate at the Directorate level of the National Forest Service. The Service is the successor to all government agencies and agencies responsible for the administration of forests, forest lands and wildlife resources. Consequently, all the powers conferred to such agencies in laws, regulations, decrees, and resolutions concerning the forestry and wildlife sector are considered transferred to the Service. The Service will be in charge of the Public Forest Registry.	DMSA manages before INFONA (National Forestry Institute), the Forestry Plan to obtain the Forestry Registry. Annually DMSA, presents its Real Forestry Plan, with the Projection and Execution for the following six months. INFONA issues a Certificate with the explanatory note to DMSA.
Environmental Impact	The Ministry of Environment and Sustainable Development (MADES) designs, establishes, supervises, monitors and evaluates	DMSA has an EIA approved by MADES, which issues the environmental license. An

[104] https://www.ecolex.org/es/details/legislation/ley-no-42273-ley-forestal-lex-faoc023975/
[105] Decree No. 11.681/75 - Regulates Law No. 422, Forestry Law. https://www.ecolex.org/es/details/legislation/decreto-no-1168175-reglamenta-la-ley-no-422-ley-forestal-lex-faoc022920/

Law	Description	Compliance Within the Framework of the Project
Assessment (EIA) Law No. 294/93 [106]	the National Environmental Policy, promoting research, recovery, conservation, preservation, protection, planning, management and use of natural resources, in coordination with public, private and civil society organizations, in order to ensure sustainable development and guarantee the right of all citizens, present and future generations to live in a healthy environment and enjoy the goods and services provided by ecosystems. The present Law, which consists of 15 articles, declares mandatory the Environmental Impact Assessment (EIA) and defines it as the scientific study that allows to identify, foresee and estimate environmental impacts (any modification of the environment caused by works or human activities), in any work or activity projected or in execution. Any assessment shall be submitted by the responsible parties to the administrative authority together with the project or activity; and the modifications introduced by: **Law No. 345/94**[107]**:** This Law amends Article 5 of Law No. 294, stipulating that all Environmental Impact Assessments and their reports shall be submitted by the person or persons responsible to the administrative authority together with the work project.	Environmental Management Program (EMP) audit is submitted to MADES every 2 years to certify compliance with the EIA.

[106]https://www.ecolex.org/es/details/legislation/ley-no-29493-evaluacion-de-impacto-ambiental-lex-faoc022956/?q=Ley+294%2F93&xdate_min=&xdate_max=

[107] https://www.ecolex.org/es/details/legislation/ley-no-34594-modifica-la-ley-no-29493-sobre-evaluacion-de-impacto-ambiental-lex-faoc023953/

Law	Description	Compliance Within the Framework of the Project
	And its Regulatory Decree No. 453/13 [108]**:** By virtue of this Decree, the scope of Article 2° of Decree No. 453 of 2013, which lists the works and activities that require obtaining an environmental impact statement, is expanded.	
Law No. 7190/23 on Carbon Credits[109]	The purpose of this Law is to establish the ownership regime of the credits derived from the benefits of reduced, avoided and/or captured carbon and to determine the ownership of the Carbon Credits generated by projects developed in the Republic of Paraguay, in order to encourage and facilitate the participation of all sectors in the mitigation of Greenhouse Gas emissions and in the Carbon Markets, safeguarding the compliance of the contributions determined at a national level. Likewise, to identify the parties involved. The Law also creates the Carbon Registry as a formal mechanism for the accounting of Carbon Credits that are the object of mitigation projects and for the recording of the transactions that are formalized with said credits.	To date, the corresponding regulation of the Law is pending, therefore, the creation of the Registry of Carbon Credits, as a registry under the Ministry of Environment and Sustainable Development, with the purpose of registering the data related to any type of mitigation project aimed at obtaining Carbon Credits within the voluntary market. Likewise, DMSA would comply with the additional requirements for transactions in addition to the registration and payment of fees, as well as the percentage to be retained by the MADES of the carbon credits that would be destined to the Nationally Determined Contributions (between 3% - 10%). Once the Law is regulated, it will enter into full force and DMSA will comply with the registration obligation of this project and with

[108] https://www.ecolex.org/es/details/legislation/decreto-no-954-por-el-cual-se-modifican-y-amplian-los-articulos-20-30-50-60-inciso-e-90-10-14-y-el-anexo-del-decreto-no-453-de-2013-por-el-cual-se-reglamenta-la-ley-no-2941993-de-evaluacion-de-impacto-ambiental-lex-fa0c135604/

[109] https://www.bacn.gov.py/leyes-paraguayas/11986/ley-n-7190-de-los-creditos-de-carbono

Law	Description	Compliance Within the Framework of the Project
	Law 1447/99[110]: The Kyoto Protocol implements the United Nations Framework Convention on Climate Change by committing industrialized countries to limit and reduce greenhouse gas (GHG) emissions in accordance with agreed individual targets. **Law No. 1507/99[111]:** The Montreal Protocol allowed the elimination and reduction of the use of substances that damage the ozone layer, helping not only to protect it for the current and future generations, but also to improve the results of initiatives aimed at addressing climate change. **Law No. 5681/16[112]:** The Paris Agreement establishes the efforts to reduce emissions to stabilize GHGs in the atmosphere and keep the increase of the global average temperature below 2°C. Paraguay has submitted its Nationally Determined Contributions, assuming the international commitment to reduce 20% of greenhouse gas emissions projected to 2030.	the other duties contemplated in the aforementioned legislative initiative.
Determinations of the Social Security	Regulates labor regulations in Paraguay.	DMSA complies with national taxes and contributions on forestry workers. These are

[110] http://dncc.mades.gov.py/quienes-somos/marco-legal#:~:text=La%20Ley%20N%C2%B0%201447,a%C3%B10%202001%20por%20el%20cual

[111] https://www.bacn.gov.py/leyes-paraguayas/10360/ley-n-1507-aprueba-las-enmiendas-del-protocolo-de-montreal-relativo-a-las-sustancias-que-agotan-la-capa-de-ozono#:~:text=Law%20N%C2%BA%201507%20%2F%20APPROVED%20LAS,AGOTAN%20LA%20CAPA%20DE%20OOZONO

[112] https://portal.ips.gov.py/sistemas/ipsportal/contenido.php?c=242

Law	Description	Compliance Within the Framework of the Project
Institute (IPS in Spanish) [113]		paid through the Social Security Institute, which includes: ○ Medical care for work-related accidents ○ Medical care due to illness ○ Pension contributions ○ Family allowances are paid directly by the employer

Source: DMSA, 2023.

[113] https://portal.ips.gov.py/sistemas/ipsportal/contenido.php?c=242

Table 23. Laws that Affect Forestry Activities in Paraguay but NOT the Current Project.

Law	Description	Project Impact
Law for the promotion of afforestation and reforestation N° 536/95[114] .	The Law consists of 5 chapters and 30 articles. INDEX: General provisions (I); Incentives to forestry activities (II); Tax regime (III); Penalties (IV); Special and final provisions.	The current project does not benefit from these incentives because the land on which it is being developed is of low quality.
Developed by Decree Nº 9.425/95[115] - Regulates Law Nº 536/95, for the promotion of forestation and reforestation.	The Decree, which consists of 25 articles, regulates Law No. 536/95 on the promotion of forestation and reforestation, and establishes the criteria for the classification of forest priority soils and management plans, as well as incentives for forestry activities. This Law provides that the State shall promote the action of afforestation and reforestation in forest priority soils, based on a Forest Management Plan and with the established incentives. The National Forestry Service will periodically supervise the faithful compliance of the afforestation or reforestation program.	

Source: DMSA, 2023.

[114] https://www.ecolex.org/es/details/legislation/ley-no-53695-ley-de-fomento-a-la-forestacion-y-reforestacion-lex-faoc017512/

[115] https://www.ecolex.org/es/details/legislation/decreto-no-942595-reglamenta-la-ley-no-53695-de-fomento-a-la-forestacion-y-reforestacion-lex-faoc017513/

5 Carbon Ownership and Rights

5.1 Project Holder

Individual or organization	**Desarrollos Madereros S.A. (DMSA)**
Contact person	Pablo Aquino
Job position	Forestry Engineer at Pomera Maderas SA
Address	Super highway Itaipu km 32 (N), Hernandarias - Alto Paraná, Py.
Phone number	+595 631 22777 / +595 631 23623 / +595 631 23600.
Email	paquino@pomeramaderas.com

The owner and proponent of the project is Desarrollos Madereros S.A. (DMSA), which has more than 25 years of experience in the cultivation and production of timber for industrial use, promoting the establishment of commercial plantations with good environmental practices, and therefore holds the FSC® (Forest Stewardship Council®) Forest Management and Chain of Custody Certification, granted exclusively to companies that demonstrate responsible management of forests and forestry plantations.

This company is also the owner of the land where the project is being developed and is an autarkic company that has decided to develop a carbon sequestration project on a small portion of the Tapytá and Hernandarias ranches with its own resources: capital, personnel and means of production are provided by DMSA.

It is important to mention that Desarrollos Madereros S.A. is the legal name of the company in Paraguay, but the trademark is POMERA MADERAS, under which another company of the same business group also operates in Argentina: Garruchos SA. Although the company is known by the brand name POMERA

MADERAS and its official website is under this name, throughout this document we have chosen to use the legal name Desarrollo Madereros S.A. (DMSA).

DMSA, in addition to being the project owner, performs key functions in the implementation for the success of the afforestation, which in other projects may be carried out by entities other than the project owner. This offers clear advantages from a strategic alignment and coordination point of view:

- As **project proponent**, DMSA coordinates the development of the technical documents required for the validation and verification of the initiative, considering the requirements established by the BCR Protocol. To this end, it employs its own human resources, in addition to being the contracting company of the other entities participating in the certification process: environmental consultancy and conformity assessment body. In addition, it carries out the Project's forest inventories that serve as the basis for the monitoring report quantifying the Greenhouse Gas reductions/removals of the Mitigation Forestry project. In this role DMSA will hold title to the VCC credits generated by the project.
- As the **sole owner of the land**, it assumes the responsibilities for its management and the necessary procedures for its change of use from livestock to forestry before the competent authorities. In addition, DMSA will ensure the permanence of forestry activities for the duration of the project. In this role, it also carries out the relationship with the neighboring communities and activates social actions aimed at achieving a positive impact of the project and the rest of its other forestry activities.
- As a **company specialized in forestry management**, DMSA carries out the necessary tasks for the execution of the project in an integral manner: from the preparation of the soil to its planting, as well as the forestry management tasks aimed at the maintenance, care and optimal growth of the plantations, exercising the functions of risk prevention (fire, pests, etc.). For this task, DMSA has its own equipment as well as outsourced equipment.

5.2 Other Project Participants

Provide contact information for GHG Project participants (add rows if necessary).

Individual or organization	**DESARROLLOS MADERERROS S.A.** **(DMSA, also known as Pomera Maderas)**
Contact person	Pablo Aquino
Job position	Forestry Engineer in charge of carbon capture projects
Address	Superhighway Itaipu km 32 (N), Hernandarias - Alto Paraná, Py.
Phone number	+595 631 22777 / +595 631 23623 / +595 631 23600
Email	*paquino@pomeramaderas.com*

Individual or organization	**Cambium Earth SL**
Contact person	*Juan Murillo Arias*
Job position	Head of Product Development
Address	Calle Recaredo, nº3 28002, Madrid, (Spain).
Phone number	+34 608 350 706
Email	*juan.murillo@cambium.earth*

5.3 Agreements Related to Carbon Rights

DMSA is the sole owner of the carbon rights. A contract has been signed between DMSA and Cambium Earth SL for the trading of the Carbon Credits of this project by Cambium Earth, in exchange for a commission. The contract is available upon request.

5.4 Land Tenure (Projects in the AFOLU Sector)

DMSA is the owner of the plots of land where the project activity will be developed. The following table specifies since when the company has been the owner of these plots.

Table 24. List of Plots with Their Acquisition Date and Reference.

ZONE	DATE OF DEED	PLOT	REFERENCE	DISTRICT
Tapytá	1996/07/23	7271	7533	San Juan Nep.
H-2	1999/02/04	13138	18046	Hernandarias
H-3	1998/10/21	1338	2243	Hernandarias
H-29	1998/11/9	13864	3331	Hernandarias
H - 45	2000/05/26	749	1382	Hernandarias
H - 45	2000/05/26	749	1380	Hernandarias
H - 45	2000/05/26	9355	15261	Hernandarias
H - 45	2000/05/26	1951	2786	Hernandarias
H - 45	2000/05/26	1950	2785	Hernandarias
H - 45	2000/05/26	2723	4437	Hernandarias
H - 45	2000/05/26	29703	30632	Hernandarias
H - 45	2000/05/26	29704	30633	Hernandarias
H - 45	2000/05/26	29702	30631	Hernandarias
H - 45,1	2000/05/26	2614	4338	Hernandarias
H - 45,1	2000/05/26	2626	4357	Hernandarias
H-49	2000/03/21	K13/3624	2996	Minga Guazú

Source: DMSA, 2023.

Proof of land ownership in Paraguay is provided by means of a Condition of Ownership Report, which is filed with the General Directorate of Public Registries. This Condition of Ownership Report demonstrates DMSA's ownership of the land and that there are no settlements of ethnic groups and/or local traditional communities within the project area.

The Condition of Ownership Report is processed by a Public Notary who needs to have the number of the property or matriculation in the land registry; the properties can also be identified by their registration number in the land registry.

This report may be requested before the Public Notary by any person who has this information. The plot and reference numbers that make up the project area are shown in Table 24. Therefore, if any interested party wishes to corroborate this information, he/she may do so without any inconvenience.

DMSA has all the original title deeds of the lots that make up the project as of the date of acquisition, as well as with the conditions of ownership of recent date. All

these physical documents are in safekeeping at DMSA's administration, and digitalized copies are also provided to the auditors of the validation and verification body, and to the technical team of the BCR seal itself as part of the confidential Supplementary Documentation of this project.

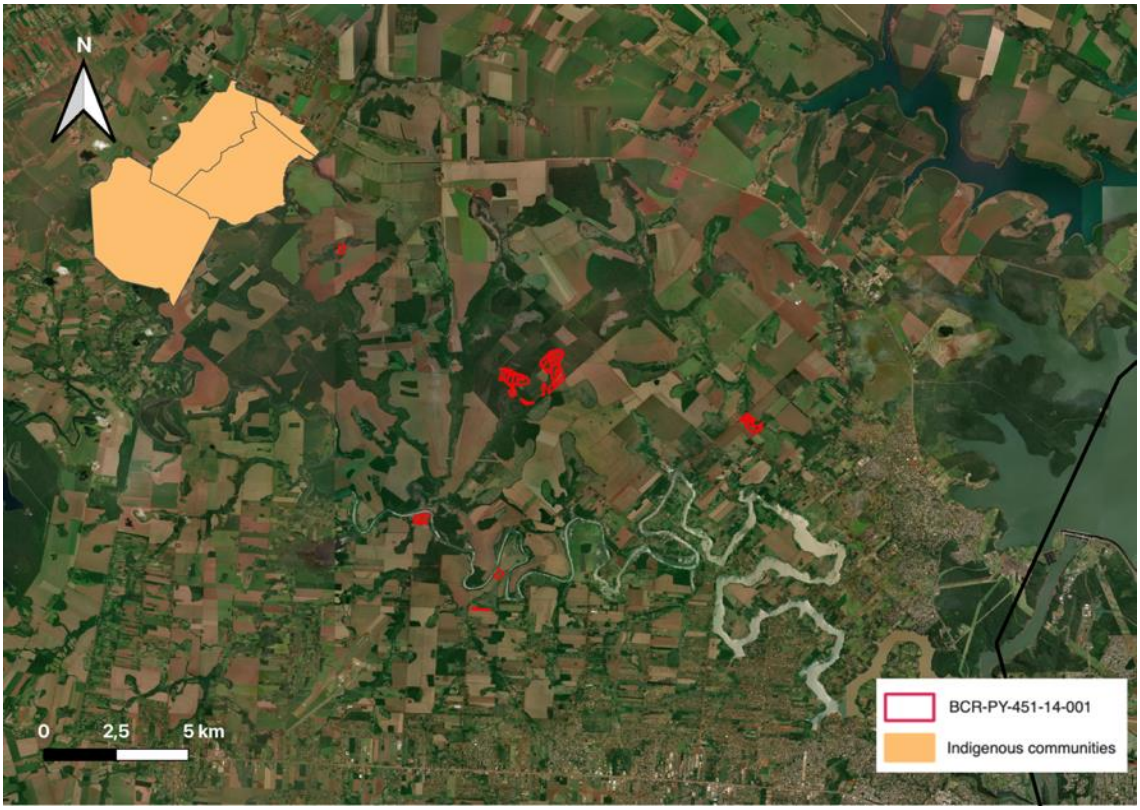
ANNEX 1 shows an example of a domain condition (after deleting confidential information such as proper names) and how to interpret it.

In order to ensure transparency, prior to each verification, the Ownership Conditions Report of all the lots that make up the project area will be requested again before a Notary Public, in order to be presented at each audit and thus demonstrate that there have been no transfers of ownership throughout the life of the project.

Finally, there are no indigenous communities in the project plots, according to data on indigenous communities from the Geoportal of the National Institute of Statistics of Paraguay.[116]

[116] Indigenous Communities Layer in the Geographic/Society Layers section https://portalgeoestad.ine.gov.py/

Figure 56. Presence of indigenous communities in the area of influence of the project, Hernandarias.



Source: National Institute of Statistics of Paraguay, 2023. ArcGIS World Imagery base cartography. Datum WGS84.

Figure 57. Presence of indigenous communities in the area of influence of the project, Tapytá.

Source: National Institute of Statistics of Paraguay, 2023. ArcGIS World Imagery base cartography. Datum WGS84.

6 Climate Change Adaptation

This forestry project contributes directly to mitigating the causes of climate change by capturing atmospheric CO_2, while increasing the resilience of previously degraded areas to the consequences of global warming.

The presence of forest cover in the project area also contributes to responsible soil management, reducing additional erosion and regulating the hydrological cycle.

In turn, the project contributes to the sustainable development of the region and the country in the following ways:

- Conservation of Biological Diversity. Work with Fundación Moisés Bertoni.

- Development of forestry capabilities on eroded, shallow, clay loam soils[117].
- Maintenance of the productive capacity of forest ecosystems.
- Maintaining the health and vitality of forest ecosystems.
- Conservation and maintenance of soil and water resources.
- Maintaining the contribution of forests to the global carbon cycle.
- Drainage system against flooding. Drainage maintenance is defined in DMSA's periodic budget.
- Choice of adapted species: Desarrollos Madereros SA has a Research and Development (R&D) area, which is a fundamental tool for the generation of technology that will be used for silvicultural management and the establishment of forest plantations.

One of the main actions to adapt to climate change resulting from the current project is the development and planting of hybrid species that have demonstrated better adaptability to the climate change being experienced in the region. The R&D program seeks to improve tree growth through genetic testing of the trees so that the species can better adapt to inclement weather. This is an ongoing process as new tests are constantly being carried out.

The advances achieved in R&D are incorporated into the forestry management plan established by the company in order to maximize the growth and production of the plantations, achieving high quality timber.

To this end, the materials are subjected to strict physical-mechanical studies of the wood, which guide the selection of the best material for each situation, without neglecting the evaluation of volume growth, cold tolerance, disease resistance, industrial performance, etc.

During 2006 and 2007, 120 superior individuals were selected, mainly in *Eucalyptus spp.* and evaluated for volume, stem shape, health and type of branches within a

[117] https://imagoteca.com.py/republica-del-paraguay-mapa-de-reconocimiento-de-suelos-de-la-region-oriental/

commercial forest stand of 5.400 ha. These were evaluated in trials established in Hernandarias and Tapytá.

In 2009, the selection of more than 1.000 superior individuals *of E. grandis and E. urophylla* continued, evaluating the volume, shape of the trunk, health, type of branches, frost resistance, biomass production. The selection has been carried out in the four Base Populations of *E. grandis* that the company has, three in Hernandarias and one in Tapytá, and the Base Populations of *Eucalyptus urophylla.*

As for the Base Populations, we have the Third Generation for both *E. grandis* and *E. urophylla*. The families that form part of the genetic base are necessary to obtain new materials on a permanent basis.

The controlled crossbreeding program is also being followed up, the results of which will provide new material for subsequent selection.

On the other hand, taking into account the requirements indicated in Section 11.8 of the BCR Standard v3.4 and the analysis made above, it is possible to make the following statements:

- The project is in line with the with the National Climate Change policies (see section 4)

- The project improves conditions for the conservation of biodiversity and its ecosystem services, and its activities generate sustainable and low-carbon productive landscapes, taking into account that it is a commercial plantation developed in a non-forest area.

- The project integrated actions that assist in the efficient use of soil, including, land use consistent with land vocation and agroecological conditions that increases competitiveness by reducing vulnerability to climate change, as the project activities description evidence (see section 2.3).

- The project proposes areas with restoration processes in areas of special environmental importance, taking into account that part of the areas of the properties where the project is developed have a high degree of ecological importance (see secion 2.5).

- The project develops forest production systems more adapted to high temperatures, droughts or floods, to improve competitiveness, income and food security, especially in vulnerable areas, taking into account that it is developed in an area where the main activity is extensive livestock farming, which favors the risk of drought and soil degradation due to erosion.

- The project generates a reduction in GHG emissions from agricultural activities, compared to the scenario without the project, taking into account that the baseline scenario corresponds to extensive livestock farming.

- The project develops actions directly related to adaptation measures to climate change, taking into account that a forest plantation is established on two properties that have a high degree of ecological importance (see secion 2.5).

7 Risk Management

In accordance with section 2 of the BCR Permanence Risk and Risk Management Tool V 1.1, Table 25, Table 26, and Table 27 describe the risks identified by the project proponent in environmental, financial and social aspects of the project. Also following this tool, the risks were rated in three grades: high, medium and low, according to their potential impact on carbon benefits. High risk means a risk of reversal associated with this variable that can impact up to 10% of the carbon benefits accrued by the project in each verification event. Medium risk represents a reversal risk that can reach 5-10% of the VCC units. And low risk represents a reversal risk of less than 5% of the VCCs.

Table 25. Identification and Qualification of Environmental Risks of the Project.

Risk	Description	Risk Rating
Fires	Forest fires generate up to one third of global ecosystem carbon emissions according to IPCC expert reports. At the same time, the increase in the earth's temperature caused by climate change intensifies forest fires, as this variable is their main driving factor. The increase in heat also dries out vegetation, increasing the probability of combustion[118] . According to United Nations publications, forest fires are projected to increase by 30% by 2050 and by more than 50% by the end of the century[119] . The monthly statistics of fire outbreak monitoring in Paraguay for the month of October 2020 reported 40.953 fire outbreaks throughout the national territory. The latest Heat Foci Report[120] on the Republic of Paraguay published on September 30, 2021 of the last 10 years, indicates that during the period from 2019 to 2021 a significant increase in the number of detected outbreaks was detected. These results are mainly linked to the drought that the region has been experiencing in recent years caused by the climatic phenomenon of La Niña[121] , and related to human activities that influence the occurrence of these outbreaks. The Ministry of Public Health and Social Welfare of Paraguay states that the causes of forest fires are mostly related to human activities. According to various publications, forest	High

[118] https://news.un.org/es/story/2022/02/1504472

[119] https://www.un.org/sustainabledevelopment/es/2022/02/los-incendios-forestales-aumentaran-un-30-para-2050-y-un-50-para-fin-de-siglo-debido-a-la-crisis-climatica/

[120] https://focoscalor.meteorologia.gov.py/

[121] Díaz, F., & Alvaro, P. (2020). Analysis of forest fire occurrence and its relationship with the El Niño-Southern Oscillation (ENSO) climate phenomenon in Paraguay, 2001-2019 (Master's thesis, FCT-UCA).

Risk	Description	Risk Rating
	and rural fires in Paraguay are due to anthropogenic causes, and about 1% are due to natural causes such as lightning strikes.[122] The use of fire is common in rural communities as a low-cost and accessible cultural practice for clearing land, eliminating weeds, stubble and pests. The communities of Ciervo Cua, Enramadita, Toro Blanco, Corazón de Maria, Ñumi, Tacuaró, Manduarã, neighboring the Tapytá field, and the Toryvete, Independiente and Acaraymi communities in the fields located in Hernandarias, carry out these practices on a regular basis. However, the communities do not have the safety conditions, nor do they have the tools and equipment to fight fires, nor the preparation and trained personnel (brigade members) in case the use of fire gets out of control. The consequences of forest fires in recent years in Paraguay have not only had an impact on the natural environment, but also with losses in the millions of dollars (Molinas-González, 2021)[123] . Fire risk is not constant throughout the year. DMSA uses the IPI (Fire Danger Index). The calculations used to determine the fire danger index are based on the Monte Alegre or Soarez formula, adjusted to DMSA's needs. It is the product of a series of meteorological considerations such as temperature, humidity, wind speed. Number of days elapsed since the last rainfall, effective precipitation, data published and updated on the Pomera	

[122] Molinas-González, C. R., & Florentín, P. (2021). Forest fires in Paraguay: implications for their prevention and management. Investigaciones y Estudios-UNA, 12(1), 47-57.
[123] Molinas-González, C. R., & Florentín, P. (2021). Forest fires in Paraguay: implications for their prevention and management. Investigaciones y Estudios-UNA, 12(1), 47-57.

Risk	Description	Risk Rating
	Maderas website, thus allowing an analysis of the degree of danger of fire occurrence and measures to be taken. The adjusted formula is a cumulative coefficient, which categorizes the danger of vegetation fires. When precipitation occurs during the observation period, it is corrected according to the precipitation fallen. Forest fires are caused by natural factors such as lightning, or by human factors, such as burning in livestock fields, for pasture improvement, or resprouting from controlled burns, or even intentionally by activities such as poaching, poachers, honeymooners, or pyromaniacs. Forest fires can cause serious damage by destroying plantations, damaging tree timber, reducing vegetation cover, exposing the soil to erosion, affecting water quality by dragging ash and soil, damaging air quality by emitting smoke and gases, decreasing the availability of food for wildlife and exposing them to mortal risks. DMSA developed an index to rate values threatened by fire occurrence and spread Classification of threatened values 1. Experimental forest areas. **Productive forest areas:** a. Plantations. b. Native forest. c. Agricultural areas. d. Reservations.	

<table>
<tr><th>Risk</th><th>Description</th><th>Risk Rating</th></tr>
<tr><td></td><td>

Historical occurrence: the highest percentage of fires generated in the regions where the project plots are located occurs during extreme weather conditions with long periods of drought.

<table>
<tr><td>Risk</td><td>Station</td><td>Period</td></tr>
<tr><td>High</td><td>Spring-Summer</td><td>November - April</td></tr>
<tr><td>Medium</td><td>Winter-Spring</td><td>July - September</td></tr>
<tr><td>Low or nil</td><td>Fall-Winter</td><td>May -August</td></tr>
</table>

Only 1% of fires are of natural origin caused by lightning, the rest are due to anthropogenic activities that can be coded as:

- Negligence: agricultural burning, clearing of roads, wire fences, burning of pasture/stubble.
- Forestry work: poorly maintained machines without spark arresters, smokers, burning sawdust and neighbors' garbage.
- Use of pyrotechnics: rockets at Christmas parties
- Other events: use of fire for barbecue, children playing with fire, remains of smoke used in beekeeping, use of fire for poaching.

Other Causes

- Electrical wiring: lack of maintenance.
- Resurgence of controlled fires: due to lack of ash guard.

Fires are the natural risk that could cause the most damage to the project. If a fire occurs, the wood from the trees, depending on the damage suffered, can be used for commercial purposes. However, if it were to occur in the area of the current project, the potentially affected area would have to be replanted. DMSA has the firm decision and commitment to do so and has the necessary resources to do so.

</td><td></td></tr>
</table>

Risk	Description	Risk Rating
Winds	According to the Risks Atlas prepared by National Emergency Secretariat[124] of the Republic of Paraguay, approved by Resolution SEN No. 565/2018[125], in the department of Alto Paraná and Caazapá hurricane winds (speed greater than 160 km per hour) can occasionally occur and can originate tornadoes in extensive plains. The probability of these events occurring in the project area is very low. During the summer, the sirocco wind blowing from the northeast is dominant, warm and humid. In winter the dominant wind is cooler, as it comes from the south, from the Pampa, driven by the Atlantic anticyclone, but in any case cooler than the sirocco. Winds are usually light, rarely exceeding 70 km / h, although occasionally there are hurricane winds, with speeds above 160 km / h, which causes that in extensive plains can originate tornadoes[126] . The most relevant damages that winds can cause to trees are trunk breakage and root overturning. In the first case, the mitigation measure is to carry out resprouting management. In the following case, depending on the level of damage, the trees will be replanted.	Low
Pests and diseases	The areas where the forest management units are located are characterized by the natural habitat of leafcutter ants, the main pest affecting forest plantations and considered endemic to the region, where forest management must include strict control over the ant population level. Otherwise, the project will be seriously affected, even reaching extreme situations in which it becomes unfeasible.	High

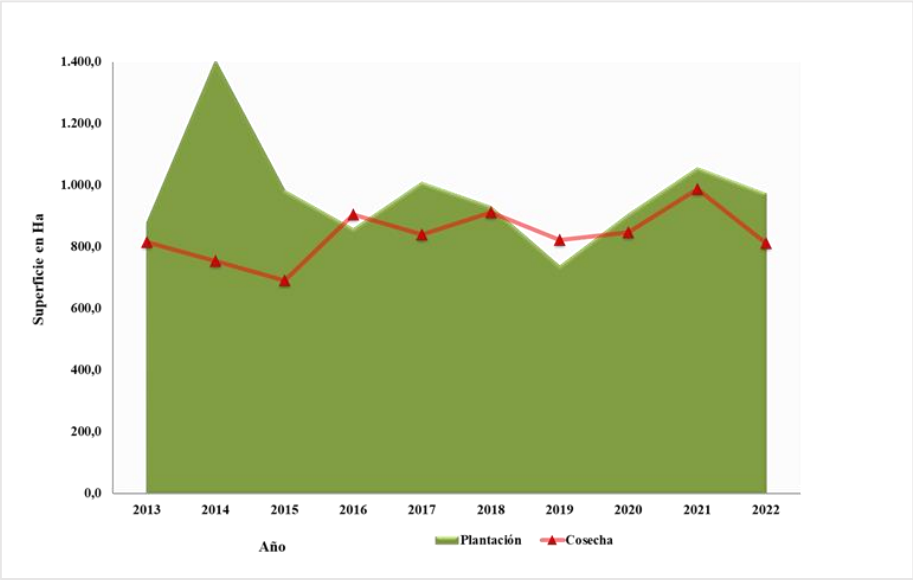
[124] https://www.sen.gov.py/application/files/9015/9862/5498/Atlas_de_Riesgos_de_Desastres_de_la_Republica_del_Paraguay_2018.pdf
[125] https://www.mades.gov.py/wp-content/uploads/2019/04/RESO-AA-N%C2%B0-565_2018.pdf
[126] https://www.sen.gov.py/application/files/9015/9862/5498/Atlas_de_Riesgos_de_Desastres_de_la_Republica_del_Paraguay_2018.pdf

Risk	Description	Risk Rating
	As mentioned above, we continue with the treatment of the populations of cutter ants (Atta spp. and Acromyrmex spp.). These affect the growth of the trees due to the intense defoliation they generate if they are not properly controlled. This threat is present throughout the plantation cycle. There are also other pests that have a lower risk of occurrence and whose consequences are not significant for the project's forest stands. These other pests are only monitored because there is no real risk of significant impact. These are: *Thaumastocoris peregrinus, Glycaspsis spp, and Leptocybe invasa*.	
Floods	According to the *Atlas de Riesgos de Desastres de Paraguay*, the non-existence of events in the historical records and given the situation of the project plots with respect to the hydrographic network, also taking into consideration that the soils are moderate to well drained and that DMSA contributes positively to the maintenance and protection of natural drainage and executes the relevant drainage works in forestry projects, there is no considerable risk of flooding in the project area.	Low

Source: DMSA, 2023.

Table 26. Identification and Rating of Project Financial Risks.

Risk	Description	Risk Rating
Resources secured for the establishment of the project	DMSA, as promoter and sole financier of the project, has more than 20 years of forestry activity in the regions where the current project is being developed. It has a forestry patrimony of more than 8.500 hectares, which are normalized and in 2018 are being planted in the third cycle. All investments in plantations are historically made with its own funds that not only come from forestry activities, but also from other production activities. DMSA has also developed a forestry management plan, in compliance with FSC requirements, where all the activity to be developed is projected for 10 years.	Low

Risk	Description	Risk Rating
	Once the deadline is met, a new forest management plan is implemented for the next 10 years. As of 2018, the second forest management plan is being implemented since the beginning of FSC certification in 2006. As shown in the following graph, DMSA maintains a forest management rate of approximately 900 hectares per year in both planting and harvesting. Figure 1. Planted area/harvest DMSA.  Source: DMSA, 2023. The surface area of the project (172,76 ha) means that its scale is less than 20% of the company's annual volume of activity, for which DMSA has the solvency to be able to plan and execute the planting work for this project.	

Risk	Description	Risk Rating
	In the last decade, DMSA's economic performance has remained above 30% of its turnover, which allows it to have sufficient funds to plant the area of the current project. Therefore, it is not considered that there is a risk to be able to afford a plantation.	
Resources secured for project maintenance	DMSA, as promoter and sole financier of the project, has more than 20 years of forestry activity in the regions where the current project is being developed. It has more than 8.500 hectares of forestry assets, which have been normalized and the third cycle is being planted as of 2018. In turn, DMSA has a professional staff made up of Agricultural and Forestry Engineers and Technicians, accompanied by external advice from professionals in different areas such as biologists, veterinarians, geneticists, entomologists, phytopathologists, soil scientists and of course highly qualified and experienced professionals in the areas of administration, finance and human resources to carry out all the activities necessary for the maintenance of the project. In the last decade, DMSA's economic performance has remained above 30%, which implies that all the activities required to maintain the project throughout the accreditation period are fully guaranteed by DMSA's solvency. Therefore, given the scale of the project, it is not considered that there is a risk for a company whose forestry operations cover a much larger area, and which executes with technical solvency and sufficient budget availability.	Low
Financial capacity of the project holder	DMSA, as promoter and sole financier of the project, has more than 20 years of forestry activity in the regions where the current project is being developed. It has more than 8.500 hectares of forestry assets, which have been normalized and the third cycle is being planted as of 2018. Since 2007 DMSA guarantees the industry (timber and biomass) the constant delivery of more than 200.000 solid m^3 of round wood, which guarantees around 2.000 jobs from the field to the industry with its added value. In turn, not only has DMSA's economic	Low

Risk	Description	Risk Rating
	performance remained above 30% in the last decade, but it also owns more than 21.000 hectares of land. Therefore, it is not considered that there is a risk with respect to the company's financial capacity to undertake all the activities necessary to ensure that the project is maintained for the entire accreditation period.	

Source: DMSA, 2023.

Table 27. Identification and Qualification of Social Risks of the Project.

Risk	Description	Risk Rating
Land disputes	DMSA owns all of the land, 100% titled and duly registered in the General Directorate of Public Registries. DMSA's land tenure dates back more than 20 years. In the Table 13 specifies how long the company has held these titles, which affirms that the project plots are not under dispute by ethnic groups and/or local traditional communities. The original documents are shared in the supporting documentation folder[127] . In Paraguay, land (real estate) is a registrable asset, so that any person, whether natural or legal, who holds the title/ownership of the land (real estate) must register the title deeds in the public registry. In order to prove the ownership of the land (real estate), a request must be made to the General Directorate of Public Registries for a certificate called Condition of Ownership	Low

[127] Deeds of Ownership and Ownership Condition Reports in supplementary documentation folder 02.

Risk	Description	Risk Rating
	Report. It was requested by a Public Notary with the title deed and complete the certificate following its guidelines. This certificate currently informs about the ownership of the real estate and everything that affects it. It has no expiration date.	
Political risks	Paraguay's political risks are very low. Since 1989 with the departure of Alfredo Stroessner (end of the de facto government of Paraguay), the country has been in an uninterrupted democratic process. Paraguay has a functioning structure in which the private sector is the protagonist, generating incentives for economic/industrial development such as monetary stability, low inflation and low tax burden. For example: • The GDP growth of the Republic of Paraguay from 2006 to 2020 has been 3,8% per year.[128] • Moody's, Standard & Poor's and Fitch ratings classify Paraguay as a stable country.[129] • Inflation from 2006 to 2021 averaged 4,93%.[130] • Low tax burden: Paraguay's tax system is designed to promote the development of economic and industrial activities.[131]	Low
Opportunity cost	DMSA has more than 20 years in the forestry activity. This is due to the firm commitment and conviction it has for the realization of this project through plantations, generating an additional benefit to the environment and society. At the same time, by entering the	Low

[128] https://issuu.com/opentechla/docs/presentaci_n_pa_s_ingles_2022_16_mar_2022
[129] https://issuu.com/opentechla/docs/presentaci_n_pa_s_ingles_2022_16_mar_2022
[130] https://datos.bancomundial.org/indicator/FP.CPI.TOTL.ZG?end=2022&locations=PY&start=2006&view=chart
[131] https://issuu.com/opentechla/docs/presentaci_n_pa_s_ingles_2022_16_mar_2022

Risk	Description	Risk Rating
	carbon market, the forestry projects that are designed will be more profitable, which means that the risk of changing activities will be less and less.	

Source: DMSA, 2023.

7.1 Reversal Risk

Section 7 of this document identified and analyzed the natural, financial and social risks that could occur in the project. In this section the mitigation measures that DMSA identified for the medium and high risks, as well as their monitoring, will be developed following the BCR Risks and Permanence V 1.1 tool.

It is important to note that according to the BCR Standard v 3.4 in section 14.1.1 "Reversal risk" establishes that projects in the AFOLU sector, once GHG removals are registered, a reserve of 20% of the total GHG emission reductions quantified for each verified period will be automatically discounted and maintained.

These retained Verified Carbon credits may be released and placed on the market at a later verification, if and only if the GHG project remains under the BCR Standard and active in the BioCarbon Registry system. Therefore, when the first verification report is prepared, the 20% established for reversion risk will be deducted from the total GHG removals of the project in this first stage.

Table 28. Project Environmental Risk Mitigation Measures.

Risk	Risk Rating	Mitigation Measures
Fires	High	The **Fire Protection Plan** of the project designed by DMSA, contains the Integrated Fire Management Plan, establishing measures to detect, combat and mitigate the effects of forest fires and use fire as a tool in order to avoid or minimize economic and environmental impacts, keeping the affected Human Resources trained in the Heritage Protection, it is aimed at both Tapytá and Hernandarias Farm. To review the plan in detail please refer to the document "Fire Protection Plan" in the Supplementary Documentation folder[132] . Fire monitoring is explained in detail in section 17 of the monitoring plan.
Winds	Low	Although this risk rating is low for the project, the project has taken certain mitigation measures to avoid wind losses since the planning of the establishment of the plantations, which are located near natural barriers. In the event of this type of risk and damage to any of the surfaces of the project, DMSA has the solvency and the decision to replant everything that is affected.
Pests and diseases	High	The mitigation plan is based on the development of a detection and control strategy. It comprises a set of measures that, in an integrated manner, make it possible to maintain damage levels below the threshold of serious economic damage. At the same time, excessively aggressive treatments are avoided, since under the FSC criteria the measures are intended to have a low impact on the environment and represent a low risk for forest operators and neighboring local communities.

[132] Complementary documentation/ 04.-Risk management/ Fire Protection Plan

Risk	Risk Rating	Mitigation Measures
		Since the most relevant pest for the project is the leafcutter ants, pest control is focused on them. Controls are carried out using granulated baits that are distributed manually in the vicinity of the ant hills. The bait is composed of an inert part and another part containing the phytosanitary product approved by SENAVE[133] and also permitted by FSC (DMSA has been FSC certified since 2006). To reduce the risk to non-target animals, the control procedure is directed, where it is first necessary to identify the nests and then apply the product to the mouths of the anthills. If the entrance mouths are not found, the product is applied to the side of the paths built by the ants. All personnel involved in the control and combat of cutter ants are properly instructed and trained in the handling and application of agrochemicals. DMSA has embarked on a project "Isolation of fungi for the control of cutter ants in forest crops" with the research institution IPTA to search for control alternatives with entomopathogenic agents. As of mid-2018, a joint research work started with the National University of Asunción, other forestry companies and a cooperative, whose objective is to investigate the dynamics of leafcutter ants in Paraguay. This project is still in the development stage. Pest and disease monitoring activities can be found in the monitoring section 17. Within the complementary documentation[134] , the DMSA Operating Procedure for ant control is provided.

[133] https://www.senave.gov.py/
[134] Risk management/ PO 05-DMSA Ant Control

Risk	Risk Rating	Mitigation Measures
Floods	Low	As demonstrated in section 3.4 (natural barriers) of this document the risk of flooding within the project area is minimal and therefore no special mitigation measures beyond the usual drainage for forestry projects are considered.

Source: DMSA, 2023.

Table 29. Project Financial Risk Mitigation Measures.

Risk	Risk Rating	Mitigation Measures
Resources secured for the establishment of the project	Low	As demonstrated, the DMSA project developer has secured resources for the establishment of the project. However, additional mitigation measures are taken to ensure the long-term solvency of the project activity. Of each year's economic result, a portion is allocated to the legal reserve to the optional reserve, and, in turn, an equivalent and sufficient liquid economic fund is maintained at all times to cover all costs associated with the current project for a period of 10 years.
Resources secured for the establishment of the project	Low	As demonstrated, the DMSA project developer has secured resources for the maintenance of the project. However, additional mitigation measures are taken to ensure the long-term solvency of the project activity. Of each year's economic result, a portion is allocated to the legal reserve to the optional reserve, and, in turn, an equivalent and sufficient liquid economic fund is maintained at all times to cover all costs associated with the current project for a period of 10 years.
Financial capacity of the project holder	Low	As demonstrated, DMSA faces no financial risks. However, additional mitigation measures are taken to ensure the long-term solvency of the project activity. Of each year's economic result, a portion is allocated to the legal reserve to the optional reserve, and, in turn, an equivalent and sufficient liquid economic fund is

		maintained at all times to cover all costs associated with the current project for a period of 10 years.

Source: DMSA, 2023.

Table 30. Project Social Risk Mitigation Measures.

Risk	Risk Rating	Mitigation measures
Land disputes	Low	The risk associated with land disputes is very low due to the demonstration of land ownership as described in section 5.4 of this document as evidenced by the land tenure deeds. Prior to each verification the certificate of ownership status will be processed before the Dirección General de los Registros Públicos which would demonstrate that DMSA will remain the owner of the land and that there are no land disputes.
Political risks	Low	DMSA is a member of production associations such as: the Paraguayan Timber Federation (member of the Board of Directors), the Paraguayan Agricultural Coordination, the Soybean Producers Association, the Paraguayan Rural Society and participates proactively in the Congress on legislative projects that may influence DMSA's activity. This ensures full knowledge of all political changes that may arise.
Opportunity cost	Low	DMSA has been carrying out forestry activities for more than 20 years. This is due to the firm conviction to contribute to the environment through its activities. DMSA made the decision to include carbon credit projects as part of its business unit. Therefore, the extra income that the carbon credits will produce makes it less likely that DMSA will develop another activity.

Source: DMSA, 2023.

8 Sustainable development safeguards (SDSs)

The project activity converts an area of low production, where extensive cattle ranching was carried out, into a forestation that will contribute positively to mitigating the advance of climate change by capturing carbon dioxide from the atmosphere. The project is based on direct planting with low-impact and environmentally friendly techniques, and the use of sustainable management practices under FSC certification, which means that the design, planting and maintenance of the forest are carried out through a sustainable forest management program that avoids negative impacts on biodiversity, local communities, the water balance of the watersheds and the scenic beauty of the landscape.

This afforestation project will be carried out considering DMSA's Forest Management Plan under the FSC certified Forest Management standard. And in compliance with Law N° 422/73[135] . And Law N° 536/95[136] .

The afforestation project activity in soils degraded by cattle ranching with suboptimal quality for afforestation is included in the environmental studies developed for both estancias: Hernandarias and Tapytá. Only part of the environmental impacts mentioned in the environmental assessment correspond to the environmental impacts of the project activity. The analyses of the environmental impacts come from the Environmental Impact Study[137] developed by DMSA and approved by the Secretariat of the Environment (currently the Ministry of the Environment and Sustainable Development).

The following is an analysis of potential impacts carried out following the BCR Tool Sustainable Development Safeguards (SDSs) version 1.1 (Tables 31 through 41), which is in accordance with the requirements of the BCR Standard v3.4, section 15.

[135] https://www.ecolex.org/es/details/legislation/ley-no-42273-ley-forestal-lex-faoc023975/.
[136] https://www.ecolex.org/es/details/legislation/ley-no-53695-ley-de-fomento-a-la-forestacion-y-reforestacion-lex-faoc017512/
[137] Environmental Impact Assessment Study. Main Report/October.2000 / submitted and approved by SEAM/ environmental impact statement N° 32/01 dated 23/3/2001.

Table 31. Land use: Resource efficiency and pollution prevention and management

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Land degradation or soil erosion, leading to the loss of productive land?	Potentially	In general, the potential risk of a negative impact on soils from a forestry project can be caused by three project activities: 1) land preparation 2) tree planting 3) use of agrochemicals for weed control 4) forest harvesting activities Section 2.3 of this document details how these activities are planned to be carried out. Furthermore, later in this section, the mitigation measures included in the project to mitigate and reduce this risk are described in greater detail.
Contaminating soils and aquifers with pollutants, chemicals, or hazardous materials?	Potentially	All DMSA projects are certified by the FSC, which has criteria for reducing fertilizers, as well as a pesticide policy. The first indicates that the use of non-natural fertilizers must be minimized or avoided, and the second aims to reduce the total volume of chemical pesticides and eliminate the use of the most dangerous ones (folder 14 of the supplementary documentation). Additionally, DMSA has its own Responsible Management Program for Agrochemicals (folder 4 of the supplementary documentation), which aims to avoid, minimize and mitigate the possible environmental and health impacts that could arise from the reception, loading, storage, handling, application and final disposal of phytosanitary products. In addition, although the Tapytá Farm is located in an area of relative altitude and far from significant water courses in the vicinity of the project area, the Aña Cuá stream runs through the Hernandarias Farm, very close to the project area, which ends up emptying into a relatively important water course, the Acaray River. In order to adequately control that there are no negative effects on this watercourse, when the first stage of quantification is carried out, water quality studies will be conducted where the pH and dissolved oxygen in the water will be monitored both at the entrance and exit of the Aña Cuá stream in the vicinity of the project strata, to ensure that it complies with the Paraguayan Surface Water Quality Standard.
Air and water pollution resulting from project-related emissions,	No	Residues produced during seedling production are biodegradable and are planted together with the seedlings (see section 11.7). Finally, DMSA's Responsible Management of Agrochemicals Program also focuses on waste disposal practices (Folder 4). The generation of other wastes whose improper handling could contaminate water or air is not considered.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
discharges, or improper waste disposal practices?		
Detrimental excess of nutrients caused by the use of fertilizers and/or pesticides?	No	In its Responsible Management of Agrochemicals Program (which complies with FSC requirements), DMSA establishes the exact quantities of fertilizers and pesticides per hectare, minimizing the risk of excessive application (Folder 4 of the supplementary documentation). This document also establishes that its workers must receive training to apply agrochemicals.
Inadequate waste management practices, leading to the improper disposal of project-related waste and potential environmental harm?	No	All DMSA operating procedures clearly indicate how its staff must handle any type of waste associated with the different activities (supplementary documentation folder 7). In addition, waste from agrochemical containers is treated in accordance with DMSA's Responsible Management of Agrochemicals Program (Folder 7).
Inefficient resource use, including energy, water, and raw materials, leading to increased environmental footprint?	No	The procedure for artificial irrigation is outlined in DMSA Operational Procedure #7 (Folder 7 of the supplementary documentation) and is only indicated during planting events and when the Head of Operations deems it necessary. On the other hand, planting is done manually, as are thinning and pruning. Only land preparation and harvesting require the use of heavy machinery, and these activities follow DMSA Operational Procedures (Folder 7) and FSC regulations (Folder 14).
Losing productive agricultural land to urban expansion, impacting local food production, rural livelihoods, and overall food security?	N/A	The lands where project activities are taking place were acquired by DMSA between 1996 and 2000 (Table 24), and all of them were previously used for livestock rearing, so no agricultural land is or will be affected by project activities.
Urbanization, leading to the urban heat island effect, impacting local climates and potentially contributing to higher energy consumption for cooling?	N/A	The project activities will not generate any urban development, but instead will restore forest cover, which will have a positive impact on the local climate.
Disrupting natural drainage systems, leading to	N/A	Natural drainage systems will not be altered. On the contrary, increased forest cover will stop soil erosion and allow more water to be retained.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
increased vulnerability to floods, soil erosion, or other hydrological issues?		
Inadequate recycling and reuse of project-related resources, leading to unnecessary waste and environmental impact?	No	Agrochemical residues will be disposed of in accordance with DMSA's Responsible Management of Agrochemicals Program (Folder 7), and seedling tubes are biodegradable (Section 11.7).
Deforestation or degradation of forested areas impacting carbon sequestration, biodiversity, and ecosystem services?	No	No deforestation occurred at the start of project activities. Instead, project activities are being carried out on lands that were formerly used for livestock farming and will restore forest cover. All forestry activities are carried out following FSC standards (Folder 14) and at the end of the project, forest cover will remain intact.
Changes in agricultural practices, such as intensive monoculture, leading to soil degradation, loss of biodiversity, and increased vulnerability to pests?	N/A	No agricultural practices will take place in this project.
Urbanization or infrastructure development leading to changes in land use patterns and potential habitat fragmentation?	No	The infrastructure that was built for the project is the access roads for forestry operations as well as facilities for forestry workers. Considering the reference land use, the project does entail a change in land use, as it is now used for afforestation and at the end of the project it will still be a forest. However, there is no habitat fragmentation as a result of the project. On the contrary, the resulting forest cover will have a positive impact on habitat connectivity.

Table 32. Water

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Exacerbating water scarcity or depleting water resources?	No	We do not consider that this project may generate significant negative impacts given its small scale, spatial fragmentation and the climatology of the project areas, since evapotranspiration in a eucalyptus plantation in a subtropical climate zone can be estimated at 1,000 mm/year[138], while precipitation in the project area exceeds 1,800 mm/year.
Water pollution, including contamination of rivers, lakes, oceans, or aquifers as a result of project-related activities such as emissions, spills, or waste disposal?	Potentially	Regarding the potential impact on water quality, there could be a slight and punctual negative impact due to the project activity corresponding to the soil preparation stage. To avoid this, a manual tillage technique with minimal impact[139] will be used, which facilitates water infiltration. However, once the soil has been removed, rainfall could generate small runoffs that could drag mineral sediments into the river beds in the project area. In addition, there could be a potential impact due to the use of agrochemicals, but this would also be minimal, since the use of agrochemicals will be restricted to the maximum quantities stipulated by the FSC seal procedures. Section 2.3 describes how fertilization and weed control are carried out, in accordance with the DMSA Responsible Management of Agrochemicals Program (Folder 4 of the supplementary documentation). Although the Tapytá Farm is located in an area of relative altitude and far from significant water courses in the vicinity of the project area, the Aña Cuá stream runs through the Hernandarias Farm, very close to the project area, which ends up emptying into a relatively important water course, the Acaray River. In order to adequately control that no negative effects occur on this water course, when the first stage of quantification is carried out, water quality studies will be carried out where the pH and dissolved oxygen in the water will be monitored both at the inlet and outlet of the Aña Cuá stream in the vicinity of the project strata, to ensure that it complies with the Paraguayan Standard for Surface Water Quality[140].

[138] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5388327/
[139] http://revistas.uach.cl/pdf/bosque/v16n2/art01.pdf
[140] https://normas.intn.gov.py/cgi-bin/koha/opac-detail.pl?biblionumber=470

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Disrupting aquatic ecosystems, including marine life, river ecosystems, or wetlands, due to changes in water quality, temperature, or flow patterns?	No	As indicated in section 2.5, in the subsections Hydrology/Hydrogeology and Hydrographic Networks, no watercourses pass through the project area and DMSA is committed to the conservation of gallery forests surrounding seasonal watercourses.
Altering coastal dynamics, including erosion, sedimentation, or changes in sea levels?	N/A	The project area is located more than 600 km inland, so it does not alter coastal dynamics.
Displacing or negatively impacting wetland habitats, affecting the unique biodiversity and ecosystem services provided by wetlands?	No	It is important to note that the project area in Hernandarias is very close to wetlands and the Acaray River. However, as indicated in section 2.5, DMSA is committed to the conservation of gallery forests surrounding seasonal watercourses. Additionally, as indicated in section 3.1.1 regarding the conditions of applicability of the methodology, none of the selected plots can be considered a wetland according to the RAMSAR convention and the National Wetlands Inventory of Paraguay. Figures 10 and 11 show the location of the wetlands closest to the project area for both Tapytá and Hernandarias.
Altering river flow patterns, potentially leading to downstream impacts on water availability, sediment transport, and ecosystems?	No	As mentioned above, the water courses that run through the project areas (seasonal and permanent) are surrounded by gallery forests that will be preserved during the life of the project with the aim of not altering their flow patterns.
Depleting aquifers and groundwater resources as a result of the project's activities, impacting local water supplies and ecosystem sustainability?	No	As indicated in section 2.5, in the Precipitation section, the accumulated annual precipitation in the Hernandarias area reaches 1,867 mm/year and in the Tapytá area 1,856 mm/year. Therefore, artificial irrigation of the plantations will be very rare and scarce, so that the aquifers and groundwater sources will not be depleted.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Mountainous terrains, including changes in snowmelt patterns, glacier dynamics, or alterations in water runoff?	N/A	There will be no alterations in water runoff. The seasonal waterways will be maintained, as well as the gallery forests that surround them.
Disrupting lake ecosystems, including changes in water quality, nutrient levels, or habitat disturbance?	N/A	There are no lakes in the project area.
Contributing to ocean acidification, with potential consequences for marine life and coral reef ecosystems?	N/A	As previously stated, the project area is located more than 600 km away from the ocean.

Table 33. Biodiversity and Ecosystems

Could the project/initiative activities potentially entail or result in:	Response	Mitigation or preventive action
Habitat destruction or fragmentation, impacting biodiversity by reducing available habitats for various species?	No	The project does not generate habitat destruction or fragmentation, impacting biodiversity since it is being developed in an area where cattle ranching predominates (see sections 3.3 and 3.4)
Introducing invasive species,which could negatively affectnative flora and fauna and disrupt local ecosystems?	No	The project does not include invasive species as it can be seen in section 2.3.
Altering ecosystem dynamics, including changes in species composition, trophic interactions, or nutrient cycleson the environment?	No	The project is being developed in an area where cattle ranching predominates (see sections 3.3 and 3.4) and does not include any activity that could generate alteration of ecosystem dynamics, including changes in species composition, trophic interactions, or nutrient cycles on the environment (see section 2.3).

Could the project/initiative activities potentially entail or result in:	Response	Mitigation or preventive action
Disrupting migration patterns for wildlife species, such as birds,mammals, or aquatic organisms?	No	The project is being developed in an area where cattle ranching predominates (see sections 3.3 and 3.4).
Chemical contamination or pollution negatively impacting biodiversity in soil, water, or air?	No	The project does not include any activity that could generate chemical contamination or pollution negatively impacting biodiversity in soil, water, or air (see section 2.3).
Overexploiting naturalresources, such as timber, water,or other materials, leading to declines in biodiversity andecological balance?	No	The plantation is designed for responsible timber production (see section 2.3).
Overharvesting species at rates faster than they can actually sustain themselves in the wild?		
Climate change-induced impactson biodiversity, including shifts in species distributions, changesin phenology, or increased vulnerability to extreme weatherevents?	No	The project includes positive climate change impacts, as it was discussed in section 6.
Negatively impactingendangered or threatened species within the project area, either directly or indirectlythrough habitat changes or otherdisturbances?	No	The project does not include any activity that could negatively impacting endangered or threatened species within the project area, either directly or indirectly through habitat changes or other disturbances; besides, it should also be noted that one of the project's objectives is to promote the conservation and protection of local biodiversity, so the activities are designed to meet these objectives.
Reducing genetic diversitywithin populations, potentially leading to decreased resilienceand adaptability of species in theface of environmental changes?	No	
Inadequate monitoring andassessment of biodiversity within the project area, making it Challenging to identify and address changes over time?	No	The project does not include any activity that associated with inadequate monitoring and assessment of biodiversity within the project area, making it Challenging to identify and address changes over time (see sections 2.3 and 16).

Could the project/initiative activities potentially entail or result in:	Response	Mitigation or preventive action
Pressure on vulnerableecosystems?	No	The project is being developed in an area where cattle ranching predominates (see sections 3.3 and 3.4).

Table 34. Climate change

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Increasing greenhouse gas emissions?	No	On the contrary, we estimate that the project will capture 3.828 tCO_2 on average each year (section 3.7.4). Additionally, given the previous land use of the project area, the baseline is 0 tCO_2 (section 3.7.3), so there will be no increase in GHG emissions.
Changes in habitat suitability for species due to climate change impacts, leading to shifts in species distributions or loss of critical habitat?	No	Given the pre-project land use and the increase in forest cover resulting from project activities, the project will have a positive impact on species distribution and will aid habitat connectivity. Planting native tree species will provide habitat for birds, insects, mammals, reptiles and other native species, and encourage the regeneration of native flora and fauna[141]. Finally, as indicated in section 11.9, the transformation of land use from livestock farming to forestry and the planting and conservation of native species will contribute positively to both fauna and flora biodiversity, and both are interrelated, since a new forest not only serves as a refuge, but also as a source of food, as the project will introduce native fruit trees such as Ingá, Araticú, Yvyraró, Ñangapiry or Yvyrapita, which will attract different animal species.

[141] Pero P., et al., 2019. Proceedings X International Congress on Silvopastoral Systems, p. 263-291. Asuncion, Paraguay, 24-26 September 2019 https://repositorio.inta.gob.ar/bitstream/handle/20.500.12123/9047/INTA_CRPatagoniaSur_%20EEASantaCruz_Peri_PL_%20SSP_de_Sudam%c3%a9rica_Alternativa_productiva.pdf?sequence=1&isAllowed=y

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Disrupt ecosystem services provided by biodiversity, such as pollination, water purification, and carbon sequestration, affecting overall ecosystem functioning?	No	Given the pre-project land use, the project activities will actually increase the ecosystem services provided by the resulting forest.
The spread of invasive species, leading to competition with native species and alteration of ecosystem dynamics?	N/A	No invasive species will be used in the project.
Increased frequency or intensity of extreme weather events, such as storms, droughts, or floods, which can damage habitats and threaten species survival?	No	Given the size and fragmentation of the project area, it is unlikely that project activities will have an impact on extreme weather events. Additionally, as stated on section 3.4, there are no historical records of flooding in the project area, and the risk of flooding is low. Regarding drought, the region has been experiencing a drought in recent years caused by La Niña climatic phenomenon[142], whose scale is larger than the project area and will likely not be affected by it.
Alteration of the phenology and behavior of species, affecting reproductive cycles, migration patterns, and interactions with other species, disrupting ecosystem dynamics?	No	On one hand, given the historical commercial use of *Eucalyptus grandis* and its hybrids, the phenology of this species is well known and suitable for the project region. On the other hand, the other 11 species to be used in the project are native to the region, so their phenology will not be altered by local conditions. Finally, regarding the impact the project may have on fauna, as indicated in section 11.9, the transformation of land use from cattle ranching to forestry and the planting and conservation of native species is going to contribute positively to both faunal and floral biodiversity, and both are interrelated, as a new forest not only serves as a refuge, but also as a food source.
Reducing genetic diversity within species populations due to climate change-induced habitat loss or fragmentation,	No	Project activities will increase area occupied by the native ecosystem, having the opposite effect on genetic diversity.

[142] Díaz, F., & Alvaro, P. (2020). Analysis of forest fire occurrence and its relationship with the El Niño-Southern Oscillation (ENSO) climate phenomenon in Paraguay, 2001-2019 (Master's thesis, FCT-UCA).

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
compromising the adaptive capacity of populations to environmental stressors?		
Exacerbation of the prevalence of diseases and pathogens among wildlife populations, leading to population declines and ecosystem destabilization?	No	As indicated in section 2.2, when a greater number of different species coexist in an ecosystem, both in terms of specific and genetic diversity and abundance of individuals, the capacity of the system to maintain equilibrium is greater. For example, the consequences of low rainfall are mitigated in a mature forest and crop pests quickly find biological controllers that maintain the equilibrium of their populations.
Weakening the resilience of ecosystems to disturbances, making them more susceptible to collapse or regime shifts, with cascading effects on biodiversity and ecosystem function?	No	Biologically diverse communities are likely to convey resilience to ecosystems[143]. Hence, the inclusion of 11 native species in the plantation design will increase ecosystem resilience. Additionally, it is important to highlight that other species are likely to establish throughout the years, and they will not be harvested, increasing biodiversity.
New challenges in effectively incorporating climate change considerations into biodiversity conservation planning, such as identifying climate-resilient habitats and prioritizing species and ecosystems for conservation action?	No	Native species that are well adapted to local conditions were selected for the reforestation activities. The seedlings will come from different sources, ensuring genetic diversity. Moreover, the project will be implemented in flat areas of the Hernandarias and Tapytá farms, so the risk of flooding is relatively low, and the reforestations will help retain water and soil during extreme weather events. In addition, the Project will be implemented based on the principles of adaptive management, to favor the establishment of the native species contemplated in the design, as well as new species that may become established naturally in the project area.
Habitat loss, pollution, and overexploitation, amplifying the impacts on biodiversity and complicating conservation efforts?	No	Given the pre-project land use and the increase in forest cover resulting from project activities, the project will have a positive impact on species distribution and will aid habitat connectivity. Planting native tree species will provide habitat for birds, insects,

[143] Cleland, E. E. (2011) Biodiversity and Ecosystem Stability. Nature Education Knowledge 3(10):14. https://www.nature.com/scitable/knowledge/library/biodiversity-and-ecosystem-stability-17059965/

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
		mammals, reptiles and other native species, and encourage the regeneration of native flora and fauna[144].

Table 35. Labor and working conditions

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Forced labor, or human trafficked labor?	No	The second FSC principle concerns workers' rights and states that the company must eliminate all forms of forced labor (Supplementary Documentation Folder 14). Furthermore, according to the latest FSC audit report (Supplementary Documentation Folder 14), 97% of DMSA workers in the project area come from local communities and all workers are formally employed.
Child labor or forced labor practices during the project either directly or within the project's supply chain?	No	FSC's second principle also states that the company cannot employ children under the age of 13, sets limits on the activities of workers aged 13-15 and on the daily working hours of workers aged 15-18 (Supplementary Documentation Folder 14). According to FSC's latest audit report (Supplementary Documentation Folder 14), they do not employ children under the age of 18 at all. In addition, DMSA's labor policy indicates the company's commitment to not using child labor, as well as to promoting voluntary and consensual employment relationships (Supplementary Documentation Folder 4). DMSA's labor policy also indicates the company's commitment to promoting voluntary and respectful employment relationships (Supplementary Documentation Folder 15).
Unsafe working conditions, exposing project stakeholders to potential hazards	No	DMSA has been developing its own Operating Procedures for years, minimizing the risks for workers. All the OPs that can be found in the supplementary information folders (in

[144] Pero P., et al., 2019. Proceedings X International Congress on Silvopastoral Systems, p. 263-291. Asuncion, Paraguay, 24-26 September 2019 https://repositorio.inta.gob.ar/bitstream/handle/20.500.12123/9047/INTA_CRPatagoniaSur_%20EEASantaCruz_Peri_PL_%20SSP_de_Sudam%c3%a9rica_Alternativa_productiva.pdf?sequence=1&isAllowed=y

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
or accidents before, during and after the implementation of the activities?		particular folders 4 and 7) indicate the personal protective equipment required for each task, as well as first aid material. In addition, workers receive first aid training (supplementary information folder 6).
Exploitative labor practices, such as inadequate wages, excessive working hours, or poor working conditions for the personnel engaged during the project activities?	No	All workers are registered for formal employment and are guaranteed all their rights and benefits. Additionally, as indicated in section 4, DMSA complies with national taxes and contributions for forest workers, and has its own labor policy (additional documentation folder 15). These are paid through the Social Security Institute, which includes: o Medical care for work-related accidents o Medical care due to illness o Pension contributions Family allowances are paid directly by the employer.
Discrimination in employment, including unequal opportunities, biased hiring practices, or unfair treatment based on factors such as gender, ethnicity, or other characteristics?	No	DMSA's employment policy indicates the company's commitment to ensuring that there is no discrimination or discriminatory practices (Supplementary Documentation Folder 15). Furthermore, the latest FSC audit report (Supplementary Information Folder 14) indicates that the company does not engage in any discrimination when providing employment to the local population.
Violating workers' rights, including issues related to freedom of association, collective bargaining, or other fundamental labor rights during the project's activities?	No	According to the latest FSC audit report (Supplementary Information Folder 14), workers are free to organize and form an association but have not done so. In addition, DMSA's labor policy indicates the company's commitment to respect freedom of association and to respect the membership of its workers in workers' organizations (Supplementary Information Folder 15).
Unfair treatment, exploitation, or inadequate protections for contractual workers or migrant laborers?	No	In its labor policy (supplementary information folder 15), DMSA is committed to complying with all applicable national regulations and international agreements. Thus, all workers are registered as formal employees and are guaranteed all their rights and benefits. They work 8 hours a day, as established by the national Labor Code and the Insud Argentina code of ethics (Integrity Program, supplementary documentation folder 4), and DMSA keeps daily control.
Inadequate grievance mechanisms, making it challenging for workers to address concerns, report issues, or seek resolution for labor-related problems?	No	DMSA has an Operating Procedure for receiving queries, complaints and conflict resolution mechanisms (Operating Procedure 20, additional documentation folder 4). This document aims to establish a communication and consultation channel, and includes methodologies to address complaints and claims from both workers and neighboring communities.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Insufficient social welfare support, such as healthcare, insurance, or other benefits for workers engaged in project activities?	No	All workers are registered for formal employment and are guaranteed all their rights and benefits. As indicated in section 4, DMSA complies with national taxes and contributions for forest workers, and has its own labor policy (additional documentation folder 15). These are paid through the Social Security Institute, which includes: o Medical care for work-related accidents o Medical care due to illness o Pension contributions o Family allowances are paid directly by the employer Additionally, as demonstrated in section 11.3, DMSA pays the salary of the nurse that works in the Family Health Unit in the community of Toryvete, ensuring that this community always has access to medical attention.
Displacement or negative impacts on local communities due to labor-related issues, including challenges related to employment opportunities and livelihoods?	No	According to the latest FSC audit report (Supplementary Information Folder 14), 97% of DMSA workers in the project area come from local communities, so there is no displacement in local communities due to work-related issues.
Lack of training?	No	Training is carried out as preventive actions based on an accident analysis. They are also carried out following a training program and as a response to emergencies (for example, first aid and fires). An example of a training schedule can be seen on page 5 of the Public Summary of the 2022 Monitoring Plan (supplementary documentation folder 15).

Table 36. Gender equality and women empowerment.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Gender-based discrimination in employment opportunities, recruitment processes, or access to leadership positions, hindering women's participation and advancement?	No	This risk is monitored by both FSC (FSC – DMSA Public Summary 2022, supplementary documentation, folder 14) and DMSA through the implementation of its labor policy, seeking to “ensure that there is no discrimination in employment and occupation, and that employment and occupation practices are not discriminatory” (Pomera Maderas Labor Policy p. 1, supplementary documentation, folder 4).

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
		Likewise, DMSA is part of Grupo Insud, which in its Integrity Program (supplementary documentation folder 15) indicates that any discrimination based on gender is prohibited in any hiring process.
Unequal access to project benefits, resources, or decision-making processes, resulting in disparities between men and women in the distribution of project-related opportunities and rewards?	N/A	Since this is not a community project, but a private one with a company as the proponent and the only entity with carbon rights, this question does not apply.
Limited participation and representation of women in project activities, consultations, or community engagements, potentially marginalizing their voices and perspectives?	Potentially	Of the 41 people who attended the public presentations of the project, 7 were women. It is important to mention that the delivery of documents to the auditor for validation and verification of the project was done in 2023 and that the validation visit took place in July of the same year. Thus, the public presentations of the project were carried out during the month of May 2023, when the current version of this tool was the "No Net Harm Environmental and Social Safeguards (NNH)" and the gender approach was not considered so specifically. In the following interactions with the community, the participation of more women will be actively sought by holding presentations at different times to offer more alternatives for assistance to the invited women. Likewise, it is important to note that the presentation was broadcast by municipal authorities through the Facebook page of the local radio station, and there is no record of virtual attendance.
Increasing unpaid care work burden on women, such as caregiving responsibilities or household chores, due to changes in community dynamics or time constraints resulting from project activities?	N/A	The project is part of DMSA's regular activities in the region, so it does not involve any changes in the dynamics of its employees.
Limited access to education, training, or capacity-building opportunities for women and girls, inhibiting their ability to develop skills and pursue leadership roles within the project or related industries?	No	DMSA has an agreement with the National Forestry Institute of Paraguay, which runs two Higher Forestry Technical Training Centers (CEFOTESFOR). Every year, DMSA receives applications for professional internships from women and men from this college. However, it is important to mention that more applications are received from men, since the majority of students are men. Due to the Insud Group policy, to which

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
		DMSA adheres, no discrimination is made when hiring (supplementary documentation folder 15).
Gender-based violence or harassment occurring within project settings or project affected communities, affecting women's safety, well-being, and ability to participate fully?	No	In the Grupo Insud Integrity Program, which is followed by DMSA, the value of a harassment-free workplace is highlighted, different types of harassment are described, and the procedure to follow in case of harassment is indicated (p. 15). Also, as part of its standard 2.2, the FSC requests that there are confidential and effective mechanisms for reporting cases of harassment and discrimination (supplementary documentation folder 14). As the project is not located on community lands, gender-based violence or harassment will not occur in any community as a result of the project.
Inequitable access to land, natural resources, or economic opportunities, particularly disadvantaging women in rural or indigenous communities affected by land use changes?	N/A	As previously stated, the project does not affect rural or indigenous communities because it is being implemented on private property that has been owned by DMSA for more than 20 years.
Underrepresentation of women in decision-making processes, including planning, governance structures, or stakeholder consultations, leading to less inclusive and effective outcomes?	N/A	As mentioned above, the project is being carried out on private DMSA property and DMSA is the only company with rights to the carbon property, so this question does not apply.
Gender-blind policies, interventions, or project designs that fail to consider the specific needs, priorities, and capacities of women and men, resulting in unintended negative consequences for gender equality and women empowerment?	N/A	As mentioned above, the project is being carried out on private DMSA property and DMSA is the only company with rights to the carbon property, so this question does not apply.
Limited economic empowerment and livelihood opportunities for women, such as access to credit, entrepreneurship support, or income-generating activities, within project-affected communities?	N/A	As previously stated, the project does not affect rural or indigenous communities because it is being implemented on private property that has been owned by DMSA for more than 20 years.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Health and safety risks that disproportionately affect specific genders within the community, potentially leading to disparate impacts on men and women?	No	All risks related to project activities are mapped in section 7 of this document, and no health and safety risks were identified as such. Additionally, risks associated with DMSA's normal operations are mapped and controlled through different procedures, such as the Responsible Management of Agrochemicals Program, the Risk Identification and Assessment Manual, and Operating Procedure 14 on Incident Response (additional documentation folder 4). With these tools, DMSA seeks to avoid and reduce any health and safety risks, regardless of the gender of its workers. Furthermore, as part of its standard 2.2, FSC requests that there are confidential and effective mechanisms for reporting cases of harassment and discrimination (additional documentation folder 14).
Cultural and social barriers that may hinder the advancement of gender equality and women empowerment within project settings or affected communities, such as stereotypes, norms, or traditional roles and expectations?	No	It is common for the forestry sector to be dominated by men. However, FSC establishes in its principle 2.2 that DMSA shall promote gender equality in different aspects, as well as implement systems that promote gender equality and prevent discrimination (supplementary documentation folder 14). In addition, in its Annex B, FSC establishes as a training requirement that workers be able to recognize and report cases of sexual harassment and gender discrimination (supplementary documentation folder 14). Likewise, in its Annex E-1 it requires DMSA to carry out activities and programs related to gender equality.
Inadequate gender analysis and monitoring mechanisms, resulting in a lack of understanding of gender dynamics and missed opportunities for promoting gender equality and women empowerment?	No	In its Annex B, the FSC establishes a training requirement that workers be able to recognize and report cases of sexual harassment and gender discrimination (supplementary documentation folder 14). In addition, in its Annex E-1, it requires DMSA to carry out activities and programs related to gender equality.

Table 37. Land acquisition, restrictions on land use, displacement, and involuntary resettlement.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Conflict over land resources and/or rights, such as competition for space between different land uses,	No	As indicated in Table 24 of this document, the lands where project activities are taking place have been owned by DMSA since 1996, 1998, 1999 or 2000. Additionally, as indicated in section 3.6 of this document, the land was used prior to the project for

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
communities, or stakeholders affected by the project?		extensive cattle ranching. This activity was carried out by three third parties (two individuals and one company) who leased the land to DMSA from 2005, 2007 and 2010. The contracts (supplementary documentation folder 3) were terminated in order to initiate project activities, and the cattle were sold for slaughter, and no complaints or comments have been registered by the persons involved.
Land acquisition, leading to changes in land ownership patterns and potential conflicts with local communities and landholders?	N/A	As indicated in Table 24 of this document, the land has been owned by DMSA for over 20 years. Furthermore, there is no intention to purchase more land to expand the project. Project activities will only be implemented on a small portion of the total properties owned by DMSA in the area. Therefore, even if we wanted to expand the project in the future, no additional land acquisition would be necessary.
Imposing restrictions on traditional land use practices, affecting the livelihoods and cultural practices of communities in the project area?	N/A	Since all project activities will be implemented in private property that has been owned by DMSA for over 20 years, no traditional land use practices would be modified.
Displacing communities or residents from their homes and lands, leading to social, economic, and cultural disruptions?	No	The leasing of land to third parties for extensive livestock farming included, in two cases, the use of housing for workers (supplementary documentation, folder 3). The houses were only used by the livestock foremen, but not as a place of residence. Therefore, no displacement occurred due to the project.
Involuntary resettlement or relocation of communities, impacting their access to resources, services, and community networks?	N/A	As mentioned above, the land where project activities are taking place has been owned by DMSA for over 20 years, so there will be no displacement of communities due to the project.
Communities losing their livelihoods and agricultural productivity as a result of land acquisition or restriction on land use?	N/A	As mentioned above, the land where project activities are taking place has been owned by DMSA for over 20 years, so there is no direct impact on the livelihoods of neighboring communities.
Insufficient compensation and benefits for affected communities and individuals, leading to economic hardships and social discontent?	N/A	As mentioned above, the land where project activities are taking place has been owned by DMSA for over 20 years, so no communities were directly affected by the project.
Lack of free, prior, and informed consent from affected communities, potentially	N/A	As stated above, the land where the project activities are taking place is private and has been owned by DMSA for over 20 years. Furthermore, as indicated in the documents

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
resulting in conflict and challenges to project implementation? *		provided in Supplementary Documentation Folder 2, the land does not overlap with indigenous territory, so the free, prior and informed consent of neighbouring communities is not required.
Social and cultural disintegration within displaced communities, leading to the erosion of social cohesion and cultural practices?	N/A	As mentioned above, no communities were displaced due to the initiation of project activities because the land has been owned by DMSA for over 20 years.
Communities losing access to common resources, such as forests, water bodies, or grazing lands, due to land acquisition or use restrictions?	No	As stated above, the project area has been owned by DMSA for over 20 years. Therefore, any land acquisition will not result in communities losing access to common resources such as grazing lands.
Inadequate resettlement plans, potentially leading to insufficient support, services, and infrastructure for resettled communities?	N/A	No resettlement of communities will occur due to project activities, so this question is not applicable.

Table 38. Indigenous peoples and cultural heritage.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Violating the right of indigenous peoples, including their right to land, resources, and self-determination?	N/A	As stated in Figures 56 and 57, the project areas do not overlap with indigenous communities.
Impacts on indigenous lands and territories, potentially leading to the displacement of indigenous communities and disruption and loss of livelihoods?	N/A	As stated in Figures 56 and 57, the project areas do not overlap with indigenous communities.
Negatively impacting the traditional livelihoods, such as hunting, fishing, or	No	There has been no record of intrusions by neighboring communities on the land, so the change in activities on the land does not negatively affect indigenous peoples or neighboring communities.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
gathering, due to changes in land use or environmental conditions?		
Losing sacred sites and cultural heritage, impacting the spiritual and cultural identity of indigenous communities?	N/A	As indicated in Figures 56 and 57 and in the Property Status Reports for all parcels (supplementary documentation folder 2), there are no indigenous communities in the project area, so no sacred sites will be lost due to the project.
The lack of free, prior and informed consent from indigenous communities (FPIC), potentially resulting in conflicts and challenges to project implementation? *	N/A	As stated above, the land where the project activities are taking place is private and has been owned by DMSA for over 20 years. Furthermore, as indicated in the documents provided in Supplementary Documentation Folder 2, the land does not overlap with indigenous territory, so the free, prior and informed consent of neighboring communities is not required.
Inadequate cultural impact assessments, potentially leading to insufficient understanding of the project's impact on indigenous cultures and traditions?	N/A	The project does not take place in common use lands or in indigenous territory, and it has been owned by DMSA for over 20 years.
Losing indigenous knowledge and practices related to land management, resource utilization, and traditional ecological knowledge?	N/A	As stated in Figures 56 and 57 and in the Condition of Ownership Reports for all plots (supplementary documentation folder 2), there are no indigenous communities present in the project area, which has been owned by DMSA for over 20 years. Hence, no loss of indigenous knowledge and practices will be triggered by the project.
Cultural disintegration and the erosion of social cohesion within indigenous communities?	N/A	As stated in Figures 56 and 57 and in the Condition of Ownership Reports for all plots (supplementary documentation folder 2), there are no indigenous communities present in the project area, which has been owned by DMSA for over 20 years. Hence, this question does not apply.
Inadequate recognition and respect for indigenous governance systems, potentially leading to conflicts over land and resource management?	N/A	As stated in Figures 56 and 57 and in the Condition of Ownership Reports for all plots (supplementary documentation folder 2), there are no indigenous communities present in the project area, which has been owned by DMSA for over 20 years. Hence, this question does not apply.
Insufficient benefit-sharing mechanisms, resulting in the unequal distribution of benefits derived from the project among indigenous communities? **	N/A	Supplementary documentation folder 2 holds all of the Condition of Ownership Reports emitted by the General Directorate of Public Registries. As stated in section 5.4 of this document, these reports prove that there are no indigenous communities in the project area. Hence, this question does not apply.
Conflicts arising over land rights, particularly when the project involves	N/A	As stated in Figures 56 and 57 and in the Condition of Ownership Reports for all plots (supplementary documentation folder 2), there are no indigenous communities present

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
changes in land use that may be contested by different stakeholders, including indigenous communities?		in the project area, which has been owned by DMSA for over 20 years. Hence, this question does not apply.

Table 39. Community health and safety.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Exposure to hazardous materials, chemicals, or pollutants, potentially leading to adverse health effects or life-threatening risks	Potentially	DMSA has its own Responsible Management of Agrochemicals Program, which establishes the operating procedures related to the application of fertilizers and pesticides, among other chemical products (supplementary documentation, folder 4). This program establishes the procedures to avoid exposure, as well as what to do in case of accidental contact with chemical products. DMSA also has an Operating Procedure for Action in the Event of Incidents and Accidents (PO14, additional documentation folder 4).
Degrading air quality in the project area due to emissions, dust, or other airborne pollutants?	No	Heavy machinery that produces air pollution is only used during planting and clear cutting, which will only occur a handful of times during the project's lifetime (see section 2.3 for Project Activities). Finally, as stated in section 3.7.3, no biomass combustion is to be performed in the project.
Water contamination, including pollution of water sources or reduced access to clean water, affecting community health and well-being?	Potentially	All DMSA projects are certified by the FSC, which has criteria for reducing fertilizers, as well as a pesticide policy (supplementary documentation folder 14). The first indicates that the use of non-natural fertilizers must be minimized or avoided, and the second aims to reduce the total volume of chemical pesticides and eliminate the use of the most dangerous ones. Additionally, DMSA has its own Responsible Management Program for Agrochemicals (Folder 4 of the supplementary documentation), which aims to avoid, minimize and mitigate the possible environmental and health impacts that could arise from the reception, loading, storage, handling, application and final disposal of phytosanitary products. Although the Tapytá Farm is located in an area of relative altitude and far from significant water courses in the vicinity of the project area, the Aña Cuá stream runs through the Hernandarias Farm, very close to the project area, which ends up emptying

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
		into a relatively important water course, the Acaray River. In order to adequately control that there are no negative effects on this watercourse, when the first stage of quantification is carried out, water quality studies will be conducted where the pH and dissolved oxygen in the water will be monitored both at the entrance and exit of the Aña Cuá stream in the vicinity of the project strata, to ensure that it complies with the Paraguayan Surface Water Quality Standard.
Increased noise levels or vibrations resulting from project operations, potentially causing disturbances and health impacts for nearby communities?	No	The nearest communities are located 2 kilometers from Tapytá and 3 kilometers from Hernandarias, so clear-cutting activities will not disturb them (causing noise above 85 dB) or cause health impacts.
Traffic accidents or road safety hazards associated with increased traffic flow or transportation activities related to the project?	Potentially	DMSA has a specific Operating Procedure for the transport of forest products (PO 3, supplementary documentation folder 7). This procedure aims to regulate the transport of products and prevent accidents, injuries and material losses.
Workers exposure to hazardous conditions, physical attacks or inadequate safety measures?	No	DMSA has a series of tools to prevent the exposure of its workers to dangerous conditions and inadequate safety measures, such as a Risk Identification and Assessment Manual, an Operating Procedure for action in the event of incidents and a Responsible Management Program for Agrochemicals (supplementary documentation folder 4).
Increased prevalence of vector-borne diseases or pest infestations as a result of changes in environmental conditions or habitat disruption?	No	Project activities do not include the creation of water bodies or frequent artificial irrigation, which tend to increase mosquito populations. On the contrary, the elimination of extensive livestock farming and the establishment of forest cover will reduce soil compaction and improve water infiltration, reducing the sites where mosquito larvae thrive. Additionally, the elimination of livestock and pastures from the site will reduce the prevalence of tick-borne diseases in the project area. In addition, a social action plan is being developed and implemented for the communities in Hernandarias and Tapytá, and they have a calendar with annual activities. Among these activities, some are contemplated with the NGO Mundo Sano (also part of Grupo Insud) as part of the educational project "Prevention in Action," on the prevention of mosquito-borne diseases and the importance of handwashing, focused on reducing mosquito-borne diseases. The foundation has recreational and educational material and activities are carried out based on games with local schools. The foundation

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
		is a non-profit organization created to reduce the impact of neglected health and works to improve the well-being of the most vulnerable populations.
Community displacement or involuntary resettlement, leading to social disruption, stress, and negative health outcomes?	No	The leasing of land to third parties for extensive livestock farming included, in two cases, the use of housing for workers (supplementary documentation, folder 3). The houses were only used by the livestock foremen, but not as a place of residence. Therefore, no displacement occurred due to the project.
Community mental health and well-being, including stress, anxiety, and social isolation resulting from changes in living conditions or community dynamics?	No	As mentioned above, the land where the project activities are taking place is private and has been owned by DMSA for over 20 years, so there were no changes in community dynamics with the start of the project.
Inadequate emergency preparedness and response mechanisms, leading to challenges in managing and mitigating potential health and safety emergencies?	No	The risks associated with DMSA's operations are mapped and controlled through different procedures, such as the Responsible Management of Agrochemicals Program, the Risk Identification and Assessment Manual, and Operating Procedure 14 on Incident Response (additional documentation folder 4). With these tools, DMSA seeks to avoid and reduce any health and safety risk, ensuring that all its workers are prepared to react in the event of any emergency.
Changes in land use patterns, such as increased exposure to disease vectors or decreased access to natural resources essential for health?	N/A	The project aims to establish a semi-native forest, which will provide a number of ecosystem services that did not exist in the pre-project scenario (pasture for extensive livestock farming). The project will therefore increase natural resources in the area. However, since the project is implemented on private land, communities do not have access to the properties (which, as indicated in Table 24, have been owned by DMSA for over 20 years). Regarding exposure to disease vectors, as indicated above, the project will decrease the prevalence of vector-borne diseases in the project area, so this question does not apply.
Inadequate health infrastructure and services in the project area, leading to challenges in addressing community health needs and emergencies?	No	Due to the proximity of the different project areas to local communities, DMSA's procedures for emergency care indicate transfer directly to the District Hospital in Hernandarias, while for Tapytá the transfer is made to the District Hospital in San Juan Nepomuceno. In addition, all operational procedures indicate what first aid material should be on hand to carry out such activities.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
		In addition, as demonstrated in section 11.3, DMSA pays the salary of the nurse who works at the Family Health Unit in the community of Toryvete, which guarantees that this community always has access to medical care.

Table 40. Corruption.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Funds allocated for the project/initiative being misappropriated or embezzled through fraudulent practices or kickbacks?	No	As part of Grupo Insud Argentina, DMSA adheres to its Integrity Program (supplementary documentation folder 15), which is a code of ethics that establishes a series of values and principles to be respected by all member companies and collaborators, as well as behavioral requirements. It also outlines the procedure to follow to report non-compliance, and the consequences that may result. Complaints are analyzed by the Conduct Analysis Unit (UAC), made up of personnel from Human Resources, the legal area and a group of external advisors specialized in the subject matter.
Bribery or kickbacks being solicited or offered to secure contracts, permits, or other project-related approvals?	No	DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), which emphasizes the rejection of improper payments or bribes to public officials or people with executive positions in other companies. It also indicates that there will be no negative consequences for employees who refuse to pay such bribes, although this may lead to losing business operations or negative results in administrative procedures.
Nepotism or favoritism in the selection of contractors, suppliers, or project personnel, compromising the integrity and fairness of procurement processes?	No	There are a limited number of forest service providers in Paraguay. For this reason, DMSA has worked with four forest service providers for harvesting, thinning and silviculture since its inception. These providers have been maintained over the last decade and are constantly evaluated by DMSA to ensure compliance with all national regulations and FSC requirements. To date, DMSA has not received any contact from other potential providers, nor is it aware of any others.
Fraudulent reporting or manipulation of project data, such as inflating project costs or overstating achievements, to	No	DMSA is the sole funder of the project and has a budget prepared and approved for its implementation. Each area has its own approved budget, and monthly reports are made to the DMSA Management to ensure that no corrupt practices are being incurred. In

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
obtain additional funding or meet performance targets?		turn, DMSA also accounts for its budgets to Grupo Insud, adhering to its Integrity Program.
Conflicts of interest among project stakeholders or personnel, such as individuals with financial interests in project outcomes or decision-makers with personal connections to project contractors?	No	The Insud Group Integrity Program, to which DMSA adheres, outlines the company's procedures and measures to ensure that there are no conflicts of interest that may interfere with and affect the project (additional documentation folder 15).
Lack of transparency in project decision-making processes, budget allocations, or contract awards, leading to suspicions of corruption or malpractice?		DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), where integrity and transparency are established as central principles in the group's operations.
Weak regulatory oversight or enforcement mechanisms, allowing for corrupt practices to go undetected or unaddressed within project/initiative activities?	No	DMSA is under constant supervision by third-party and government entities. According to DMSA's Register of Applicable Regulations (supplementary documentation folder 15), every three months the legal department reviews the laws applicable to its projects to identify changes and updates. In this way, DMSA ensures that it has the necessary information to prepare for all the supervisions it receives from the government and third parties.
Undue influence or pressure exerted by external parties, such as political figures or industry lobbyists, to sway project decisions or gain unfair advantages?	No	The Insud Group Integrity Program states that the relationship between DMSA employees and any public official must be reported to Human Resources to avoid corrupt practices (supplementary documentation folder 15). Likewise, this program indicates that employees cannot receive certain gifts (money, lavish gifts, loans and valuable objects) and that there will be no negative consequences if the business is affected by not agreeing to pay a bribe. It also outlines the procedure to follow to report non-compliance, and the consequences that may result. In this way, influence or pressure from external parties is avoided.
Inadequate accountability mechanisms or whistleblower protection, discouraging individuals from reporting instances of corruption or unethical behavior?	No	The mechanism established in the Integrity Program mentioned above (supplementary documentation folder 15) to report non-compliance with the code of ethics is anonymous.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Corruption in the environmental permitting process, such as officials accepting bribes to overlook environmental violations or grant permits unlawfully?	No	DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), which emphasizes the rejection of improper payments or bribes to public officials or people with executive positions in other companies. It also indicates that there will be no negative consequences for employees who refuse to pay such bribes, although this may lead to losing business operations or negative results in administrative procedures.
Corruption within subcontracting relationships, such as subcontractors paying bribes to secure favorable terms or win subcontracting opportunities?	No	DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), which emphasizes the rejection of improper payments or bribes to public officials or people with executive positions in other companies. It also indicates that there will be no negative consequences for employees who refuse to pay such bribes, although this may lead to losing business operations or negative results in administrative procedures.

Table 41. Economic impact.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Compromising healthy competition, resulting in unhealthy rivalry and undermining collaboration and cooperation essential for achieving project goals?	No	DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), which emphasizes the commitment of all companies in the group to comply with the corresponding legislation to avoid monopolistic practices and unfair competition.
Loss of employment opportunities, particularly for vulnerable populations, as a result of changes in economic activities or restructuring?	N/A	As it is being implemented on DMSA's private property, the project does not entail changes in economic activities. Furthermore, there will be no job losses as a result, but rather job creation at the local level.
Creating economic dependence, such as tourism or conservation initiatives, leading to vulnerability to fluctuations in project funding or market conditions?	No	The project does not include tourism or conservation activities. The project is financed by DMSA, a company with more than 20 years of experience in the forestry sector, particularly in the region where the project is being developed. All investments in plantations have historically been made with its own funds, which come not only from forestry activities, but also from other productive activities. DMSA has also developed a forest management plan, in compliance with FSC requirements, which projects all the activities to be developed over a 10-year period.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Market distortions or increased competition, such as changes in land use patterns or shifts in supply and demand dynamics within local economies?	N/A	DMSA has 8,300 hectares of forestry land in the project region, so the project size is not large enough to cause market distortions or increased competition.
Increasing the cost of living for local communities as a consequence of project-related developments, such as infrastructure projects or influxes of external workers?	No	As stated in the FSC Report in Supplementary Folder 14, 97% of the workers come from local communities. In addition, no infrastructure will be built outside the project area, so there is no risk of increasing the cost of living for local communities.
Inequitable distribution of benefits, leading to disparities in wealth, income, or access to resources among different segments of the population?	N/A	As indicated in section 5 of this document, the sole owner of the land where the project is being implemented is the private company DMSA, which is also the proponent of the project, so this question does not apply.
Losing traditional economic practices and knowledge systems, potentially undermining cultural heritage and resilience to economic shocks in communities?	N/A	As indicated in Table 24 in section 5.4 of this document, all parcels in the project area have been owned by DMSA since at least 2000. Therefore, this question is not applicable.
Negatively impacting small-scale enterprises or informal economies that rely on natural resources or ecosystem services?	No	The lands surrounding the project area are used for small-scale and large-scale soybean cultivation. We also believe that the scale of the project is small compared to the rest of DMSA's activities in the area, so the project will not have any negative impact on small businesses or informal economies.
Financial uncertainties, such as project delays, budget overruns, or changes in funding sources, affecting investment confidence and economic stability?	No	As mentioned above, the sole financier of the project is DMSA. It has a budget prepared and approved for its implementation and the company is committed to the success of the project.
Limited access to financial resources, such as credit or microfinance services, for entrepreneurs or smallholders affected by project-related changes in land use or economic activities?	N/A	The project will not cause any impacts that will result in the need for financial resources from third parties, so this question does not apply.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Lack of economic resilience and adaptive capacity within project affected communities, particularly in response to external shocks or long-term changes in market conditions?	N/A	No communities will be directly affected by the project to the degree where this question would apply to the project.
Inadequate compensation or mitigation measures for economic impacts, such as loss of assets or disruptions to income streams, experienced by individuals or communities?	N/A	DMSA is the sole funder of the project and has a budget prepared and approved for its implementation, so this question does not apply.

Table 42. Governance and compliance.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Insufficient institutional capacity within project/initiative implementing agencies or partner organizations, leading to challenges in effective governance and project management?	No	As indicated in section 5 of this document, DMSA has more than 25 years of experience in the cultivation and production of wood for industrial use, promoting the establishment of commercial plantations with good environmental practices, which is why it holds the FSC Certification for Forest Management and Chain of Custody, awarded exclusively to companies that demonstrate responsible management of forests and forest plantations.
Weak governance structures and mechanisms within the project/initiative, such as unclear roles and responsibilities, inadequate decision-making processes, and limited transparency and accountability?	No	As mentioned above, DMSA is the sole funder of the project and its budget is defined and approved. Furthermore, project activities are carried out by staff and service providers who normally carry out forestry activities, and are compatible with the normal operation of the company, ensuring that all persons involved are aware of their roles and responsibilities.
Inadequate stakeholder engagement and participation in project/initiative decision making processes, leading to	N/A	DMSA is the sole financier and owner of the land where the project is being implemented and of the rights to the carbon generated, so this question does not apply.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
governance gaps and reduced project legitimacy?		
Ineffective or inadequate regulatory frameworks governing project activities, resulting in loopholes, inconsistencies, or gaps in environmental protection and governance standards?	No	The project activities comply with FSC standards, which in turn are based on local Paraguayan standards. This ensures that there are no gaps, inconsistencies or loopholes in environmental protection and governance standards in the project.
Delays or challenges in obtaining necessary permits, licenses, and approvals for project activities due to regulatory complexities, bureaucratic inefficiencies, or legal requirements?	No	DMSA has a Legal and Regulatory Affairs department that works on the legal aspects of all its projects, ensuring that delays and challenges are addressed. In this case, the project start date was 1 December 2018. All necessary permits, licenses and approvals were obtained on time and are up to date (see supporting documentation folders 10 and 11).
Political interference in project/initiative decision-making processes, such as pressure to prioritize certain projects or interventions based on political agendas rather than scientific or environmental considerations?	No	DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), which establishes that all employees must inform Human Resources about the existence of links with government officials in order to avoid conflicts of interest that could lead to this type of interference. In the specific case of the project, there is no political pressure to replace these activities with others, since the Alto Paraná department itself is characterized by a large number of agricultural and livestock activities, which have greater weight and attention than forestry activities. The focus is on agriculture, not forestry.
Non-compliance with relevant laws, regulations, permits, and international agreements governing GHG emissions, biodiversity conservation, environmental protection and land use management, leading to legal challenges and reputational risks?	No	The project does not entail significant GHG emissions. Additionally, as previously stated, DMSA has the FSC certification, ensuring compliance with laws, regulations, and permits.
Conflicts of interest among project stakeholders or decisionmakers, such as individuals with personal or financial interests that may influence project outcomes or decision-making processes?	No	DMSA adheres to the Integrity Program of Grupo Insud Argentina (folder 4), which establishes that all employees must inform Human Resources about the existence of links with government officials in order to avoid conflicts of interest that could lead to this type of interference.

Could the project activities potentially entail or result in:	Response	Mitigation and/or preventive actions
Limited access to justice for communities affected by project activities, such as barriers to legal recourse or remedies for grievances related to land rights, environmental harm, or social impacts?	N/A	There are no communities affected by the project, although there is a procedure for possible consultations established in Operating Procedure 20 (additional documentation folder 4).
Insufficient monitoring and evaluation mechanisms to assess project performance, impacts, and compliance with governance standards, leading to gaps in accountability and learning?	No	DMSA is permanently present in the project area. It also has an annual review by FSC and third-party audits, where management and monitoring plans are reviewed. So, its projects are under constant supervision.
Inadequate capacity building and training for project stakeholders, such as government officials, local communities, and civil society organizations, to effectively participate in project governance and decision-making processes?	N/A	Even though the project was socialized with local communities and relevant stakeholders, the main activities and benefits from the project only involve the participation of DMSA, given the private characteristic of the land.

Impacts on Water Resources

In general, an afforestation project could have two types of negative impacts on the quantity and quality of water resources:

- Decrease in surface and shallow groundwater availability due to evapotranspiration induced by new plantations.
- Contamination of surface or groundwater caused by the forestry project activity.

Regarding a potential impact on the availability of water resources in Hernandarias and Tapytá, we do not consider that this project could generate significant negative impacts given its small scale, its spatial fragmentation, and the climatology of the project areas, since evapotranspiration in an eucalypt plantation in a subtropical climate zone can be estimated at 1.000 mm/year[145] , while rainfall in the project area exceeds 1.800 mm/year.

With respect to a potential impact on water quality, there could be a slight and punctual negative impact due to the project activity corresponding to the soil preparation stage. To avoid this, a manual tillage technique will be used[146] with minimal impact, which facilitates water infiltration. However, once the soil has been removed, rainfall could generate small runoffs that could drag mineral sediments to the riverbeds in the project area.

In addition, there could be a potential impact due to the use of agrochemicals, but this would also be minimal, since the use of agrochemicals will be restricted by the maximum amounts stipulated by the FSC seal procedures.

Although the Tapytá Farm is located in an area of relative altitude and far from significant watercourses in the vicinity of the project area, the Aña Cuá stream flows through the Hernandarias Farm, which ends up flowing into a relatively

[145] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5388327/
[146] http://revistas.uach.cl/pdf/bosque/v16n2/art01.pdf

important watercourse, the Acaray River. To adequately control that there will be no negative effects on this watercourse, when the first quantification stage is carried out, water quality studies will be conducted where pH and dissolved oxygen in water will be monitored both at the inlet and outlet of the Aña Cuá stream in the vicinity of the project strata, to ensure that it complies with the Paraguayan Standard for Surface Water Quality[147] .

Impact on Soil

In general, the potential risk of a negative impact on soils from a forestry project can be caused by three project activities:
1) site preparation
2) tree planting
3) use of agrochemicals for weed control.
4) Forest harvesting activities

Section 2.3 of this document describes in detail how these activities are planned to be carried out.

Regarding land preparation, this activity could generate a slight soil disturbance due to the use of machinery such as tractors and harrow[148]. However, in this project, as a mitigation measure to reduce this impact, the "minimum tillage" technique was used. This means that soil preparation was carried out only in strips 1 to 2 meters wide along the tree planting lines. This system is one of those that generates the least soil disturbance because it strongly reduces the portion of soil that is tilled[149]. At the same time, the days when the minimum tillage task was carried out were carefully selected, selecting the appropriate humidity conditions to avoid further soil compaction[150].

[147] https://normas.intn.gov.py/cgi-bin/koha/opac-detail.pl?biblionumber=470
[148] https://www.scielo.sa.cr/pdf/tem/v31n1/0379-3982-tem-31-01-167.pdf
[149] http://revistas.uach.cl/pdf/bosque/v16n2/art01.pdf
[150] https://www.jircas.go.jp/sites/default/files/publication/manual_guideline/manual_guideline-_-_44.pdf

In Hernandarias, soil preparation activities were carried out in 2018, 2019 and 2020. While in Tapytá, the soil preparation activity was carried out in 2019 and 2022. All this with a view to the planting of eucalypt, since the planting of native trees from 2024 onwards is planned without prior soil preparation.

Regarding tree planting, this activity will be carried out manually, so the soil disturbance that this may generate is low[151]. Tools such as shovels and hoes will be used to dig the holes, and a light vehicle (less than 2.000 kg) will be used to transport the plants to the limits of the stratum. Within the stratum, the plants were transported by hand using containers. The operator made a hole with a shovel only in the place where the tree was planted. The planting was also done manually where the plant was inserted and then covered with soil from the same hole.

The planting of eucalypt in both Tapytá and Hernandarias has been planned to take place in 2018, 2019, 2020 and 2022, and from 2024 the planting of native trees will begin, as can be seen in Table 2 and in Table 3.

On the other hand, any forestry project must consider the potential negative impact on the soil during management due to the use of agrochemicals during weed control activities.

In our project, it is important to highlight that the Responsible Agrochemical Management Program[152] is carefully followed for the entire agrochemical use procedure. Under this program, weed control in the project uses a combination of chemical, manual and/or mechanical control practices. Priority is given to minimizing the use of agrochemicals and reducing the area of application. The handling, storage, application and final disposal of phytosanitary products is

[151] https://journals.lib.unb.ca/index.php/IJFE/article/view/30002/18825252 36

[152] Responsible Agrochemical Management Program in supplementary documentation, project activities subfolder.

carried out under strict safety standards for the operator and the environment, in accordance with the program.

In terms of forest harvesting activities, we can see that Table 7 details the procedure for this activity and each of the mitigation measures that are contemplated to minimize impacts on the soil, such as the following: The main purpose of all harvesting measures for clear-cutting and thinning is to control and localize soil compaction. The maneuvers of stockpiling and selection of logs must be limited to the area of the stocking piles and must not be extended to other sectors of the stand, in order to control and locate soil compaction, among others.

In addition, only FSC-authorized agrochemicals are used in the amounts stipulated by the FSC management standard[153] (DMSA has been FSC certified since 2006). To obtain FSC certification, it is necessary to pass annual audits that review the work orders and the list of agrochemicals that were used in the proportion that their respective safety data sheets were applied and the agrochemical purchase invoices that show the quantity and types of these chemicals purchased during the analysis period. Once the audits have been approved, a certificate is issued for a period of four years. DMSA has been FSC certified continuously since 2006.

Impact to Flora, Fauna and Landscape

The impact on flora and fauna will vary according to the degree of progress of the project. However, it will always be positive[154] because the project will transform an area of degraded pastureland due to livestock activity into, firstly, a forest plantation with exotic species and over time it will be transformed into a native forest.

[153] https://connect.fsc.org/sites/default/files/2022-08/FSC-POL-30-001a%20V3-0%20ES%20Listas%20FSC%20de%20Pesticidas%20Altamente%20Peligrosos.pdf

[154] https://www.researchgate.net/profile/Ronnie-De-Camino/publication/262728776_Impactos_ambientales_de_las_plantaciones_forestales_y_medidas_correctivas_de_caracter_silvicultural/links/00463538a7617054cb000000/Impactos-ambientales-de-las-plantaciones-forestales-y-medidas-correctivas-de-caracter-silvicultural.pdf

Therefore, the flora and landscape will be positively affected compared to the existing cattle ranch prior to the project due to the presence of trees. On the other hand, the fauna will be positively affected because the trees allow birds to nest and enhance the presence of mammals. As the project progresses, it is expected that native species will also contribute to the presence and proliferation of fauna in the area.

In Paraguay, the Ministry of Environment and Sustainable Development (MADES) designs, establishes, supervises, monitors, oversees and evaluates the National Environmental Policy, promoting research, recovery, conservation, preservation, protection, regulation, management and use of natural resources, in coordination with public, private and civil society organizations, in order to ensure sustainable development and guarantee the right of all citizens, present and future generations to live in a healthy environment and enjoy the goods and services provided by ecosystems. The MADES[155] requires the presentation and approval of an Environmental Impact Study, which must be updated every 2 years, in order to start forestry activities.

Compliance with the Environmental Management Plan[156], which regulates the requirements for the proper use of agrochemicals, is included among the requirements of the Environmental Impact Study that must be submitted. In addition, an annual audit is carried out in the warehouse where the agrochemicals are stored to ensure that they are handled correctly. If these requirements are not met, a permit for the activity will not be granted.

In relation to the social and socioeconomic environment where the project is developed, there is a significant positive impact on the generation of local labor and consequently on the improvement of the family economy of the neighboring

[155] https://www.mades.gov.py/

[156] https://www.mades.gov.py/wp-content/uploads/2019/06/RESOLUCION-177-de-fecha-29-de-marzo-de-2019.pdf

communities. It produces improvements in relation to the training of qualified personnel and best practices in safety and hygiene through training programs.

The project contributes to transmit to operators and the local population the importance of the following values: professionalism in services, quality labor standards among operators and suppliers, and the importance of environmental conservation, hygiene, and safety practices. Promotes the growth and development of the local and regional market by increasing the demand for inputs and services, while providing raw material for the development of the regional wood industry.

The impacts identified in this component are detailed below.

Job Creation and Changes in Traditional Technological Practices

The mitigation measures implemented are based on:

a. The forestry activity has a multiplying effect and is highly demanding of skilled labor, and in this sense, the company generates around 500 direct jobs; giving greater preference to local labor with the consequent social benefit.
b. Training is provided in the use of new technologies, promotion and implementation of hygiene and safety measures by the company and contractors, and training in the use of equipment and machinery to improve production processes.
c. All forest workers are registered in formal employment and all their rights and benefits are guaranteed by the commitment of the Service Providers, and with local laws.

Social Responsibility

The company's policy considers neighboring communities as an integral part of the forestry business, thus contributing to the improvement of socioeconomic needs, offering opportunities for labor insertion and favoring those located near the forestry management units (FMUs) based on a Social Management Plan, and also considering requests for donations received outside the FMUs.

The main objective of the Social Management Plan of Desarrollos Madereros S.A. (DMSA) is to build and maintain permanent relationships of trust with those stakeholders that coexist daily with the forestry activity, seeking to preserve and create social value.

The main stakeholders with whom DMSA and its forestry area interact are: workers, contractors and their employees, communities in the area of influence of the operations, indigenous communities, suppliers and customers, municipalities, authorities, non-governmental organizations, universities and scientific institutions, the media and civil society in general.
With all stakeholders, DMSA seeks to maintain a relationship based on respect, transparent and honest communication, promoting spaces for dialogue and understanding.

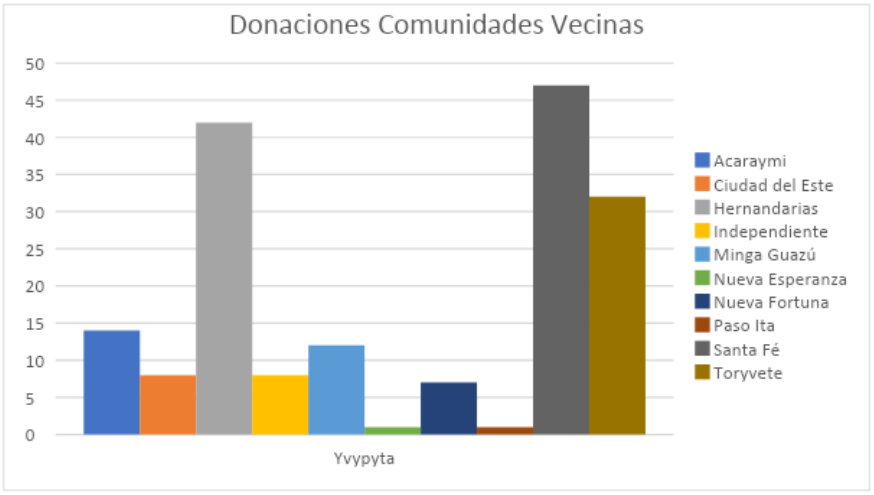
The company's policy considers neighboring communities as an integral part of the forestry business, which is why it contributes to the improvement of socioeconomic needs, offering possibilities for insertion into the labor market and favoring those that are close to the FMUs on the basis of a Social Management Plan, and also considering requests for donations received outside the FMUs.

As part of the approved donation program, fuel is supplied monthly to police stations in the areas of Yvypyta (Hernandarias) and San Juan Nepomuceno (Tapytá) and a monthly contribution to the Hernandarias volunteer firefighters.

A total of 207 requests were received from different communities, of which 100% were fulfilled.

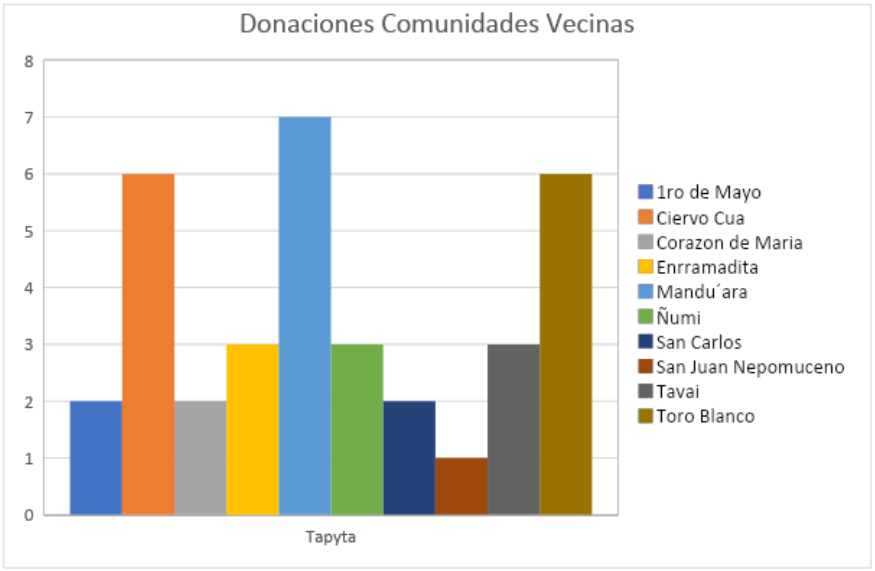
In Hernandarias, 10 communities have benefited. The beneficiary entities are distributed among Educational Centers, Health Centers, Neighborhood Organizations, Indigenous Communities, Volunteer Fire Departments and Police Stations.

Figure 58. Communities benefited in Hernandarias (Y axis = no. of donations per community).



Source: DMSA, 2023.

Figure 59. Communities benefited in Tapytá (y-axis = number of donations per community).



Source: DMSA, 2023.

9 Stakeholder engagement and consultation

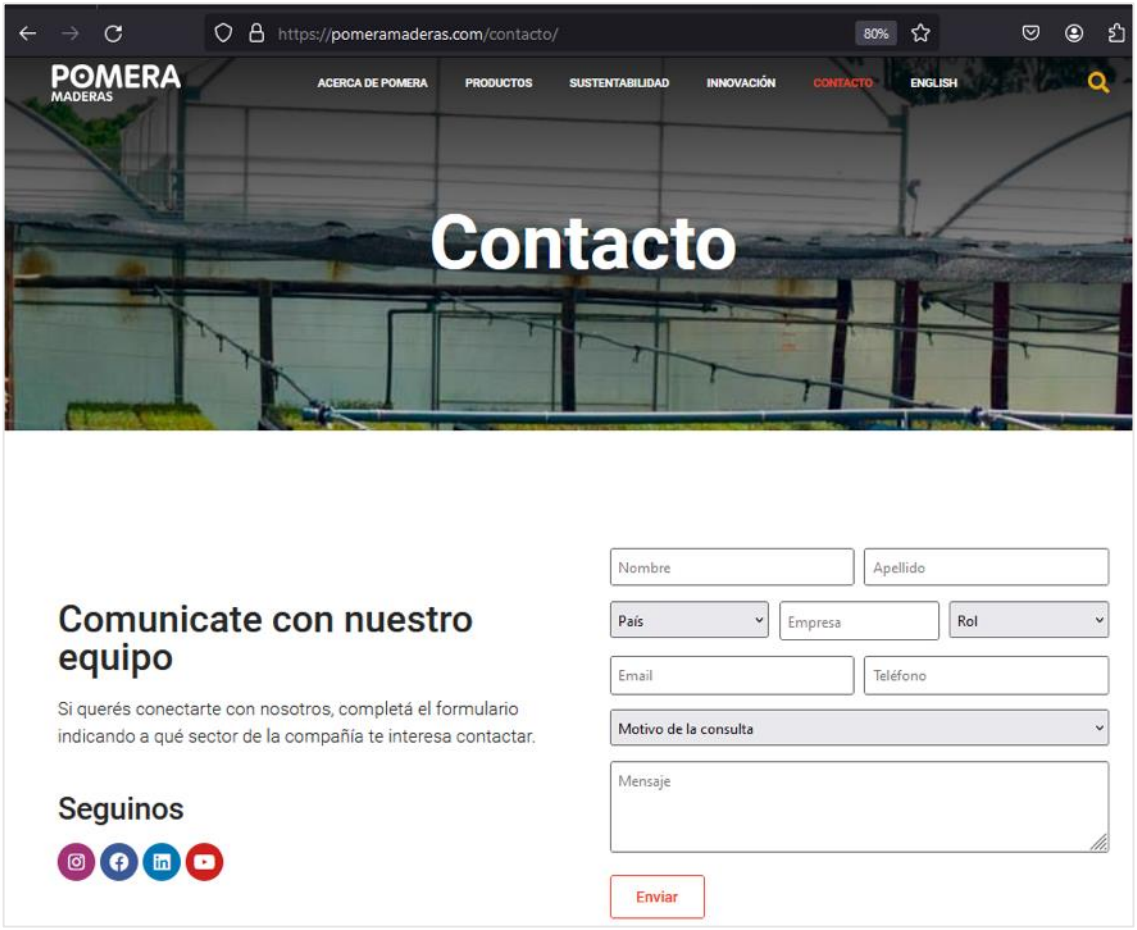
As stated in section 5.4, particularly in Figures 56 and 57, the project does not take place in indigenous people's lands or local communities. During the month of May 2023, the public presentation to stakeholders of the carbon sequestration project through afforestation with eucalypt and native species developed in the fields of Hernandarias and Tapytá took place.

In order to provide as much clarity as possible, and in compliance with the principles of DMSA, the workshops were held in person in order to be as close as possible to the stakeholders. Considering that the proposed project is divided into two locations, the characteristics and objectives of the project were presented in both locations on different days.

At the end of the presentation, a round of questions and answers was held, which have been recorded in the minutes (these minutes are provided as part of the project's Supplementary Documentation for consultation by BCR's auditors and reviewers).

In addition, Pomera Maderas (DMSA's trade name) always keeps a contact channel open for parties interested in its projects and activities through the company's website (Figure 60).

Figure 60. Channel through web page to leave comments.



Source: DMSA, 2023.

For the convening and holding of these public presentation days, different types of stakeholders were identified according to their direct or indirect impact on the project, including governmental organizations, non-governmental entities and both individuals and legal entities.

Direct stakeholders are those who are directly involved in the development of the project and who can influence the project's actions, such as national or local government entities whose role is to approve project activities.

The other stakeholders with a non-direct role in the project, but who may be affected by it, are considered indirect stakeholders: representatives of the health

centers adjacent to the project, primary and secondary schools, and security and fire prevention forces. Civil associations included those representing the forestry sector and volunteer firefighters. Individuals included private neighbors of the forestry fields, independent professionals and contractors.

Thus, we have the following types of stakeholders

Table 43. Stakeholder Analysis: Identified Stakeholders.

Interested Party	Direct or Indirect Actor	Role Within the Project (Detailed Development Below)	How Does the Project Affect Each Stakeholder/How Is the Project Affected By It?
National Agency: MADES	Direct	The Ministry of the Environment and Sustainable Development designs, establishes, supervises, monitors, and evaluates the National Environmental Policy, and within this the environmental evaluation processes that condition the development permits for the project.	The project complies with all MADES environmental legal requirements. This point is developed in the legal compliance section.
National Agency: INFONA	Direct	The National Forestry Institute is the entity in charge of the administration, promotion and sustainable development of the country's forest resources.	The project is legally obligated to comply with all INFONA requirements regarding forest planning and management. This point is developed in the legal compliance section.
Municipality of Hernandarias and Municipality of San Juan Nepomuceno	Direct	These are the municipalities where the current project areas are located.	The project is legally obligated to comply with the requirements of the municipalities in terms of land management, taxation (real estate tax), and commercial license (or business license). Therefore, for both municipalities, the existence of the project represents an additional source of tax revenues.
Security Forces and Volunteer Firefighters	Indirect	Mainly involved in the fire contingency project.	The project area was already under its area of operation, although the new land use may require a greater effort on its part. To mitigate the impact of this condition, all the resources that the DMSA itself provides for surveillance and firefighting in coordination with the security forces and firefighters are available.
International certifications: FSC	Indirect	The project has been developed under the FSC forest management standard, under which DMSA has been developing all its activities since 2006.	FSC criteria have positive effects on the social and environmental dimension of forest management.

Interested Party	Direct or Indirect Actor	Role Within the Project (Detailed Development Below)	How Does the Project Affect Each Stakeholder/How Is the Project Affected By It?
NGOs - Moises Bertoni Foundation	Indirect	It is a non-profit organization, with the objective of contributing to the conservation and sustainable development of the country's natural resources.	Some of the aid works to the communities carried out in this project are channeled through this NGO.
Neighboring communities	Indirect	The project, and DMSA as its proponent, interacts permanently with neighboring communities through public participation dynamics.	The project represents a new employment-generating activity for the neighboring communities, which in turn benefit from the project's social action (ODS).
Educational centers in the vicinity of the project	Indirect	The project develops training promotion actions in collaboration with educational institutions, mostly rural, located in the vicinity of the project.	The specific actions of this project are detailed in addressing Sustainable Development Goal 4 - quality education.
Paraguayan Timber Federation	Indirect	It is the leading union of the forestry-industrial sector in Paraguay. Its main role is to debate with CONADERNA and INFONA when a draft law or regulation may affect the activity.	

Source: DMSA, 2023.

Neighboring Communities

Within the framework of this project -and its general activity- DMSA maintains transparent and honest communication with the different relevant actors in the social environment in which its activities are framed. The objective is to build permanent and mutually collaborative relationships with the communities where its operations are located, incorporating their concerns and needs in decision-making. To achieve this, DMSA works to minimize the negative impacts of its operations.

It gives priority to permanent dialogue with local communities and peasant communities in the area of influence: Toryvete in Hernandarias, Enramadita, Corazón de Maria, Toro Blanco, Ciervo Cuá, Manduarã, 1° de Mayo, Ñumi in Tapytá, as well as the Indigenous Communities: in Hernandarias there are Acaraymi and Independiente. In Tapytá the Indigenous Community of Tacuaró. Where Desarrollos Madereros S.A., through an annual management plan, assists the communities with the provision of seeds for self-consumption and vegetable garden, soil preparation, delivery of eucalypt seedlings, native plants and cassava seeds. It also provides inputs for ant and weed control and fertilizers. Many of DMSA's workers come from neighboring communities.

Security Forces Police and Volunteer Firefighters

Security forces intervene when a fire is confirmed. Their main tasks are to reassure neighbors, inform them of the notice to firefighters and give clear instructions. They coordinate the arrival of fire brigades, rescue, ambulances and others if necessary. They also help to facilitate access to and positioning of heavy vehicles.

Regarding the Volunteer Firefighters, their mission is everything related to prevention, extinguishing and investigation, in relation to firefighting, rescue and salvage of people and goods, as well as the educational action of the community for prevention.

FSC®

Desarrollos Madereros S.A. certified its forest management in 2006 (Certificate SGS-FM/COC-002837) under the standards of the Forest Stewardship Council - FSC, demonstrating the importance of protecting the environment and the health and safety of its workers.

The certificate issued by FSC is valid for 5 years and is audited annually against the FSC standard to verify compliance. The established principles that must be complied with are:

- Principle 1: compliance with laws
- Principle 2: Workers' rights and conditions of employment
- Principle 3: Rights of indigenous peoples
- Principle 4: Relations with communities
- Principle 5: benefits of the forest
- Principle 6: Environmental values and impacts
- Principle 7: Management planning
- Principle 8: Monitoring and evaluation
- Principle 9: high conservation values
- Principle 10: Implementation of management activities

Desarrollos Madereros S.A. has always operated with great social and environmental sensitivity. For this reason, all of its plantations have been FSC® certified since 2006. This project will also have this certification, therefore, the design, planting and maintenance of the forest are carried out through a sustainable forest management program that allows the commercialization of the wood, avoiding negative impacts on biodiversity, local communities, the water balance of the watersheds and the scenic beauty of the landscape.

INFONA

The mission of the National Forestry Institute (INFONA) is to promote sustainable forest management through a participatory and inclusive policy and in compliance with competition laws, providing products, services and technologies that contribute to the economic, social and environmental development of the country.

It is the state body created by Law No. 3464/08, whose general objective is the administration, promotion and sustainable development of the country's forest resources, in terms of their defense, improvement, expansion and rational use.
Desarrollos Madereros S.A. In compliance with Law 3464/08, DMSA reports its forestry plan to INFONA on a semiannual basis, including the standing stock of

plantations. It also reports the areas to be planted and areas to be harvested and silvicultural management (pruning, thinning, etc.). See details of legal compliance in section 4 of this document.

INFONA and Desarrollos Madereros S. A. have an inter-institutional cooperation agreement.

The purpose of the inter-institutional cooperation agreement is to offer opportunities for internships within the company's facilities, considering that the education and training of forestry students will improve the services offered in the forestry sector, as well as contribute to improving the knowledge acquired through practice. DMSA receives at least one intern per year. There are several cases where interns become direct employees of DMSA.

MADES

The Ministry of Environment and Sustainable Development (MADES) designs, establishes, supervises, monitors and evaluates the National Environmental Policy, promoting research, recovery, conservation, preservation, protection, planning, management and use of natural resources, in coordination with public, private and civil society organizations, in order to ensure sustainable development and guarantee the right of all citizens, present and future generations to live in a healthy environment and enjoy the goods and services provided by ecosystems.

The Undersecretariat of State for Natural Resources and the Environment of the Ministry of Agriculture and Livestock makes available to civil society Law 294/93 on Environmental Impact Assessment and its Regulations as part of the Environmental Legislation Series of Paraguay, within the framework of the activities developed by the National Strategy Project for the Protection of Natural Resources (SSERNMA/GTZ), which supports the Undersecretariat of State in the definition and implementation of the National Policy for the Protection of Natural Resources and the Environment.

The Environmental Impact Assessment is an environmental policy instrument, consisting of a set of procedures capable of ensuring, from the beginning of the process, a systematic examination of the environmental impacts of a proposed

action (project, program, plan or policy) and its alternatives. See details of all legal compliance in section 4 of this document.

As described in the section on regulatory compliance, the project must have submitted and approved its Environmental Impact Assessment (EIA)[157] , which is done only once at the beginning of the activities. This report must be updated every 2 years reporting the Environmental Management Program. The proponent DMSA performed its update in 2022 (the cover page of the approval certificate from MADES can be seen in ANNEX 4).

Municipalities of Hernandarias and San Juan Nepomuceno

Desarrollos Madereros S.A. complies with municipal legal instruments such as payment of real estate tax (annual tax), which serves to demonstrate ownership of the land, and the commercial license (annual tax), which serves to demonstrate the legality of the company. At the same time, the company interacts with the Local Development Plans in neighboring communities, contributing to their sustainable progress.

DMSA maintains a good relationship with the municipal institution, promoting joint actions for the communities when it arises; in order to provide community welfare, the development of local interests and the promotion of citizen participation See details of the collaboration with the community in section 11 of this document.

Moisés Bertoni Foundation

In 1996, the company Forestal Yguazú SRL, as part of a Shell Forestry investment plan, acquired land in Paraguay for a reforestation and afforestation project. The Moisés Bertoni Foundation (FMB) was hired to carry out technical studies for the implementation of a Natural Reserve in the natural ecosystems of the property, which identified its biological importance, accentuated by its strategic location between two protected areas.

[157] Environmental Impact Assessment Study. Main Report/October.2000 / submitted and approved by SEAM/ environmental impact statement N° 32/01 dated 23/3/2001.

In recognition of the institutional trajectory and previous joint work, in 2003, Shell Forestry (currently Desarrollos Madereros S.A.) donated 4.736 hectares of the private reserve to the Foundation for its administration, management and conservation in perpetuity.

On June 28, 2005, by Decree Nº 5831, the Tapytá Reserve was recognized by the Paraguayan State as a "Perpetual Protected Wildlife Area". The Reserve conserves a great diversity of animal and plant species representative of the Upper Paraná Atlantic Forest (BAAPA) and is recognized as one of the most important places for bird conservation in Paraguay.

The Moisés Bertoni Foundation is a non-profit organization founded in 1988 with the objective of contributing to the conservation and sustainable development of the country's natural resources. It is currently a reference point for consultation on socio-environmental issues.

Desarrollos Madereros S.A. is a member of the Foundation's board of directors. Many of the socio-environmental activities developed by DMSA are channeled through the Moises Bertoni Foundation.

Schools

DMSA assists 21 educational institutions, mostly rural, located in the vicinity of the project. These schools have very few resources, are located in small towns and are mainly engaged in farming and animal husbandry activities.

Desarrollos Madereros S.A. has activities such as volunteering with educational institutions neighboring the company both in Hernandarias and Tapytá, in conjunction with the Mundo Sano Foundation, related to the prevention of mosquito-borne diseases and the importance of hand washing, handmade soap making with teachers, as well as the delivery of seeds for vegetable gardens, and the accompaniment of the tasks for the proper maintenance of the same. Donations such as hoses for irrigation, poles, seeds for vegetable gardens, candies and food for children's day celebrations, talks on fire risks and native forest and fruit species were also given. Section 11 details all the contributions and assistance provided by DMSA to these educational institutions.

The following is a list of educational institutions in Hernandarias and Tapytá.

Table 44. Educational Institutions with Whom DMSA Collaborates.

Institution	Place/Location
Hernandarias	
School Bas. N° 3240 Santa Rosa	B° Santa Rosa
School Bas. N° 2418 Esc.Bas. N°Virgen de Fátima	Toryvete Colony
School N° 3497 San Jose Obrero	Toryvete Colony
School Bas. N°1521 Father Arnold Janssen	Km 32 Acary-mi
Arnold Janssen Agricultural and Livestock Technical School	Acary-mi
School N°1519 Felipe Nery Lafuente	Ita Pass
School N°2412 San Miguel	Col.Acaray
School N°14692 Angel Antonia	Acaraymi
School N° San Miguel	Acaraymi
School No. Independent	Independent Ind.
Tapytá	
School Bas. N°1.631 San Isidro Labrador	Enramadita
School Bas. N°6.335 San Miguel Arcangel	Enramadita
Esc.Bas. N°6.333 Virgen del Carmen	White Bull
School Bas. N°2.587 San lorenzo	Guazú White Bull
Esc.Bas. N°5.123 Sacred Heart of Jesus	Manduara
School Bas. N°7.180 San Jorge	Manduara
School Bas. N° San Roque González de Santa Cruz	Quail deer

Institution	Place/Location
School Bas. N° San Blas	quail deer
School Bas. N° San Blas	Tacuaro Ind.Commu.Tacuaro
School Bas. N° Tacuaro	Heart of Mary
School Bas. N° Sacred Heart of Mary	San Carlos
School Bas. N° San Carlos	San Carlos

Source: DMSA, 2023.

Paraguayan Federation of Woodworkers

The Federación Paraguaya de Madereros is the leading association of the forestry-industrial sector in Paraguay. It has more than fifty associated companies and its origins date back to 1950 when the first general assembly was held, constituting the Board of Directors of what was then called Asociación de Madereros y Afines. This federation is the sector's representative before the Paraguayan Congress in the National Commission for the Defense of Natural Resources (CONADERNA) and the INFONA board.

The main role of the Federación Paraguaya de Madereros is to interact with CONADERNA and INFONA every time a draft law or regulation that may affect the activity is debated.

Fepama is also a member of the most important business associations in Paraguay, such as the Union of Production Associations (UGP), the Federation of Production, Industry and Commerce (Feprinco), the Paraguayan Industrial Union (UIP) and the National Forestry Board, where it is actively represented.

The main objective of the guild is to defend the interests of its members and the Forestry-Industrial sector, as well as to encourage forestry development and promote awareness of the economic and environmental importance of the sector. Desarrollos Madereros S.A. is a member of the board of directors and actively participates in the meetings.

In order to hold the public hearing, invitations were sent by e-mail and by telephone via WhatsApp to representatives of governmental organizations, civil associations, educational centers, security forces, health field, and private neighbors. The invitation included information on the day, time and form of the meeting. To ensure participation, calls were made the day before as a reminder of the invitation.

Figure 61. Public consultation in Hernandarias.

Source: DMSA, 2023.

Figure 62. Public consultation in the municipality of San Juan Nepomuceno.

Source: DMSA, 2023.

The objective of the public consultation was to raise awareness of the DMSA Carbon Project among its main stakeholders, sensitize and inform them about the context of climate change, mitigation strategies, compensation, and commitments at the global, national and local levels, and particularly, the contribution of the Project to mitigate the effects of climate change. The objectives, location, surface areas, species, and the way in which the whole process is being carried out for its implementation in the field, registration and documentary compliance were informed.

A Power Point presentation was shared with those present and the person responsible for the presentation was Lilian Giménez, responsible for FSC / Environment and Occupational Safety DMSA.

At the end of the presentation, there were questions and queries related to the presentation and the expected impact on the community. The feedback and questions were very positive, accepting the project and acknowledging the

company for its initiative. There were no objections or comments about possible detrimental effects on the community.

At the end of the consultation process, a report was prepared with the results obtained. All evidence of the call, the consultation, the responses, and the follow-up is recorded as supporting material.

The following table avoids mentioning the names of the attendees in order to preserve their privacy. Details of the participants can be found in the minutes of the meetings, which are provided in folder 12 of the supplementary information.

Table 45. List of Participants in the Public Consultations.

Representative Sector
Hernandarias District Hospital
Neighbor of the Community of Toryvete
Neighbor of the Community of Toryvete
Principal of School No. 3240 Sta. Rosa
Health and Hygiene of the Municipality of Hernandarias
Environment of the Municipality of Hernandarias
Finance Manager DMSA
DMSA Forestry Supervisor
Contractor INAFO/BGB
Head of Caazapá Regional Office
Caazapá Regional Office
Contractor Grupo Geral Servicios
Independent Professional
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Hernandarias 5th Police Station
Moisés Bertoni Foundation
Enramadita Sub-Health Council

Representative Sector
Directorate of Agricultural Extension (MAG)
H.D.S.J.N. Mesa Vamos
Cooperativa Capiibary Ltda.
Municipal Board of S.J.N.
University Student
Municipality of San Juan Nepomuceno
Municipality of San Juan Nepomuceno
Municipality of San Juan Nepomuceno
Radio Kapiibary FM 104,5
Judge of Misdemeanors of the Municipality of San Juan Nepomuceno
Municipality of San Juan Nepomuceno
Mayor of the Municipality of San Juan Nepomuceno
Representative of the U.P.G. Agronomy Career
Desarrollos Madereros S.A.
Desarrollos Madereros S.A.
Desarrollos Madereros S.A.
Desarrollos Madereros S.A.
Desarrollos Madereros S.A.

Source: DMSA, 2023.

9.1 Summary of Comments Received.

The following is a list of the main stakeholders and DMSA's interaction with them in the framework of this project. In the event that there is direct involvement in the project, an action plan will be included:

Table 46. Summary of Comments Received During the Stakeholder Consultation.

Representative Sector	Comment/Question	Response from DMSA
Neighbor Toryvete	The Desarrollos Madereros project is very important because reforestation will produce oxygen, which is the basis of life on earth. Hopefully it will quickly make a difference in mitigating climate change and erosion.	NA

Representative Sector	Comment/Question	Response from DMSA
	It seems to me that other companies with large areas of land should try to do the same as Desarrollos Madereros. Thanks to Desarrollos Madereros, if it fulfills its reforestation project to capture carbon, the communities neighboring its property will benefit from breathing clean air.	
Hernandarias District Hospital	How would the surrounding community benefit from this project?	Trees are the main carbon reservoirs and reduce atmospheric carbon dioxide through the process of photosynthesis. We believe as a forestry company we can contribute to mitigate the effects of climate change by capturing CO_2 through the planting of *Eucalyptus*.
Moisés Bertoni Foundation	I would like to give my opinion on the Carbon Project that was presented to the general public in the Municipality of San Juan Nepomuceno where I participated in the presentation on behalf of the Moisés Bertoni Foundation. This project is very good and interesting. Reforestation or reforestation is urgent for the whole world and in fact Paraguay is booming with the planting especially of Eucalypt, but for commercial purposes that is also serving and my suggestion is to do this reforestation for the carbon project with native plants of Paraguay and also takes advantage for wildlife refuges that like more native forest. I hope that my suggestion will be useful for a better use of this project and to go ahead and that it will be a starting point	Thank you for your suggestion and comment; we are in an initial stage of the Project, in which we mentioned that the current plantations are destined to the production of wood and DMSA's renewable energy from the company's own *Eucalypt* plantations. It should be noted that we are currently in the initial stage of submitting the project to the corresponding platform for evaluation and eventual approval. This indicates that we could be implementing plant species native to Paraguay.

Representative Sector	Comment/Question	Response from DMSA
	that will serve as an example to more companies or private owners that can do this project.	
Desarrollos Madereros S.A.	Thank you very much for the presentation of the carbon credit project made this morning, I have the following questions about it. - When we talk about carbon dioxide and carbon dioxide are we talking about the same gases with the same effects?	Carbon dioxide is a compound of carbon and oxygen that exists as a colorless gas at standard temperature and pressure conditions. It is closely related to the greenhouse effect. Prior to the 2005 IUPAC standards, it was also known as carbon dioxide, so we are talking about the same gas, and yes, it will have the same effects.
Desarrollos Madereros S.A.	The temperature increases to be maintained at 1,5 degrees Celsius over what period of time would it be?	In the Paris Agreement (2015) it mentions in Article 4: In order to meet the long-term temperature goal set out in Article 2, the Parties aim to achieve the peaking of global greenhouse gas emissions as soon as possible, bearing in mind that developing country Parties will take longer to achieve this, and thereafter to rapidly reduce greenhouse gas emissions, in accordance with the best available scientific information, to achieve a balance between anthropogenic emissions by sources and removals by sinks in the second half of the century, on the basis of equity and in the context of sustainable

Representative Sector	Comment/Question	Response from DMSA
		development and efforts to eradicate poverty.

Source: DMSA, 2023.

9.2 Consideration of Comments Received

DMSA has a long history of working in harmony with stakeholders in the regions where this project will be carried out. During the more than 20 years of working in these locations, public consultations with stakeholders have been held every time a new project was planned, so this public consultation falls within the parameters of DMSA's normal operations.

The feedback and questions were very positive, accepting the project and acknowledging the company for its initiative. There were no objections or comments about possible detrimental effects on the community.

10 Sustainable Development Goals (SDGs)

According to the 2030 Agenda, the fundamental basis for ensuring sustainable development lies in the conservation and sustainable use of natural resources, so environmental sustainability is based not only on reducing damage to ecosystems, but also on the efficient management of ecosystem services that favor human development by increasing economic opportunities and social and ecological resilience. In this sense, the management of ecosystem goods and services is represented in the Sustainable Development Goals (SDGs), associated with water, climate, biodiversity and oceans, and from these, a series of interactions are generated that make it possible to meet other major global goals such as the eradication of hunger, poverty reduction and the quality of health services, among others.

In line with the 2030 Agenda, the fulfillment of the 17 SDGs represents the most efficient way to enhance sustainable development at the national level since, as they are universally constructed, the participation of various stakeholders is guaranteed to achieve their success. Furthermore, these goals place special emphasis on the inclusion of vulnerable and excluded groups, through the pursuit

of the fulfillment of human rights and social equality. Finally, by having a transdisciplinary scope, they recognize needs in social, economic and environmental terms and promote human development together with environmentally sustainable practices.

Forest management of plantations and natural areas follows the international standards of FSC certification since 2006, in the framework of which social management systems are implemented with neighboring communities and environmental management systems for all its operations and natural areas. The various activities that make up DMSA's carbon sequestration and climate mitigation project contribute to the global agenda in terms of helping to end poverty, achieve food security, promote sustainable agriculture, health and social welfare, education, access to water, foster innovation, responsible production and consumption, protect, restore, and promote the use of terrestrial ecosystems, sustainably manage forests, halt and reverse land degradation and biodiversity loss.

DMSA identifies the contribution to nine of the seventeen SDGs, based on the guidelines and conditions of the BCR program and the tools established for this purpose. The SDGs allow clear targets to be set that serve to measure the potential impact of the project's actions.

The following is a description of the project's programs and actions that strengthen efforts to promote sustainable development and mitigate the effects of climate change, with a comprehensive and responsible approach. Implementation schedules, compliance and monitoring indicators are also described.

It is important to note that DMSA has an area destined to the social area or corporate social reason budgeted annually to maintain an organizational structure of collaborative activities with neighboring communities. This area was created in 2014 and worked in response to specific requests that came to the company.

Since the decision was made to carry out the current project with the objective of generating carbon credits, this area has been professionalized. Long-term

collaborative projects directly related to the Sustainable Development Goals began to be planned.

In this way, the following programs were developed and are detailed below. There are programs that respond to the needs of communities that imply a high expenditure on the part of DMSA, such as program 1 " where a collaboration of 240.000 USD was carried out. In this type of situation, where the amount spent is disproportionately high compared to the area of the project, a proration is made to assign a real value to this type of expenditure. This USD 240.000 is divided by the 8.500 planted hectares owned by DMSA and then multiplied by the 172,6 hectares of the project area.

Besides, it is important to clarified that the apply the BIOCARBON SDG Tool v1.0 has applied to assess the contribution to the Sustainable Development Goals, which is in accordance with the requirements of BCR Standard v3.4, section 17.

10.1 SDG 1: No Poverty

General Program: Integral Development of Neighborhood Communities (Social Management)

Program A) Rural and forest fire prevention

Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

Indicator 1.5.3: Adopt and implement disaster risk reduction strategies.

Objective: In the areas where the project is located there are no state-supported fire departments; this function is covered by volunteer fire departments. Prevent and fight rural and forest fires (beyond the strict area of this project) in neighboring communities in DMSA's area of influence, through early detection with equipment, tools and trained firefighting brigades, in order to prevent fires from damaging the communities' resources, such as their homes, crops and livestock, thus deepening their poor economic situation. The project allocates

resources for fire monitoring and mitigation in the areas surrounding the project, including outside the project boundaries, to reinforce the work of the volunteer fire departments.

Program Description: Contributing to reduce the risk of forest and rural fires by providing protection to communities is a priority for DMSA, as well as generating environmental awareness and sensitization in these communities in relation to the use of fire and the dimensions and negative impacts it could reach. Through Program A) Prevention and Fighting of Rural and Forest Fires of DMSA, we implement actions that together allow us to achieve the objectives of this program. The following is a list of the actions that are planned to be carried out during the project's accreditation period:

1. Adoption and implementation of fire risk reduction strategies through road and street maintenance. This action will be divided into two stages. In the first stage, the infrastructure works for its creation will be carried out. This stage is projected to be completed in 2023. Subsequently, the program will focus on coordination and management with the authorities and communities.
2. Availability of an early fire detection system, trained brigades, a system of property protection guards, firefighting equipment and tools.
3. Frequent communication with neighboring community representatives, training and talks to officials.

Table 47. Program Schedule A) Prevention and Fighting of Rural and Forest Fires.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Fire preventive maintenance	✓	✓	✓	✓	✓	✓
ACTION 2: Equipment, machinery, combat brigadiers, etc.	✓	✓	✓	✓	✓	✓
ACTION 3: Neighboring community communication	✓	✓	✓	✓	✓	✓

Source: DMSA, 2023.

This schedule is presented over a 5-year period; however, it is projected to the year 2058, with reviews of the actions every 5 years or according to the specific needs that need to be addressed. By the end of 2023, the review and monitoring of the

communities' needs will be completed and a new schedule of activities will be drawn up.

This amount of money, which will contribute positively in the communities, is budgeted in conjunction with the current project and other DMSA activities.
DMSA developed the following rating scheme to measure and monitor the sub-activities that contribute to program compliance.

- Maintenance of roads and firebreaks
- Maintenance of equipment and machinery
- Training for brigadistas
- Communication with the Community

For actions 1 and 2 it will be used to qualify and monitor compliance:

B: Good
MB: Very Good
A: Regular
M: Bad

Indicator will be the attendance sheet or record of participants to each of the trainings.

For the fulfillment of these three actions, a coordination, management and monetary investment of US$24.617 is projected for the first 5 years; therefore, the main indicator of compliance with the program's actions will be the amount of money allocated for their implementation.

Program B) Repair of roads and bridges in neighboring communities

Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters
Objective**:** Improve access and communication for families in neighboring communities by upgrading local roads, which will facilitate their economic development.

Program Description:Neighborhood roads are used mostly by community neighbors who travel frequently to get to their places of work, health care, education, and other daily activities. Local roads are of great importance, as they are the means of communication and connectivity between rural communities and large urban centers. Roads also represent an important resource as escape routes in the event of catastrophic situations such as potential fires or other emergency situations. In case of fire, roads facilitate the evacuation of neighbors, the circulation of vehicles and firefighting machinery, and, being free of vegetation, they are also barriers to stop the passage of fire.

The Ministry of Public Works and Communications of Paraguay[158] is the state agency that establishes road sector policies and is in charge of planning, studies, works and conversation of the road network, through the Directorate of Roads (DV) for national and departmental roads and the Directorate of Neighborhood Roads (DCV) for rural roads. Although there is a Neighborhood Road Improvement Program (PR-L1092)[159] , the allocation of these resources and priorities does not always reach the neighborhood roads around DMSA. These roads are generally not asphalted or paved, nor do they have water conduction works such as sewers, vaults, and bridges. These are dirt roads, built on flat terrain, which generate mud and potholes during rainy conditions that make driving difficult, and under conditions of low rainfall generate particulate material (dust) that hinders visibility and traffic flow.

For these reasons, DMSA considers it important and a priority to accompany the neighboring community in the improvement of neighboring roads. To implement this program, DMSA holds **meetings with community leaders** to identify and prioritize road sites that require improvement. To the extent possible, DMSA **will provide resources to carry out these** road **improvements** and facilitate the **implementation of these improvements before the Dirección de Caminos**

[158] https://www.mopc.gov.py/
[159] https://www.developmentaid.org/tenders/view/429239/programa-de-mejoramiento-de-caminos-vecinales-ii-pr-l1092-rehabilitacion-de-tramos-de-caminos-vecina

Vecinales (DCV) for rural roads before the Dirección de Vialidad, which depends on the Ministry of Public Works and Communications of Paraguay.

Table 48. Program Schedule B) Repair of Roads and Bridges in Neighboring Communities.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Dialogue and coordination with the neighboring community regarding the needs for improvement of road infrastructure	✓	✓	✓	✓	✓	✓
ACTION 2: Repair of local roads	✓	✓	✓	✓	✓	✓
ACTION 3: Negotiations with road authorities	✓	✓	✓	✓	✓	✓

Source: DMSA, 2023.

For action 1, it is planned to hold an annual meeting. Therefore, the monitoring indicator will be the meeting attendance sheet.
The monitoring of Action 2 will be used to qualify and monitor compliance:

B: Good
MB: Very Good
A: Regular
M: Bad

For action 3, it is planned to hold an annual meeting. Therefore, the monitoring indicator is going to be the meeting attendance sheet; it is planned from the year 2023 onwards.

For the fulfillment of these three actions, a coordination, management and monetary investment of USD 3,000 is projected for the first 5 years; therefore, the main indicator of compliance with the program's actions will be the amount of money allocated for their implementation.

Program C) Impact on employment and promotion of forestry plantations among neighboring communities

Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

Objective: To contribute and collaborate so that the different communities can develop forestations that allow them to generate income, better conditions for the production of food and timber inputs, which contribute to their own food autonomy.

Program Description: With the seedlings delivered, plantations will be made for the production of wood intended for the extraction of wood from forest plantations can represent a source of income and employment for families. The shortage of fuel for cooking food can have an impact on the food situation. Cooking food is important for the development of a more balanced and healthy diet. In DMSA's neighboring communities, firewood is the main source of energy and forestry can be a supplier of this input.
The rural population combines forestry production with agricultural and livestock systems (FAO, 1995). Forestation can add value to the production systems of rural and indigenous communities and families. Forestation can be combined with agricultural crops. In peasant and indigenous communities neighboring DMSA fields, afforestation can be combined with local crops such as cassava or citrus, and can provide shelter, pasture and fodder for family cattle ranching.

Agrosilvopastoral crops diversify production and promote potential income and benefits for families, contributing to their food autonomy. Tree cover also favors the maintenance and improvement of the productivity of soils that have had successive agricultural uses.

Forestations make it possible to cover the lack of resources and income from other sources and provide complementary inputs that are often essential for the continued functioning of the agricultural and family organization (FAO, 1995).

Table 49. Timeline of Program C) Impact on Local Employment and Promotion of Forest Plantations Among Neighboring Communities.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Direct relationship of the project with the neighboring community	✓	✓	✓	✓	✓	✓
ACTION 2: Soil preparation and delivery of inputs and seedlings for timber production	✓	✓	✓	✓	✓	✓

Source: DMSA, 2023.

With respect to action 1, the number of jobs created by the project among the neighboring community will be measured. In addition, an annual meeting is planned to detect the perception of the project among these groups, and the needs that may arise and which can be positively influenced.

Action 2 will consist of the delivery of inputs and seedlings that will enable neighbors to plant trees, whose timber harvesting will provide them with an additional source of income; their delivery will be monitored according to the input receipt form.

The budget allocated for the program is around US$2.957, therefore, the main indicator will be the amount allocated.

10.2 SDG 2: Zero Hunger

Goal 2: Ensure the sustainability of food production systems and implement resilient agricultural practices that increase productivity and production, contribute to the maintenance of ecosystems, strengthen resilience to climate change, extreme weather events, droughts, floods and other disasters, and progressively improve land and soil quality

Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

Indicator 2.4.1: Proportion of agricultural area where organic farming is practiced.

Program D) Family and school gardens.

Objective: To contribute and collaborate so that the different communities can develop their own crops so that they can achieve their own food autonomy.

Program Description: It is recognized that home gardens improve the capacity of smallholder farmers and communities to address the interrelated problems of food security, nutrition, health and economic security. a Food and Agriculture Organization of the United Nations (FAO) recognizes the following positive effects, as well as their beneficiaries: food, nutrition, health and economic security.

The program is aimed at indigenous and rural communities in DMSA's area of influence, reaching more than 12 communities and around 300 families. In Tapytá there are the communities of Enramadita, Toro Blanco, Manduara, Corazón de Maria, Ciervo Cua, 1° de Mayo, Atongüe, Ñumi, San Carlos, Tacuaro, the latter being an indigenous community. In Hernandarias the peasant community of Toryvete, Independiente, which is indigenous, and the Acaraymy indigenous and peasant community.

The leader of each community is identified and may be represented by parents and/or mothers, teachers or school principals, who already have vegetable garden production or who wish to implement vegetable gardens in their homes or schools. DMSA purchases seeds and other tools related to garden preparation such as watering cans, drip tape and shovels. These supplies are given to community leaders who demonstrate their commitment to their proper use. DMSA staff provides technical support at the time of delivery of the inputs, and maintains a frequent dialogue to monitor progress.

Family gardens in homes and schools are integrated into daily tasks. Through the participation of family or school members and under the coordination of a community leader, food is made available to enrich, diversify and balance the diet of each meal (healthy, nutritious, sufficient). DMSA contributes to the development of organic agriculture and the important benefits it brings to the communities.

Table 50. Program Schedule D) Family and School Gardens.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Communications and meetings held with	✓	✓	✓	✓	✓	✓

Year	2018	2019	2020	2021	2022	2023
the neighboring community						
ACTION 2: Delivery of inputs and seedlings for soil preparation and planting	✓	✓	✓	✓	✓	✓

Source: DMSA, 2023.

Monitoring: The budget allocated for this program is USD 20.000 therefore the main variable to be monitored to measure the success of the program is going to be the amount of money allocated to the program's fulfillment

Regarding action 1, it is planned to hold an annual meeting. Therefore, the fulfillment of the action will be defined by its implementation, supported by the attendance sheet. For action 2, the delivery of 2.250 kilos of seeds is planned, therefore, its delivery will be monitored and supported by the delivery form.

10.3 SDG 3: Good Health and Well-Being

Target 3.8: Achieve universal health coverage, access to quality essential health services and access to safe, effective, affordable and quality medicines and vaccines for all.

Indicator 3.8.1: Percentage of population with perceived good or very good health status.

Program E) Health prevention

Objective: To have health personnel on a consistent basis in the community of Toryvete.

Program description: The Community of Toryvete has a Health Unit distant approximately 45 km from the city of Hernandarias. Due to a survey started in 2018, it was identified the need for a health staff in the community of Toryvete because only a doctor is present once a week in the Family Health Unit (USF) to meet the needs of the community. Thus, DMSA decided to collaborate with the professional fees of a local nurse to be present every day of the week attending at the USF who continuously assists the community with basic health care needs, especially in emergency cases.

Table 51. Program Schedule E) Health Prevention.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Communications and meetings held with the neighboring community	-	Survey	✓	✓	✓	✓
ACTION 2: Monetary contribution to the USF Toryvete nurse.	-	Survey	✓	✓	✓	✓

Source: DMSA, 2023.

It is planned to maintain the program throughout the 40 years of the project. A new survey will be conducted every 5 years to identify new needs that may arise.

The budget allocated for the program is USD 800, therefore, the main indicator will be the amount allocated.

With respect to action 1, it is planned to hold an annual meeting. Therefore, the fulfillment of the action will be defined by its implementation, supported by the attendance sheet. For action 2, the delivery of the amount will be projected; therefore, its delivery will be monitored, supported by the delivery form.

Program F) Hygiene promotion in disease prevention

Target 3.8: Achieve universal health coverage, access to quality essential health services and access to safe, effective, affordable and quality medicines and vaccines for all.

Indicator 3.8.1: Percentage of population with perceived good or very good health status.
Objective: To contribute with the neighboring population to the prevention of mosquito-borne diseases and diseases transmitted by lack of hand washing.

Program Description: According to the publications of the Ministry of Health of Paraguay since 2015 cases of chikungunya are reported in the country with outbreaks in 2018 and 2022 and is currently present in all departments of the

country. Mosquitoes of the species *Aedes aegypti* and *Aedes albopictus* that transmit not only this disease but also dengue, zika and yellow fever. These diseases also circulate and are present in the country.
DMSA has a social commitment with the neighboring community to help prevent these diseases as well as those transmitted by lack of hand washing.

In order to carry it forward, it has a partnership with Fundación Mundo Sano (FMS), an organization whose mission is to transform the reality of people affected by neglected diseases, with serious consequences for their health, mainly in the most vulnerable populations. FMS works with affected communities in various parts of Latin America (Paraguay and Argentina), Europe and Africa, within the framework of current regional and global strategies established by the World Health Organization (WHO), the Pan American Health Organization (PAHO).

In the rural and indigenous communities of Tapytá and Hernandarias we carry out the "Prevention in Action Program", an educational project with pedagogical and playful resources to raise awareness and sensitize about mosquito-borne diseases, and recommendations on personal and home care to reduce the risk of transmission of these diseases. The implementation of this program is face-to-face, however, to facilitate participation opportunities, the program has a remote proposal where pedagogical tools are provided to deepen knowledge, awaken curiosity and turn children into agents of change in their communities.

Together with the FMS we implemented the "Handwashing" program, which joins the "Global Handwashing Day", promoted by the Global Handwashing Partnership coalition, organizing face-to-face and virtual events in schools in the neighboring communities of Tapytá and Hernandarias. This program was very important during the pandemic, not only because the material was available virtually, but also because the subject matter was fundamental during the pandemic to reduce the risk of transmission and circulation of COVID-19. Although hand hygiene is a simple practice, in many cases it is not performed correctly or with adequate frequency. This program raises awareness of the importance of hand washing with soap and water as an effective, inexpensive and affordable means of preventing infectious diseases.

Table 52. Schedule of Program F) Hygiene Promotion in Disease Prevention.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Implementation of the Prevention in Action Program in the Schools and neighboring communities.	-	Survey	✓	✓	✓	✓
ACTION 2: Implementation of Handwashing Program in Schools and Neighboring Communities	-	Survey	✓	✓	✓	✓

Source: DMSA, 2023.

These programs will be implemented throughout the project. It is expected to be reviewed every five years or in the event of changes in conditions that require adjustments or updates on the subject.

The implementation and results of the two programs will be followed up and monitored on an annual basis. Compliance indicators will be expressed in number of schools and communities where the programs were implemented, number of children who received the educational programs.

Monitoring: Monitoring will be done through reports from Mundo Sano Foundation, which will indicate the number of children, number of teachers, number of Institutions that participated. It is projected that 700 children per year will participate, 40 teachers and 50 DMSA staff as volunteers.

Budget: The collaboration program with Mundo Sano Foundation contemplates a contribution in which the time of part of its staff has been donated to carry out Actions 1 and 2. Action 3 consists of a direct economic contribution.

10.4 SDG 4: Quality Education

Program G) Education as an opportunity for development

Target 4.3: By 2030, ensure equal access for all men and women to quality technical, vocational and higher education, including university education.

4.b.1 Gross official development assistance for fellowships

Objective: To incentivize education, encouraging scholarships to guarantee a better future for the children of the neighboring community.

Program Description: According to Law No. 1.264; General Education Law, which states that it guarantees the right to learn, and equal opportunities to access knowledge and the benefits of humanistic culture, science and technology, without any discrimination whatsoever. It guarantees the freedom to teach, with no other requirements than suitability and ethical integrity, the right to religious education, and ideological pluralism[160] .

In view of the difficulty in pursuing secondary education such as technical high school, many of the young people migrate from their communities, from their homes in search of a better-quality educational opportunity.

DMSA is strongly committed to encourage and develop education plans for the local communities, considering and contributing to close the historical gender gap. For this reason, since 2020, an annual scholarship program of 5 scholarships for women wishing to pursue university studies will be financed. This scholarship program will continue throughout the accreditation period of the current forestry project.

This program provides the opportunity to continue their education at the tertiary or university level for those students whose origin comes from the communities neighboring the project and who have a good academic performance and interest in continuing their academic education. This is achieved through agreements with educational institutions.

[160] https://siteal.iiep.unesco.org/sites/default/files/sit_accion_files/siteal_paraguay_0789.pdf

In view of the difficulty in pursuing secondary education such as technical high school, many of the young people migrate from their communities, from their homes in search of a better-quality educational opportunity.

Table 53. Timeline of Program G) Education as an Opportunity for Development.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Dialogue and coordination with neighboring community leaders	✓	✓	✓	✓	✓	✓
ACTION 2: Implementation of the Neighboring Community Scholarship Program	-	-	✓	✓	✓	✓

Source: DMSA, 2023.

Budget: For the fulfillment of these two actions, a coordination, management and monetary investment of USD 2.000 is projected for the first 5 years; therefore, the main indicator of fulfillment of the program's actions is going to be the amount of money allocated for their realization.

Monitoring: The manner in which it will be monitored is as follows,

- Action 1: Dialogue and coordination with representatives of educational institutions will be monitored through reports and records of communications/meetings held.
- Action 2: Academic Performance Report/Fee Payment/Scholarship Recipients will be monitored through the Academic Performance Report/Fee Payment/Scholarship Recipients Reports.

10.5 SDG 6: Clean Water and Sanitation

Program H) Water for Neighboring Communities

Target: 6.1 By 2030, achieve universal and equitable access to safe drinking water at an affordable price for all.

6.1.1 Percentage of population supplied by the National Drinking Water System Coverage

Objective: Improve access to water for human consumption, and services for hygiene to the neighboring communities of Tapytá, San Marcos and Ciervo Cua, and in the towns of Hernandarias and Minga Guazú in Genarito.

Program Description: Water free of impurities and accessible to all is an essential part of the world we want to live in. There is enough freshwater on the planet to achieve this goal. However, water allocation is currently inadequate and by 2050 at least 25% of the world's population is expected to live in a country affected by chronic and recurring freshwater shortages. Drought is affecting some of the world's poorest countries, exacerbating hunger and malnutrition.

This scarcity of water resources, along with poor water quality and inadequate sanitation, impacts food security, livelihoods and educational opportunity for poor families around the world. Fortunately, some progress has been made in the last decade and more than 90% of the world's population has access to improved drinking water sources.

To improve access to safe drinking water and sanitation, and the sound management of freshwater ecosystems among local communities in several developing countries.

This program seeks to facilitate access to water for people in the communities neighboring DMSA.

Table 54. Schedule of Program H) Water for Neighboring Communities.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Communications and meetings held with the neighboring community	✓	✓	✓	✓	✓	✓
ACTION 2: Contribution to water supply	✓	✓	✓	✓	✓	✓

Year	2018	2019	2020	2021	2022	2023
infrastructure in the neighboring community						

Source: DMSA, 2023.

Allocated budget**:** For the fulfillment of these two actions, a coordination, management and monetary investment of USD 12.852 is projected for the first 5 years; therefore, the main indicator of compliance with the program's actions is going to be the amount of money allocated for their realization

Monitoring: The manner of monitoring is going to be as follows,

- Action 1: Dialogue and coordination with representatives of the Neighboring Communities will be monitored through reports and records of communications/meetings held.
- Action 2: Program implementation will be monitored through the investment made.

10.6 SDG 9: Industry, Innovation and Infrastructure

Program I) Research and Development

Target 9.5: Enhance scientific research and improve the technological capabilities of industrial sectors in all countries, in particular developing countries, including by fostering innovation and significantly increasing, by 2030, the number of research and development personnel per million inhabitants and public and private sector expenditures on research and development.

Indicators: 9.5.1 R&D expenditure and Number of researchers.

Objective: To achieve forestations that optimize production, growth rate under different site conditions, carbon sequestration, and are more resilient to the effects of climate change.

Program Description: For more than 25 years DMSA, has been investing in research to improve production in forestations. The R&D team works on the identification and selection of individuals with high potential for growth, development and wood quality, with measurements of their behavior and performance in the field.

Since 1998 various materials have been incorporated. It has about 2.000 families of *Eucalyptus grandis* and 450 families of *Eucalyptus urophylla*. In turn, other

Eucalyptus species. Planted in trials with statistical designs that allow the evaluation of the performance of genotypes and their use in genetic improvement. Currently we have the third generation of families for genetic improvement.

Table 55. Program Schedule I) Research and Development.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Execution of the genetic improvement program (R&D)	✓	✓	✓	✓	✓	✓

Source: DMSA, 2023.

This program will be implemented throughout the project. It is expected to be reviewed every five years or in the event of changes in conditions that require adjustments or updates on the subject.

Monitoring: It will be carried out through a report of payment record of service providers' credit payments and/or daily activity spreadsheet per person, invoice of contracted services and salary settlement.

Other indicators will be the expenditures expressed in USD invested in the fulfillment of the genetic improvement program. Action 1 will be monitored through the amount of USD earmarked for investment and the number of personnel involved in R&D.

10.7 SDG 12: Responsible Consumption and Production

Program J) Use of non-polluting inputs

Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse activities.

12.5.1: Percentage of waste recycled with respect to total waste generated.

Objective: Reduce waste generation in the production of forest seedlings in the tree nursery and field by replacing plastic containers with biodegradable ones.

Program Description: DMSA has a strong commitment to care for the environment. For this reason, for the current project we used biodegradable seedling tubes made of cellulose, as opposed to the plastic tubes commonly used

in the region. Biodegradable tubes reduce the volume of plastic waste production, provide nutrients to the seedling once it is planted, and reduce the time the tubes remain in the environment.

Table 56. Schedule of Program J) Use of Non-Polluting Inputs.

Year	2018	2019	2020	2021	2022	2023
ACTION 1: Production of seedlings in biodegradable containers	✓	✓	✓	✓	✓	✓

Source: DMSA, 2023.

The schedule is maintained throughout the life of the project. It is reviewed every 5 years and adjusted if necessary. If any changes in production or new technologies require it, it will be reviewed in advance to evaluate improvements in the production program for seedlings in biodegradable containers.

Budget: The budget allocated for this program ranges around USD 500, earmarked over the 5-year period, for the development of the program.

Monitoring: Nursery production of seedlings in biodegradable containers will be monitored annually. The monitoring indicators will be the number of seedlings produced per year in biodegradable containers, the USD invested in seedlings with biodegradable containers.

10.8 SDG 13: Climate Action

Program K) Afforestation for carbon sequestration

Target 13.2: Integrate climate change measures into policies, strategies, plans and planning.

Indicator 13.1.2: Contribution to disaster risk reduction strategies.

Indicator 13.2.2: Total greenhouse gas captures.

Objective: Contribute to mitigate the effects of climate change by capturing CO2 with forestations of *Eucalyptus spp.* and native species and contribute to reduce disaster risk.

Program Description: The carbon dioxide capture project through afforestation, is carried out on low productivity soils in degraded sites and altered by livestock use (successive practices of overgrazing and use of fire for pasture regrowth). The project is expected to capture 78.719 tons of CO2 from 2018 to 2058, providing ecosystem services of CO2 capture, and contributing favorably to the biodiversity of the region and the social environment in which it is developed.

Once the project is completed, the native forest will be 100% representative of native species. It is expected that under these conditions other native species will naturally establish themselves over time, favored by the dispersion of seeds from birds and mammals, and by the more favorable conditions generated by the native species, gradually enriching the initially planted forest. The total area to be afforested in the project is 172,76 ha. The plantations are located in two Forest Management Units (FMUs) owned by DMSA: Tapytá, 34,02 hectares; Hernandarias, near Hernandarias, 138.74 hectares.

Table 57. Schedule of Program K) Afforestation for Carbon Sequestration.

Year	2018	2019	2020	2022	2023	2024	2025	2026	2028	2029
Action 1: Land preparation and *Eucalyptus spp.* planting (ha)	13,43 (7,7%)	102,47 (59,3%)	3,02 (1,7%)	17,53 (10,1%)	36,31 (21,0%)					
Action 2: Planting of native species (ha)						13,43 (7,7%)	102,47 (59,3%)	3,02 (1,7%)	17,53 (10,1%)	36,31 (21,0%)

Source: DMSA, 2023.

Monitoring: Actions 1 and 2 will be monitored based on the tons were removed.

10.9 SDG 15: Life on Land

Program L) Biodiversity improvement on soil previously degraded by livestock farming

Target 15.1: By 2030, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

Indicator 15.1.1: Forest area as a percentage of the total area of a jurisdiction.

Indicator 15.1.2: Proportion of sites important for terrestrial and freshwater biodiversity included in protected areas, in forests.

Objective: Increase biodiversity of both plant and animal species on soils that for decades maintained low biodiversity indices due to livestock use.

Program Description: The transformation of land use from cattle ranching to forestry and the planting and conservation of native species is going to contribute positively to both faunal and floral biodiversity, and both are interrelated, as a new forest not only serves as a refuge, but also as a food source, as the project will introduce native fruit trees such as Ingá, Araticú, Yvyraró, Ñangapiry or Yvyrapita, which will attract different animal species.

In addition, as a greater number of different species coexist in an ecosystem, their capacity to maintain equilibrium will be much greater. For example, the consequences of low rainfall are mitigated in a mature forest, and crop pests quickly find biological controllers that keep them away.

Table 58. Schedule of Program L) Improvement of Biodiversity on Soil Previously Degraded by Livestock Farming.

Year	2018	2019	2020	2022	2023	2024	2025	2026	2028	2029
Action 1: Increasing plant biodiversity	-	-	-	-	-	✓	✓	✓	✓	✓

Year	2018	2019	2020	2022	2023	2024	2025	2026	2028	2029
Action 2: Increase wildlife biodiversity	-	-	-	-	-	✓	✓	✓	✓	✓

Source: DMSA, 2023.

Monitoring: Actions 1 and 2 will begin in 2024, coinciding with the start of planting native species, and will be monitored by means of samples that count the species found. Faunal sampling will be supported by insect traps and camera traps to count and classify birds and mammals present in the project.

11 REDD+ Safeguards (For REDD+ Projects)

N/A

12 Special Categories, Related to Co-Benefits (Optional)

N/A

13 Grouped Projects (if Applicable)

N/A

14 Other GHG Program

The current project was not enrolled in any other GHG program. The project was not rejected by any other GHG program. See next section for further information about this assessment.

15 Double Counting Avoidance

To avoid double counting of emission reductions or removals, the BCR tool "Avoiding double counting of emission reductions/removals". Version 2.0 has been applied, which is in accordance with BCR Standard v3.4, section 26.

On the other hand, the BCR tool "Avoiding double counting of emission reductions/removals". Version 2.0, in its section 7 defines double counting as accounting for a GHG mitigation result in tons of CO_2 in the following scenarios:

a. One tonne of CO_2 is counted more than once to demonstrate compliance with the same GHG mitigation target
b. One ton of CO_2 is counted to demonstrate compliance with more than one GHG mitigation target.
c. one ton of CO_2 is used more than once for remuneration, profit or incentive purposes
d. A tonne of CO_2 is verified, certified or credited by assigning more than one series to a single mitigation outcome

This project does not and will not perform any of the options that define double counting. Therefore, no double counting will occur with the CO_2 removals from the project.

As stated in the previous section, this project is not registered under any other GHG program and has not been previously rejected by any other GHG program.

The land of the project has a unique owner that is the project developer, DMSA, so, any overlap of the project area with other AFOLU projects would be illegal as would not count with DMSA consent, and its developer could not demonstrate land ownership against the standard and VVB of such hypothetical project.

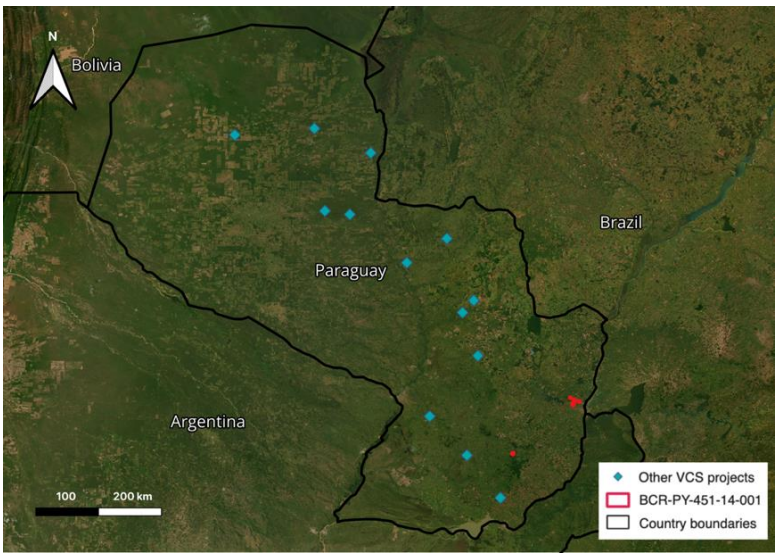
The government of Paraguay has urged the creation of an official registry of this type of project, which does not yet exist. Therefore, to determine that no overlap with other AFOLU projects happens, a survey of the existence and location of other ARR and REDD+ type GHG removal projects throughout Paraguay was carried out on the main standards and their platforms, that cover more than 90% of credits issuance worldwide[161]:

[161] https://vcmprimer.org/wp-content/uploads/2023/10/figure7.2-1.png?w=1024

- BioCarbon Registry: the only project is this one, BCR-PY-451-14-001
- VERRA: there are 14 registered projects in Paraguay [162]
- Gold Standard: no projects registered in Paraguay[163]
- Cer Carbono: no projects registered in Paraguay[164]
- Puro Earth: no projects registered in Paraguay[165]
- Global Carbon Council: no projects registered in Paraguay[166]
- Clean Development Mechanism: no projects registered in Paraguay[167]
- Plan Vivo: no projects registered in Paraguay[168]
- Climate action reserve: this standard has not developed a protocol for Paraguay[169]

[162] https://registry.verra.org/app/search/VCS/All%20Projects
[163] https://registry.goldstandard.org/projects?q=&page=1&countries=PY&project_types=22
[164] https://www.ecoregistry.io/projects
[165] https://registry.puro.earth/carbon-sequestration/projects
[166] https://projects.globalcarboncouncil.com/pages/approved_projects
[167] https://offset.climateneutralnow.org/reforestation-and-afforestation
[168] https://www.planvivo.org/pages/category/projects?Take=4
[169] https://www.arcgis.com/apps/dashboards/e2f5c6180f5040bfbdd4184a0a04824c8

Figure 63. Other GHG projects in Paraguay, together with the current project BCR-PY-451-14-001 promoted by DMSA.



Source: Own elaboration based on information collected at https://registry.verra.org/. ArcGIS World Imagery base cartography. Datum WGS84.

16 Monitoring Plan

The project activity aims to generate net anthropogenic GHG removals through the establishment of forest plantations on low quality soils that were degraded by extensive cattle ranching, and the Monitoring Plan to ensure that this objective is met is based on the requirements established in both the BCR0001 methodology version 4.0 and the complementary tools, more specifically the BCR Tool: Monitoring, reporting and Verification V1.0 (February, 2023).

In addition, Desarrollos Madereros S.A. has FSC certification for its forest management, which implies that the design, planting, and maintenance of the forest are carried out through a sustainable forest management program that avoids negative impacts on biodiversity, local communities, the water balance of the watersheds, and the scenic beauty of the landscape. In addition, operating procedures (OPs) are identified, recorded and implemented, and the most important ones for this project have been provided in the confidential supporting documentation.

The Monitoring Plan establishes credible and accurate procedures that allow for the evaluation of project performance and verification of net anthropogenic GHG emissions removals. It also establishes monitoring procedures that conform to the BioCarbon Standard and the approved monitoring methodology BCR0001 version 4.0.

Table 59. Aspects to be Monitored in the Monitoring Plan.

Aspect to Monitor	Monitoring Plan
(a) Project boundary monitoring	The boundaries of the project will be walked using GPS to verify the integrity and continuity of the project over time. This will be done at least once during the monitoring period towards the end of the project. In addition, it will be verified that the composition of the strata is consistent with the criteria established in this PD and also listed below in the subsection Strata: Description of the criteria for the composition of the strata.
(b) Monitoring of the implementation of project activities	The unit of measurement for each of the project activities will be established and the degree of compliance with the established annual objective will be verified. The activities to be followed up will be: - Number of seedlings produced in nursery - Progress of plantation establishment and maintenance activities (including soil preparation and weed control) by surface area. - Execution of plantings in each plot, verifying stratum and surface area. - Pruning activities performed according to height level
(c) Monitoring of the quantification of the project's emission reductions/removals	Proceed according to what is established below in the subsection Temporary Plots (TPs) to ensure a statistically reliable result.
(d) Quality control and quality assurance procedures	It shall be verified that the QA/QC procedures established for each of the control parameters listed

Aspect to Monitor	Monitoring Plan
	below in the Control Variables subsection are followed
(e) Verification of field data	Follow the instructions in the General Instructions subsection. described below.
(f) Review of the treatment of information	The following is to be followed as indicated in the Quality Assurance and Quality Control subsection described below.
(g) Data recording and archiving system	Follow the procedure described in the following subsection Data Recording and Filing System.

Source: DMSA, 2023.

Assignment of Monitoring Roles and Responsibilities

The head of the Research and Development Area (R&D) will be responsible for monitoring tree growth in the field. His team will be made up of the head of the area and five members of the company's technical staff of the contractor, who have technical training to perform this type of task. On the other hand, the quantification calculations, GHG removal and preparation of the PDD and monitoring report will be carried out by an external consultant.

Regarding measurements and data storage, the area in charge will be the head of the R&D area. The measurements will be stored digitally and physically. All data collected will be stored for at least two years after the last crediting period of the project activity, as required by the BCR0001 methodology "Quantification of GHG Removals" version 4.0.

Forest Growth and Condition

By means of temporary measurement plots, sample unit size 400 m^2 , randomly distributed and with a coverage of ages, species and sites.

The variables measured are DBH, total height, shape, aptitude and health. Field data is collected every five years by means of a spreadsheet, the information is processed and analyzed, and a monitoring report is prepared for each verification of net GHG capture.

The DMSA monitoring plan has been designed to provide all relevant data necessary to verify:

Strata: Description of the Criteria for the Composition of the Strata.

The variables considered to determine the number of strata were the types and combinations of species, density and planting distances and year of planting, while topography and soil type were considered indirectly with the species planted given their linkage. For the genus *Eucalyptus* the three species grandis, hybrid (*grandis x urophylla*) hybrid (*grandis x camaldulensis*) and a mix of eleven native species are considered which are: Guatambú (*Balfourodendron riedelianum*); Ingá (*Inga laurina*); Peterevy (*Cordia trichotoma*); Aratiku (*Rollinia emarginata*); Timbó (*Enterolobium contortisiliquum*); Yvyraro (*Pterogyne nitens*); Cedro misionero (*Cedrela fissilis*); Ñangapiry (*Eugenia uniflora*); Lapacho (*Handroanthus heptaphyllus*); Yvyrapyta (*Peltophorum dubium*); Grapia (*Apuleia leiocarpa*) that will be present in the same proportion in each of the strata. The planting years are five in total: 2018, 2019, 2020, 2022 and 2023, while the planting densities of all species are two: 858 and 1146 trees per hectare. Taking into account the aforementioned criteria, 8 strata were defined. The strata are mapped and identified in the GIS (Geographic Information System).

Temporary Plots (TPs)

For the sampling work, the method chosen was to select temporary plots that will change during each monitoring. This complies with the good practices recommended in the methodology applied, BCR0001 version 4.0.

To calculate the number of temporary sampling plots to be associated with each stratum, equation 23 of section 17.3.1.4 of the BCR 001 version 4.0 methodology was used.

The distribution of the plots within a stratum is random, their names are coded to be associated with the measurements recorded in the field, and their geographical position is recorded in a GIS database so that the sampling plots corresponding to each stratum and monitoring date can always be located.

Sampling intensity: The project holder will select the sampling intensity, depending on the planted areas (it can be 0,5% or 0,1% in relation to the size of the planted area). 0,5% will be used.

Size of temporary sampling plots: The sampling plots used were 400 square meters, complying with section 17.3.1.3 of the BCR 001 version 4.0 methodology.

Installation of Temporary Plots and Measurements

- Determination of the center of the sampling plot: Using the ArcMap program, the center of each sampling plot is randomly generated. This coordinate is loaded into the GPS for the location in the field.
- Once the center of the plot is located, a wooden stake of at least 3" by 2" section is driven in this point.
- By means of another stake placed in a position visible from the center of the plot (between 10 and 15 m), it defines the north course.
- From this direction, the trees are numbered clockwise, taking as a second criterion from the outside to the inside. This correlative numbering is done with paints of easy visualization with prolonged permanence for each tree.
- The general information of the plot, squares, date of measurement, etc. is recorded in a spreadsheet. And for each tree, the distance in meters and azimuth, having as zero origin the center of the plot.
- When the trees reach the size for DBH measurement, a ring or dot is painted on each tree at a height of 1,30 m from the imte floor (ground). The tape for successive DBH (diameter at breast height) measurements is positioned on this ring.

$$n = \frac{A_i * 10000 * sampling\ intensity}{PS}$$

Where,

n = Number of plots required for biomass estimation; dimensionless

A_i = Size of each stratum i; ha

PS = Parcel size constant for all strata

Sampling intensity = the project holder will select the sampling intensity, depending on the planted areas (it can be 0,5% or 0,1% in relation to the size of the planted area.

For conservative reasons, when the first decimal place of the result of the equation is greater than 2, it is rounded up and one more sample plot is added.

Following Equation 23 of the BCR0001 methodology version 4.0 it is going to be 27 temporary 400 square meter sample plots at 172,76 once the project is completed.

Table 60. Composition of Strata and Sampling Plots.

Stratum	Year of Planting	Species	Surface Area (Ha)	Number of Sample Plots
1	2018	*Eucalyptus* + Native (year 2024 onwards)	13,43	2
2	2019	*Eucalyptus* + Native (year 2025 onwards)	32,14	4
3	2019	*Eucalyptus* + Native (year 2025 onwards)	17,62	3
4	2019	*Eucalyptus* + Native (year 2025 onwards)	52,71	8
5	2020	*Eucalyptus* + Native (year 2026 onwards)	3,02	1
6	2022	*Eucalyptus* + Native (year 2028 onwards)	17,53	2
7*	2023	*Eucalyptus* + Native (year 2029 onwards)	11,83	2
8*	2023	*Eucalyptus* + Native (year 2029 onwards)	24,48	5
Total			**172,76**	**27**

Source: DMSA, 2023.

All sampling plots will be temporary. At each verification, the same procedure will be randomly repeated following the BioCarbon Registry's best practice recommendations.

*At the date of the first monitoring -May 2023- strata 7 and 8 will not be planted, so the total number of sample plots will be 20 in strata 1 to 6.

Tree Measurements:

- Diameter at breast height (DBH): measured with a metallic tape with diameter graduation in centimeters.
- Total height: Measured with Vertex IV according to the manufacturer's user manual.
- Number of trees per hectare: This is done at the time of measuring diameters (DBH) and total height, quantifying the number of trees entering each sampling area.
- The check for possible measurement reading error is performed at the immediate end of the plot, between 15 and 20 percent of the trees measured in the plot. The person who performed the measurement becomes an observer, and the other person of the same crew performs the remeasurement of each measured parameter.
- Field spreadsheet file: once the data loading or digitalization is finished, it is filed in a folder stored in the Operating Unit of Desarrollos Madereros S.A. The digital format in Excel is stored in the company's server.

Equipment and Tools:

- Forceps, Tapes (metric and diametric), Vertex IV, Rod, Telescope, Compass, GPS, Logging Sheet, Stand Maps, Pen and/or Pencil, Permanent Marker, Spray Paint, Wooden Stakes, Nails, Hammer, Mallet, Sheet Metal, Metal Number Engraver.
- Changes of measuring equipment: Vertex IV, Compass, GPS, Calipers, Tapes (metric and diametric), every 5 years before each Verification.
- Data processing: The field data recorded in the physical spreadsheet will be uploaded to an electronic spreadsheet (Excel) to perform dasometric and volumetric calculations.
- HR in the Inventory: We have a staff of workers with experience in tree measurements in the field, in data collection, use of measuring equipment, and they respond to the company's work procedures.

Sighting of Wild Animals

Objective: To be able to identify the evolution of the positive effects on biodiversity that the project will generate, mainly from the planting of native species from the year 2024.

The monitoring system that will be implemented is based on the technique of direct and indirect observation of the animals that roam the project area. Direct observation will be carried out with all personnel involved in general activities within the property of Desarrollos Madereros S.A., who have the instruction and obligation to report sightings of any known animal, tracks and feces that are seen within the project area, informing the personnel responsible for reporting sightings. On the other hand, 3 camera traps will be installed in a temporary location within the project area between the months of September and October because this is the period when the greatest number of species can be observed. The camera traps will be installed during these two months. The memory of each camera has a duration of 15 days. Therefore, for the monitoring, the 4 memories per camera will be analyzed, 12 memories in total, which will be produced by the camera traps. This process will be repeated every 2 years. As a complement, a direct sighting will be carried out periodically by all DMSA operators.

The sighting report is recorded in an electronic spreadsheet and the photos are stored in the Project Monitoring folder in the Central Server. Once the species has been identified, the GPS point where the sighting was made is indicated.

The camera traps will be registered at the end of the photo capture period. On that date, all the information will be entered in specific spreadsheets for the case and will be purchased every 2 years to evaluate the evolution. With respect to direct sightings, the registry will be updated periodically (every time a sighting is made) and every 2 years, coinciding with the camera trap report, a partial closure will be made to determine the evolution of the fauna in the project area. The camera traps will be monitored every 2 years in September and August (the months when the greatest number of animals are present), where the evolution of the fauna will be counted in comparison to previous periods.

Table 61. Monitoring Plan.

Modality		
A. Report per observation (at the time of occurrence) is recorded with a physical and digital spreadsheet.		
B. Installation of camera traps (photos)		
Year of Execution	**September**	**October**
2018		
2020		
2022		
2024	x	x
2026	x	x
2028	x	x
2030	x	x
2032	x	x
2034	x	x
2036	x	x
2038	x	x
2040	x	x
2042	x	x
2024	x	x
2026	x	x
2048	x	x

Source: DMSA, 2023.

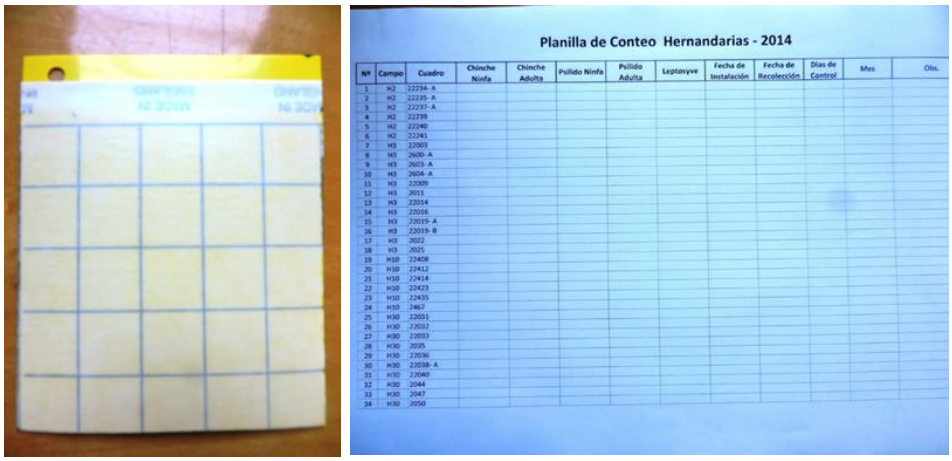
Pest Control

The objective of Foliage Pest Monitoring is to provide data on the presence or absence of forest pests within the project area affecting plantations. Forest pests

can cause significant damage to trees and consequently can reduce growth and even cause tree death.

To trap the insects, yellow chromatic adhesive traps (10 cm x 12 cm) were installed in the project area at a height of 3 meters from the ground, one in Tapytá and 2 in Hernandarias. Each trap is identified with the number of the box where it was installed. The use of the sticky trap is the most widely used in the forestry sector and the most effective and practical for monitoring the presence of pests.

Figure 64. Sticky trap model (left) and registration form model (right).



Source: DMSA, 2023.

Every 30 days the group of traps is changed. Each trap is packed with transparent plastic film so as not to damage the captured insects and to facilitate identification under the stereoscopic magnifying glass. The next step is to record the data in the Counting Form. The insect count is recorded in digital format and saved in the Project Monitoring folder in the company's Central Server.

Mitigation plan, before the appearance of pests and possible severe damage, the operations manager is informed in order to take the necessary control actions. Look for alternatives for control and implement actions of the control alternative that is best for the problem, possible control option is to promote biological controllers.

Meteorological Station

In order to minimize the uncertainty of official weather bulletins, *Desarrollos Madereros S.A*. has two weather stations as a complementary source of field data, one located in the Hernandarias field near the main office and the other in the Tapytá district of San Juan Nepomuceno. The objective is to have meteorological data at each site provided by the special instruments installed (Davis Instruments Weather Station model Vantage Pro 2), which provides useful information for decision making before carrying out silvicultural and heritage protection activities, etc.

Monitoring on the Weather Station

To ensure the proper functioning of the equipment, periodic inspections are carried out by specialized technicians (outsourced company) who are in charge of examining the operation of the components. The monitoring and cleaning of rain gauges is performed *in situ* and consists of checking for dirt and other anomalies by the company's own personnel once a week, and after a rainfall.

The operation of the equipment is monitored by daily reports generated automatically through an internet connection to the cell phone of the technicians responsible for Desarrollos Madereros S.A. The data generated is stored on the company's server.

Fire Prevention Monitoring

Detection

A very important activity, which will have a decisive influence on the success of the firefighting operation, is the rapid detection and precise location of forest fires. Surveillance towers are one of the most efficient and economical means to detect and locate fires.

The tower cabins are equipped with a chair, sliding windows, cartography (reference map), a portable radio, cellular phone, among other items.

The topography of the region is fairly flat, which makes it easy to cover an area of 70.000 ha, with a radial distance of 15 km.

There are a total of 2 (two) Observation Towers equipped to detect smoke plumes that may correspond to possible fire outbreaks, one in Hernandarias (Hernandarias municipality) and the other in Tapytá (San Juan Nepomuceno).
Mobile ground detection is based on ground patrols, which can be done by means of vehicles equipped with radio transmitters, using motorcycles or simply on foot.

This detection system can make use of roving guards on motorcycles who can monitor a given forest area. These guards must travel the entire area assigned to them on a daily basis or be located at strategic points where it is possible to observe all or most of the area. The Operations Center determines the schedule for each field.

Another way of detecting a probable fire outbreak is through information provided by the company's own personnel, contractors, passers-by or neighbors in the area.

Following I.P.I. indications, the person in charge of Prevention, equipment and logistic support will organize the watch, and will arrange permanent observation tasks from the towers from 08:00 hs. to 16:30 hs.; this last schedule is variable according to I.P.I., and may be 24 hs. when reaching VERY HIGH. The observation tasks from the towers will be suspended only in the presence of rain.

During non-working days (Saturdays, Sundays and holidays), the **Fire Chief** will implement a system of active guards, which will have a minimum of 4 people (1 driver and 3 brigade members). In case of fire detection, the chief on duty will notify the Chief Forester.

<u>Monitoring Towers (Monitoring Towers)</u>
Obligations and responsibilities
1-Report all Smoke Columns immediately to the Watch Commander.
2-Keep a daily record of all smoke and fires detected during the day.
3-Report normally every one hour, and from Orange alert onwards, it will be reported every half hour, to the supervisor of the Operations Center of each field.
4-Report to your immediate boss any damage to the tower elements and/or cabin.
5-Keep the batteries of the radios always charged.
6-Protect the radio against dust, humidity, shocks and/or falls.

7-When a storm is approaching, you must descend from the tower immediately, notifying the Supervisor of the Operations Center.
8-Duly take care of all the communication and detection equipment in the tower under his charge.

Smoke Report

Smoke reporting is used in all towers to record the existence of all smoke, both from authorized and unauthorized agricultural and livestock burning as well as forest fires.

Each time the tower employee spots smoke, the smoke and fire report should be completed. The following information should be included:

1. Date: when the report is made.
2. start time: time at which the smoke was seen by the watchman.
3. course: direction in which it leads.
4. distance: note the approximate distance of the smoke or fire from the tower.
5. site: using place names, (community, streams, rivers, roads, boundaries, among others).
6. burning in: if possible, the tower employee should indicate the type of fuel in which the fire is occurring, if not known write UNKNOWN.
7. wind in the fire: request to the logistics and communication manager.
8. wind direction: by observing the smoke plume, the tower employee can calculate the wind direction.
9. best routes: being familiar with the area, the tower employee can recommend to the brigade the best way to reach the fire site.
10. fire reported: name of the person who answered and received the message in the office, and name of the office.
11. time of report: time the fire was reported to the office.
12. Fire number: record the correlative number of the fire.
13. Any additional recommendations.

The following items must be completed at the Operations Center:

1. control time: record at what time the fire was controlled.
2. duration time in minutes: how many minutes was the duration of the fire.
3. area burned: how many hectares in total were burned.

4. the fire was fought: indicate whether or not the fire was fought.
5. by whom: write who fought the fire (forest brigades, military or private individuals).
6. if negative: explain why it is not possible to combat it.

Communications

The communication of data and the subsequent coordination of actions is carried out through a proprietary radio frequency by means of the company's own base equipment.

Communication system

When smoke is sighted, the tower operator must immediately communicate to the operations center, informing the characteristics of the smoke plume.

The elements used for communication in observation towers are radio or telephone. The radio transmitter-receiver (VHF) requires periodic battery charging, which can be done through an installation in the tower itself. The advantages of the radio are its flexibility, since it allows simultaneous communication between the towers, desk, central and mobile firefighting units, which are also equipped with radio. In case it is not possible to contact by radio, the person in charge of communication will have available the telephone numbers of the people of the organization and other emergency numbers.

Control variables

Some of the variables will be fixed and others will be variable. The latter will be monitored before each verification.

The fixed variables will be:

- Strata
- Wood density
- Expansion factor
- Root-shoot ratio
- Biomass carbon factor

The variables to be monitored will be:

- Stem volume with bark
- Area of the strata

- Chest height diameter
- Height of trees
- Survival of trees - number of trees per hectare
- Year
- Species planted for each stratum
- Soil PH
- water quality
- Sighting of wild animals
- Pests and diseases
- Weather
- Potential Fires

All information collected in each monitoring report will be stored in an organized and secure manner in digital and physical format with sufficient copies. Each file will contain field forms, estimates of changes in carbon content, geographic information (GIS) and all information that is monitored. All data collected shall be collected for at least two years after the last crediting period of the project activity, as required by BCR0001 methodology "Quantification od GHG Removals" version 4.0.

16.1 Data and Parameters to Quantify Emission Reductions

The following is a breakdown of the data and parameters used to quantify GHG sequestration. As the project progresses and empirical measurements can be made on the plantations themselves, IPCC parameters will be replaced by the project's own data.

Data / Parameter	Dj
Data unit	g/cm³ or ton/m³
Description	Basic wood density of tree species j
Data source	2006 IPCC Greenhouse Gas Inventory Guidelines Table 4.13
Value applied	Eucalypt: *Eucalyptus robusta* =0,51 Natives Mix = 0,64.

Data / Parameter	Dj
Justification for the choice of data or description of the measurement methods and procedures applied.	The 2006 IPCC guidelines include a guide for greenhouse gas inventories that provides default wood density data that should be used if data from local sources are not available, as in the present case. From Table 4.13 the values corresponding to *Eucalyptus robusta* America and the native species mix were selected.
Purpose of the data	Calculation of project emissions
Comments	*The native species mix Dj was calculated as the average of the American species of the same genera as the 11 native species used in the project as listed in Table 4.13: Enterolobium (E. cyclocarpum 0.34, E. maximum 0.4, E. schomburgkii 0.78), Eugenia (E. stahlii 0.73), Cordia (C. alliodora 0.48, C. bicolor 0.49, C. gerascanthus 0.74, C. goeldiana 0.48, C. sagotii 0.5), Cedrela (C. odorata 0.42, C. sp. 0.40-0.46), Inga (I. alba 0.62, I. edulis 0.51, I. paraensis 0.82), Rollinia (R. exsucca 0.52), Pterogyne (P. nitens 0.66), and Apuleia (A. leiocarpa 0.7) (t dm/m3 fresh volume). No species of Handroanthus, Balfourodendron or Peltophorum were listed, so these values were obtained from an open data publishing platform[97] and another source[98].*

Data / Parameter	BEF 2,J
Data unit	No dimensions
Description	Biomass expansion factor for the conversion of trunk biomass to aboveground biomass for tree species or groups of species j
Data source	IPCC, 2005. Chapter 3 Table 3A.1.10
Value applied	*Eucalyptus spp.* in tropical forests: 2 Native species mix. There are no official data for these native species in particular, so for conservative purposes, the lowest broadleaf value of 2.0 was selected.
Justification for the choice of data or description of the measurement methods and procedures applied.	The *Eucalyptus* expansion factor value of 2 was selected, being the lowest value that can be selected in the range of 2 to 9, for conservative reasons.

Data / Parameter	BEF 2,J
Purpose of the data	Calculation of project emissions
Comments	

Data / Parameter	R_i
Data unit	No dimensions
Description	Root-shoot ratio for species j
Data source	Eucalypt: 2005 IPPC ANNEX 3A.1 Biomass default Table 3.A.1.8[170] Natives mix: CDM AR-TOOL14
Value applied	Eucalypt plantation/forest • 0,29; b<50 t.d.m/ha • 0,15; 50 - 150 t.d.m/ha • 0,10; b> - 150 t.d.m/ha Native species (Tropical/sub-tropical forest then Primary tropical/subtropical moist forest): calculated with the following formula The value of R_j is estimated as $R_j = \frac{e^{(-1.085+0.9256\times\ln b)}}{b}$ where b is the above-ground tree biomass per hectare (in t d.m. ha^{-1}), unless transparent and verifiable information can be provided to justify a different value.
Justification for the choice of data or description of the measurement methods and procedures applied.	The IPCC Guidance suggests an average root:shot ratio in intervals that depend on aboveground biomass. This causes unrealistic jumps in what is usually a smooth tree growth model. For this reason, we have chosen to smooth the values by respecting the conservative intervals provided by the Guide. For our species of interest, three intervals are usually considered, depending on whether the biomass (t/ha) falls below, between or above certain limits. For this reason, we chose a 2-degree polynomial for the interpolation, ensuring that the resulting smoothed values still respect the conservative limits proposed in the Guide.

[170] https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf

Data / Parameter	R_i
	With respect to native species, it is important to note that there are no official data for Paraguay, nor is there a specific value in the IPCC (2005) tables; therefore, in order to make conservative calculations, the value was calculated with the CDM AR-TOOL14.
Purpose of the data	Calculation of project emissions
Comments	

Data / Parameter	CF
Data unit	t C (t d.m.)-1
Description	Carbon fraction of tree biomass
Data source	2006 IPCC default value of 0,47 t C / t d.m.
Value applied	0,47
Justification for the choice of data or description of the measurement methods and procedures applied.	Default value recommended in Tool 14 "Estimation of Carbon Stocks and Carbon Stock Change of Trees and Shrubs in F/R CDM Project Activities" v.04.2
Purpose of the data	Calculation of project emissions
Comments	

Data / Parameter	Ai
Data unit	has
Description	Area of stratum i
Data source	Field measurement
Description of the measurement methods and	SOPs from published manuals or from the IPCC GPG LULUCF 2003 will be applied.

Data / Parameter	Ai
procedures to be applied	
Frequency of control/recording	Before each verification
Value applied	See values in Table 17
Monitoring equipment	GPS (Global Positioning System) and GIS (Geographic Information System)
QA/QC procedures to be applied.	The quality control/quality assurance procedures of the IPCC GPG LULUCF 2003, point 5.5 shall be applied.
Purpose of the data	Project emissions calculations
Calculation method	The entire perimeter of the stand is traversed with the GPS, selecting the area calculation. This information is entered into the GIS (Geographic Information System), where it is mapped with the SHP layer. The sum of the areas of the stands/lots that make up each stratum corresponds to the total area of the stratum.
Comments	

Data / Parameter	$V_{TREE,j,p,i}$
Data unit	m^3
Description	Stem volume with bark of species j in plot p stratum i
Data source	Scientifically valid PlaForNea software version 2017 using field measurements.
Description of the measurement methods and procedures to be applied	In conjunction with the permanent plots, the software and the experience of more than 20 years in this activity, the growth models have proven to have a high accuracy according to reality. PlaForNea version 2017 is a simulator that allows estimating the growth of the main forest species planted in Mesopotamia Argentina, such as *Pinus loblolly, Eucalyptus grandis, Pinus elliottii, Pino taedae* and *Araucaria angustifolia*.

Data / Parameter	$V_{TREE,j,p,i}$
Frequency of control/recording	Before each verification
Value applied	See values in excel "DMSA emission reduction" tab 9 "Plot location - strata scheme".
Monitoring equipment	The equipment and tools are described in section 17.
QA/QC procedures to be applied.	The quality control/quality assurance procedures required by the national forest inventory shall be applied. If not available, the quality control/quality assurance procedures of the IPCC GPG LULUCF 2003 shall be applied.
Purpose of the data	Calculation of project emissions
Calculation method	The calculation is made using the growth equations used by the PlaForNea 2017 version.
Comments	

Data / Parameter	$A_{plot,i}$
Data unit	has
Description	Total surface area of sample plots in stratum i
Data source	Field measurements
Description of the measurement methods and procedures to be applied	Standard Operating Procedures (SOPs) prescribed in the national forest inventory are applied. In the absence of these, Standard Operating Procedures (SOPs) from published manuals or the IPCC GPG LULUCF 2003 are applied.
Frequency of control/recording	Before each verification
Value applied	See values in Table 17 y Table 48 composition of the strata and sampling plots

Data / Parameter	$A_{plot,i}$
Monitoring equipment	GPS. Tape measure. Compass. Stake.
QA/QC procedures to be applied.	The quality control/quality assurance procedures required by the national forest inventory shall be applied. If not available, the quality control/quality assurance procedures of the IPCC GPG LULUCF 2003 shall be applied.
Purpose of the data	Calculation of project emissions
Calculation method	The area of the plot was established by calculating the area of a circumference with a radius prefixed in the monitoring design. The method consists of locating the center of the plot, marking it with a stake. From the plot center, the radius is measured in horizontal projection with a tape measure, starting from a reference orientation.
Comments	

Data / Parameter	DBH
Data unit	cm
Description	Diameter at breast height (DBH)
Data source	Field measurement on trees in the sample plots
Description of the measurement methods and procedures to be applied	Standard Operating Procedures (SOPs) prescribed in the national forest inventory are applied. In the absence of these, Standard Operating Procedures (SOPs) from published manuals or the IPCC GPG LULUCF 2003 are applied.
Frequency of control/recording	Before each verification
Value applied	See values in Excel "DMSA emission reduction" "Plot location - strata scheme".
Monitoring equipment	The diameter at chest height is measured with a diametric tape. The tape is made of stable materials and is graduated in mm and cm on one side and in pi units on the other side. The latter allows the diameter of the tree to be measured directly around the trunk at a height of 1,3 meters.

Data / Parameter	DBH
QA/QC procedures to be applied.	The quality control/quality assurance procedures required by the national forest inventory shall be applied. If not available, the quality control/quality assurance procedures of the IPCC GPG LULUCF 2003 shall be applied.
Purpose of the data	Calculation of project emissions
Calculation method	Direct measurement
Comments	

Data / Parameter	H
Data unit	meters
Description	Tree height
Data source	Field measurement in sample plots
Description of the measurement methods and procedures to be applied	Standard Operating Procedures (SOPs) prescribed in the national forest inventory are applied. In the absence of these, Standard Operating Procedures (SOPs) from published manuals or the IPCC GPG LULUCF 2003 are applied.
Frequency of control/recording	Before each verification
Value applied	See values in Table 17 y Table 48 composition of the strata and sampling plots
Monitoring equipment	Depending on the particular case, one of three measuring devices will be used: Hypsometer or Clinometer, Vertex Dendrometer.
QA/QC procedures to be applied.	The quality control/quality assurance procedures required by the national forest inventory shall be applied. If not available, the quality control/quality assurance procedures of the IPCC GPG LULUCF 2003 shall be applied.
Purpose of the data	Calculation of project emissions.
Calculation method	Measurement with the equipment.

Data / Parameter	H
Comments	

Data / Parameter	T
Data unit	Year
Description	Time period elapsed between two successive carbon stock estimates
Data source	Time elapsed
Purpose of the data	Calculation of project emissions.
Comments	If the two successive estimates of tree carbon stocks are made at different times of the year t2 and t1 (e.g., in June of year t1 and November of year t2), then a fractional value is obtained. assigned to T

Data / Parameter	Survival of i,j, k
Data unit	Tree *ha^{-1}
Description	Survival rate per hectare established for stratum I, species j and forest system k.
Data source	Calculated from field measurements
Description of the measurement methods and procedures to be applied	The quality control/quality assurance procedures required by the national forest inventory shall be applied. If not available, the quality control/quality assurance procedures of the IPCC GPG LULUCF 2003 shall be applied.
Frequency of control/recording	It is done 3 months after planting and then once a year.
Value applied	see excel "DMSA emission reduction".
Monitoring equipment	GPS. Measuring tape, compass, stake.
Calculation method	The area of the plot was established by calculating the area of a circumference corresponding to 400 m2 per plot. The method consists

Data / Parameter	Survival of i,j, k
	of locating the center of the plot, marking it with a stake. From the center of the plot, the radius is measured in horizontal projection with a tape measure, starting from a reference orientation.
Purpose of the data	Calculation of project emissions
Comments	

Data / Parameter	Trees planted for each strata
Data unit	Tree *ha^{-1}
Description	Identification of the tree species planted for each stratum.
Data source	Calculated from field measurements
Description of the measurement methods and procedures to be applied	It will be carried out through direct observation using comparative bibliographic reference, at the temporary sampling points each year.
Frequency of control/recording	Once a year
Value applied	Number of trees per species
Monitoring equipment	Registration forms,
Purpose of the data	Calculation of project emissions
Comments	

Data / Parameter	PH,
Data unit	the 0 to 14 index will be analyzed
Description	Conducting a chemical study of soil quality to identify the availability of nutrients.

Data / Parameter	PH,
Data source	Calculated from field measurements
Description of the measurement methods and procedures to be applied	Soil sampling: soil samples will be taken at three random points, two in the Hernandarias field and one in Tapytá, a fixed point identified with GPS and wooden stakes fixed to the ground where the sample will be extracted every five years. The soil analysis will be carried out in specialized laboratories that will deliver the report with the results of chemical analysis of the soil.
Frequency of control/recording	every 5 years
Value applied	index value from 0 to 14
Monitoring equipment	Laboratory equipment
Purpose of the data	Soil nutrient availability
Comments	

Data / Parameter	Dissolved Oxygen, PH
Data unit	mg/L, U pH
Description	Dissolved oxygen in streams is essential for the survival of most aquatic species, including fish, invertebrate organisms and plants. If values below minimum required levels are detected, corrective action will be taken. The pH is the potential of hydrogen or potential of hydrogenions and serves to determine the degree of alkalinity or acidity of a solution, based on the concentration of positive hydrogen ions of the compound. This process will be carried out following the parameters of the Water Quality Standard in the National Territory of Paraguay. Resolution 222/02). This process will not be carried out in Tapytá because there is no watercourse near the project area.
Data source	Calculated from field measurements
Description of the measurement methods and procedures to be applied	Water samples will be collected from the stream (named Aña Cuá), which is located in the vicinity of the Project. Physical and chemical analyses will be performed in a specialized laboratory. The results will provide information on the quality of the water and whether it meets acceptable standards.

Data / Parameter	Dissolved Oxygen, PH
Frequency of control/recording	Every 5 years
Value applied	SMWW 4500 OC, NBR 9251 FEV 1986
Purpose of the data	Measuring water quality
Comments	

Data / Parameter	Sighting of wild animals
Data unit	Number and types of species.
Description	Establish increase or decrease of species types and number of individuals per species in the project area.
Data source	Calculated from field measurements
Description of the measurement methods and procedures to be applied	Three camera traps will be installed in a temporary location within the project area between the months of September and October, since this is the period when the greatest number of species can be observed. The camera traps will be installed during these two months. The memory of each camera has a duration of 15 days. Therefore, for the monitoring, the 4 memories per camera will be analyzed, 12 memories in total, which will be produced by the camera traps. This process will be repeated every 2 years. As a complement, a direct sighting will be carried out periodically by all DMSA operators.
Frequency of control/recording	Camera traps will be monitored every 2 years and simple sightings will be monitored periodically.
Value applied	number and type of species
Monitoring equipment and calculation method	Photography and video equipment will be used, and starting in 2024, the year native species are planted, three camera traps will be installed.
Purpose of the data	Measure whether the project contributes positively to the local fauna.
Comments	

Data / Parameter	Pests affecting plantations
Data unit	Presence of the pest in the sticky traps
Description	Survey of presence or absence of pests on plantations
Data source	Calculated from field measurements
Description of the measurement methods and procedures to be applied	To trap the insects, yellow chromatic adhesive traps (10 cm x 12 cm) were installed in the project area at a height of 3 meters from the ground, one in Tapytá and one in Hernandarias. Each trap is identified with the number of the box where it was installed. The group of traps is changed every 30 days. Each trap is packed with transparent plastic film so as not to damage the captured insects and to facilitate identification under the stereoscopic magnifying glass. The next step is to record the data in the Counting Form. The insect count is recorded in digital format and stored in the Project Monitoring folder in the company's Central Server. This type of monitoring began in October 2021. Mitigation plan, when pests appear and possible severe damage occurs, the Operations Manager is informed in order to take the necessary control actions.
Frequency of control/recording	Every 30 days
Monitoring equipment and calculation method	To trap the insects, yellow chromatic adhesive traps (10 cm x 12 cm) were installed in the project area at a height of 3 meters from the ground, one in Tapytá and 2 in Hernandarias.
Purpose of the data	Measurement of the existence of pests.
Comments	

16.2 Information related to the environmental impact assessment of GHG project activities.

Negative environmental impacts of the project activity can be mitigated and are generally temporary. They are related to potential negative impacts caused by:

1) increased traffic of trucks and heavy machinery for biomass harvesting

2) noises
3) soil compaction by trucks and personnel
4) The application of pesticides for ant and weed control.
5) Disposal of pesticide containers

Given that the project is FSC certified, there are procedures in place to minimize any negative impacts, as well as systems for receiving complaints, etc.

The project converts a low production area, where cattle ranching was not very extensive, into a forested area that will contribute positively to mitigating the advance of climate change by capturing carbon dioxide from the atmosphere. At the same time, the presence of the planted forest next to the conservation areas will create new ecotones in the landscape, which will provide refuge and reproduction areas for some species.

Therefore, the project will have many more positive impacts on the environment than negative ones. Potential negative impacts will be mitigated throughout the different stages of the project.

16.3 Procedures established for the management of GHG emission reductions or removals and related quality control.

General Instructions on Data Collection

A follow-up and review of all the data recording sheets in the field will be carried out. This will be done by the head of R&D, who will go to the field where the measurements were taken and randomly perform his own measurements (following the same protocol and with the same equipment) covering between 10% - 20% of the sampling, to corroborate the data. There should not be a deviation greater than 5%. If there is an error exceeding 5%, the entire measurement will be redone from scratch. This process will be carried out within 5 days of delivery of the spreadsheet.

In the event of differences in the electronic and paper formats, the paper format will prevail because it reflects the measurements made in the field.

Data Recording and Archiving System

Following the DMSA Backup Procedures Plan, the DMSA Administration area will be in charge of the backup and security of the data files. This data will be kept in safekeeping for at least 2 years after the last accreditation period of the project in compliance with section 17.5.3 of the BCR0001 V4.0 methodology. The review of the correct registration and data archiving system shall be performed by the administration area once a year.

A quality control system is implemented to routinely verify the consistency, correctness, and completeness of data; to identify and correct errors and omissions; and to properly document and archive data and documentation related to monitoring activities. Quality Assurance measures will be implemented to verify that data quality objectives are met and, in general, to support the effectiveness of the quality control system.

DMSA is a forestry company with more than 20 years of experience. This company has highly professional and qualified personnel with experience for the realization of all the tasks of field measurements and for the realization of the data entry necessary for this type of projects.

The company has a BACKUP PROCEDURE in order to ensure the availability and proper safeguarding of the company's information. These rules and procedures apply to all the information stored in the company's servers.

Standard Operating Procedure

The Standard Operating Procedure (SOP) will be used for the establishment of temporary sampling plots. Plots will be systematically created with a random start in each stratum to avoid subjective choice of plots (plot centers, plot reference points, movement of plot centers to more "convenient" positions). The plot locations will be identified with the help of a GPS device in the field. For each plot, the geographic position (GPS coordinates), administrative location and compartment serial number will be recorded and archived. Temporary plots will be established before the first monitoring takes place and will be measured for each monitoring event.

In the case of special circumstances (e.g., forest fires, uneven growth) additional temporary plots may be established.

Quality Assurance and Control

State-of-the-art measuring equipment will be used (e.g., graduated metal tape for DBH measurement, Vertex IV for height and distance measurement, GPS, etc.). Before any measurement task is carried out, the condition and calibration of the equipment will be corroborated and checked. The data are collected in templates that are then digitally transcribed. Before the inconsistency of a data between the 2 formats, the physical template will prevail. This will be done before each verification.

Quality assurance and quality control procedures will be implemented and the use of these procedures will be monitored to ensure that net GHG removals by sinks are measured and monitored in an accurate, credible, verifiable and transparent manner.

The project will follow the IPCC's Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG). This methodology uses two types of procedures to ensure that the inventory estimates and data inputs are of high quality: Quality Assurance (QA) and Quality Control (QC). Since a QA/QC plan is critical to building credibility, one will be developed that outlines QA/QC activities with a scheduled time frame from preparation to final report.

The plan describes specific QA/QC procedures in addition to special QA/QC review procedures. The QA/QC plan is an internal document for organizing, planning and implementing QA/QC activities and will be represented here only in reduced form.

a. Standard Operating Procedures (SOP) to be established for all procedures, such as: GIS analysis; field measurements; data entry; data documentation and data storage.

b. Training courses will be organized for all relevant personnel on all data collection and analysis procedures.

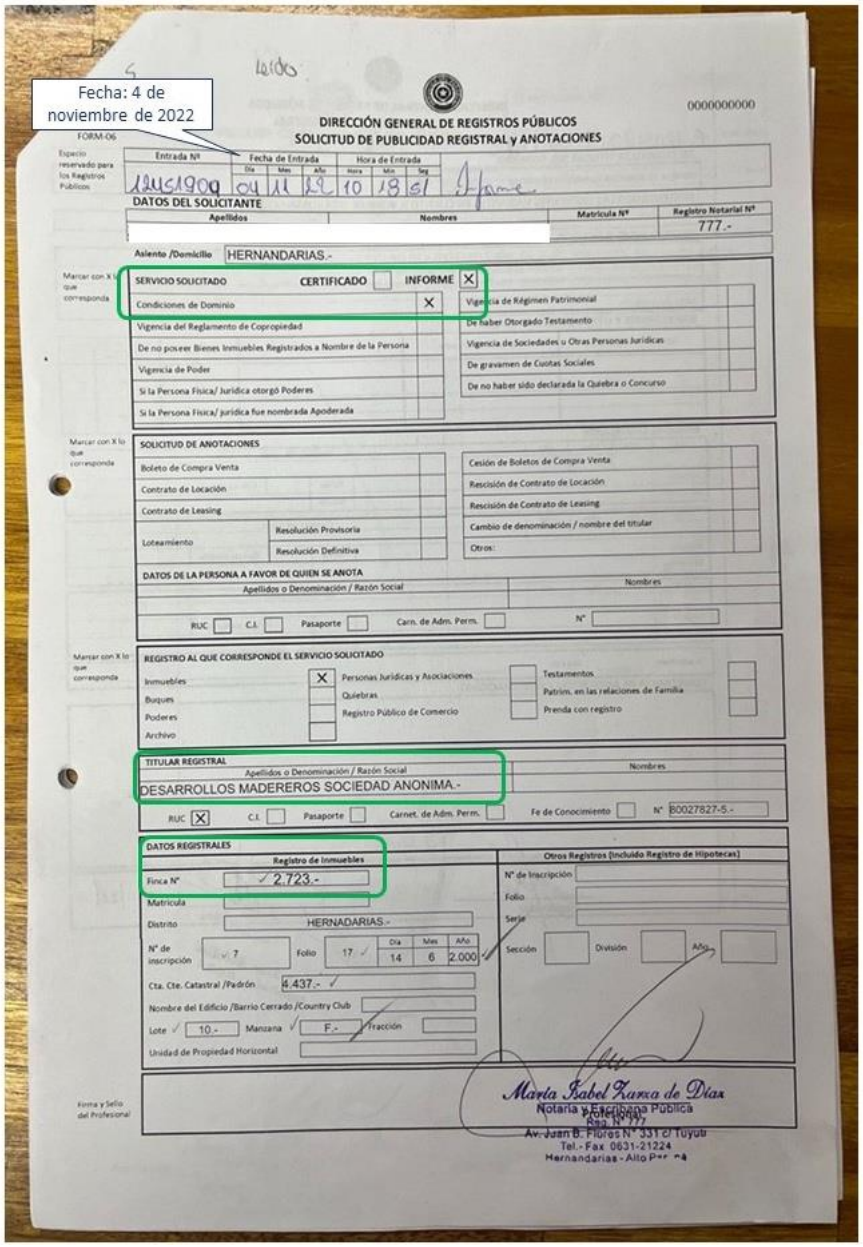
c. Steps will be taken to control errors in sampling and data analysis in order to develop a credible plan for measuring and monitoring carbon stock change in

the context of the project. The same procedures will be used throughout the life of the project to ensure continuity.

17 ANNEXES

17.1 ANNEX 1: Plot Ownership

The following is an example of a condition of ownership, the one referring to parcel 2723 of the Hernandarias Farm. The complete documentation can be found in the confidential Supplementary Documentation set, folder 02.



17.2 ANNEX 2: Example of a contract with third parties for livestock production within the project area prior to the start of the Project. The anonymized document is shown, this and the rest of the contracts are included in the Confidential Complementary Documentation

CONTRATO DE PASTOREO

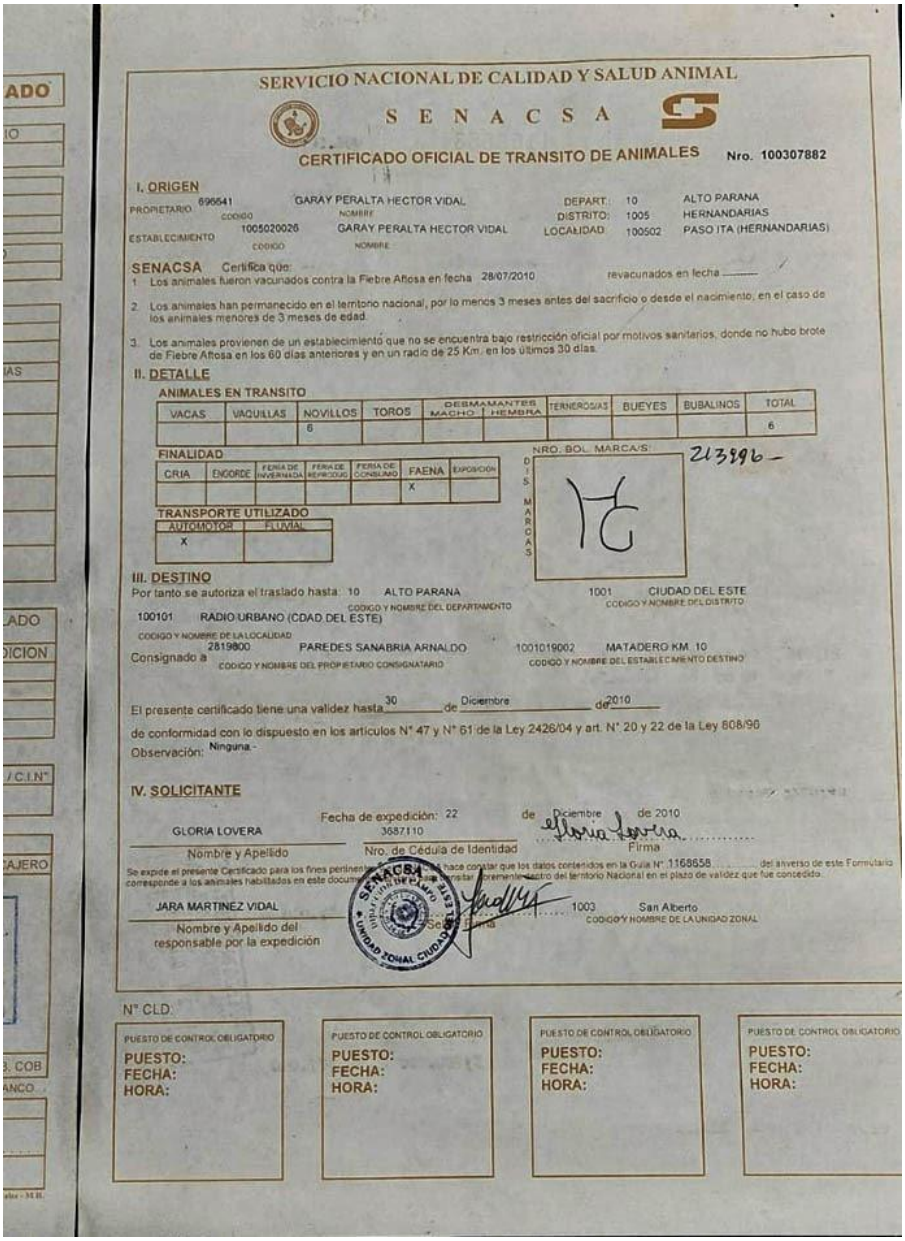
Entre ASTERIA INTIL SA con RUC: AINA 036430G representada por su vicepresidente el señor [redacted] con cédula de identidad número [redacted] (tomador del pastoreo) con domicilio en [redacted] el [redacted], Ciudad del Este, Alto Paraná,, en adelante denominado el "LOCATARIO", **por una parte** y Forestal Yguazu S.A. en adelante denominado el "LOCADOR" con domicilio en Super Carretera Itaipu Km. 32 (Norte) – Hernandarias, representado por : Ricardo Kiriluk con C.I: 4.589.550 y Karolyna Romberg con CI: 994.053 en su carácter de apoderados, domiciliados a los efectos de este acto en Super Carretera Itaipú Km. 132 Norte, de Hernandarias, Departamento Alto Paraná, **por la otra**, acuerdan celebrar el siguiente contrato de pastoreo, que se regirá por las siguientes cláusulas y condiciones:

1.- El LOCADOR cede un área de aproximadamente 1.000 Has., comprendida en el inmueble individualizado como Estancia Tapyta (Finca: 7271 Padrón: 7533), ubicados en el distrito de San Juan Nepomuceno propiedad de Forestal Yguazu S. A.., para ser destinada al pastoreo de ganado vacuno por parte del LOCATARIO. En esa superficie existen plantaciones de eucaliptos conjuntamente con pasturas naturales e implantadas. Queda incluido en el presente contrato la utilización de una casa por parte del locatario y/o sus funcionarios. El LOCADOR no tendrá responsabilidad alguna por los daños, pérdidas o accidentes que pudieran sufrir el arrendatario y/o sus funcionarios y/o su ganado en concepto alguno.----------

2. - El LOCATARIO será responsable del cuidado de su ganado, materiales necesarios para la tarea ganadera y seguridad de su personal. En general, toda la actividad ganadera y sus efectos serán responsabilidades exclusivas del LOCATARIO de pastoreo, quedando claramente convenido que el LOCADOR no tendrá responsabilidad alguna respecto de los riesgos que puedan ocurrir, incluidos el caso fortuito y la fuerza mayor. La contratación del personal afectado al servicio y el cumplimiento de las leyes, los reglamentos laborales y sociales vigentes correrá por cuenta exclusiva del LOCATARIO. Entre el citado personal y el LOCADOR no existirá relación alguna. Para todos los efectos legales, el LOCATARIO asume toda responsabilidad civil, penal y laboral. Las partes contratantes dejan expresa constancia de que entre el LOCADOR y los empleados, obreros, contratados y/o profesionales y/o técnicos contratados por el LOCATARIO para las tareas objeto del presente contrato, no existe ni existirá relación laboral ni de dependencia alguna, Igualmente, se deja expresa constancia de que en el supuesto de que el personal del LOCATARIO destinado para realizar la labor objeto del presente contrato, o a consecuencia del proceso de dicha actividad algún tercero sufriere cualquier tipo de accidente, el LOCATARIO será el único responsable por dicho personal, quedando el LOCADOR exento de cualquier responsabilidad o reclamo.-------

3.- El LOCATARIO se obliga expresamente a observar y reunir los libros registros laborales obligatorios que la ley imponga llevar a todo empleador, y en especial los contratos de trabajo, recibos de salarios, reglamento interno de trabajo, libros registros de vacaciones, de empleados y obreros, de sueldos y jornales, así como comprobantes de pago de beneficios sociales, aporte al seguro social obligatorio, y de toda remuneración exigida por la ley relativa al personal que está a su cargo. En ningún caso

17.3 ANNEX 3: Certificate of sale of livestock for slaughter.



SERVICIO NACIONAL DE CALIDAD Y SALUD ANIMAL

S E N A C S A

CERTIFICADO OFICIAL DE TRANSITO DE ANIMALES Nro. 100307882

I. ORIGEN

PROPIETARIO: 696641 (CODIGO) GARAY PERALTA HECTOR VIDAL (NOMBRE) — DEPART. 10 ALTO PARANA; DISTRITO: 1005 HERNANDARIAS; LOCALIDAD: 100502 PASO ITA (HERNANDARIAS)

ESTABLECIMIENTO: 1005020026 (CODIGO) GARAY PERALTA HECTOR VIDAL (NOMBRE)

SENACSA Certifica que:

1. Los animales fueron vacunados contra la Fiebre Aftosa en fecha 28/07/2010 revacunados en fecha .....
2. Los animales han permanecido en el territorio nacional, por lo menos 3 meses antes del sacrificio o desde el nacimiento, en el caso de los animales menores de 3 meses de edad.
3. Los animales provienen de un establecimiento que no se encuentra bajo restricción oficial por motivos sanitarios, donde no hubo brote de Fiebre Aftosa en los 60 días anteriores y en un radio de 25 Km. en los últimos 30 días.

II. DETALLE

ANIMALES EN TRANSITO

VACAS	VAQUILLAS	NOVILLOS	TOROS	DESMAMANTES MACHO	DESMAMANTES HEMBRA	TERNEROS/AS	BUEYES	BUBALINOS	TOTAL
		6							6

FINALIDAD

CRIA	ENGORDE	FERIA DE INVERNADA	FERIA DE REPRODUC.	FERIA DE CONSUMO	FAENA	EXPOSICION
					X	

NRO. BOL. MARCA/S: 213896 –

DISEÑO MARCAS

TRANSPORTE UTILIZADO

AUTOMOTOR	FLUVIAL
X	

III. DESTINO

Por tanto se autoriza el traslado hasta: 10 ALTO PARANA (CODIGO Y NOMBRE DEL DEPARTAMENTO) 1001 CIUDAD DEL ESTE (CODIGO Y NOMBRE DEL DISTRITO)

100101 RADIO URBANO (CDAD DEL ESTE) (CODIGO Y NOMBRE DE LA LOCALIDAD)

Consignado a 2819800 PAREDES SANABRIA ARNALDO (CODIGO Y NOMBRE DEL PROPIETARIO CONSIGNATARIO) 1001019002 MATADERO KM. 10 (CODIGO Y NOMBRE DEL ESTABLECIMIENTO DESTINO)

El presente certificado tiene una validez hasta 30 de Diciembre de 2010

de conformidad con lo dispuesto en los artículos N° 47 y N° 61 de la Ley 2426/04 y art. N° 20 y 22 de la Ley 808/96

Observación: Ninguna.-

IV. SOLICITANTE

Fecha de expedición: 22 de Diciembre de 2010

GLORIA LOVERA — 3687110 — Gloria Lovera

Nombre y Apellido — Nro. de Cédula de Identidad — Firma

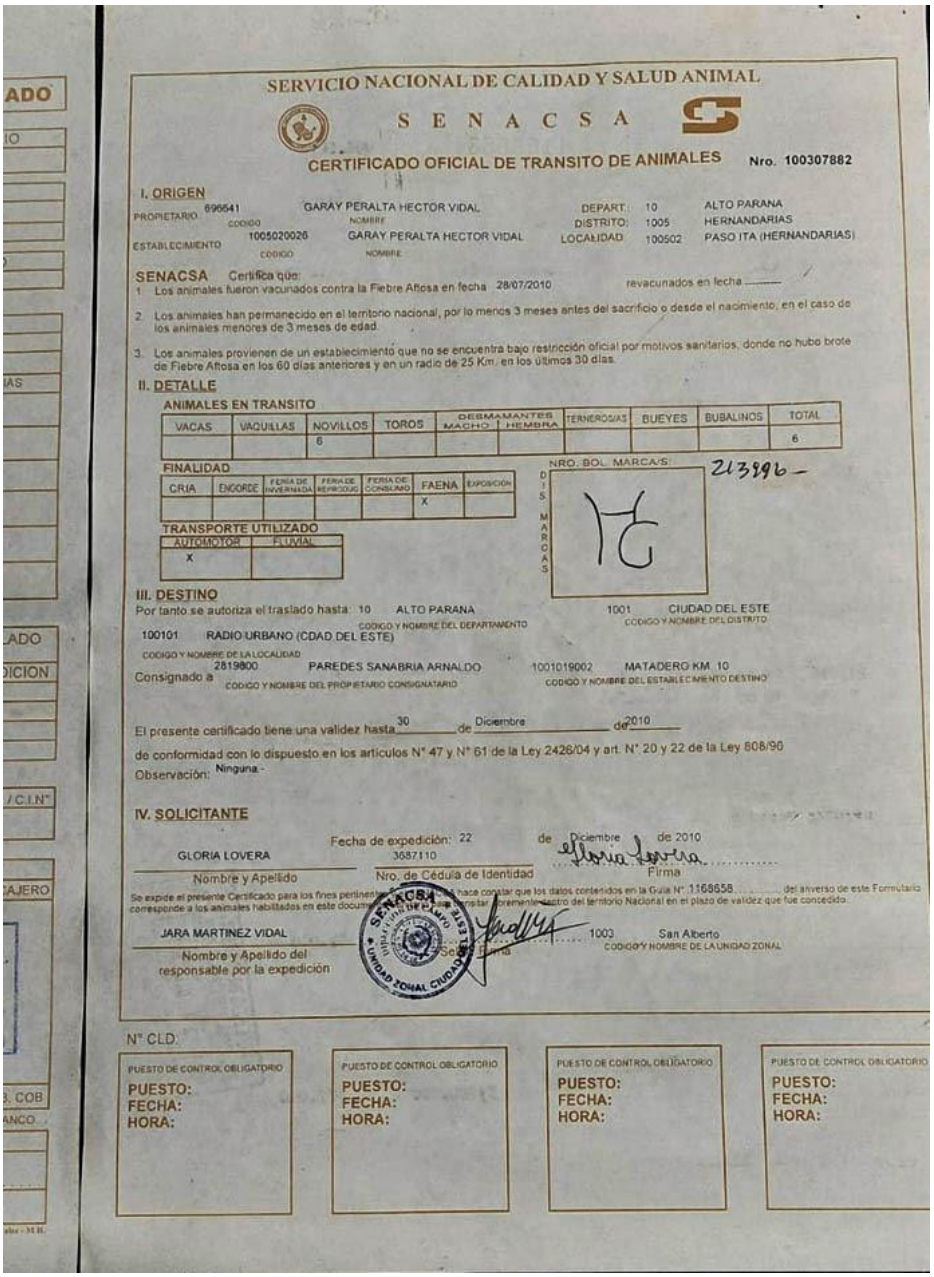
Se expide el presente Certificado para los fines pertinentes [illegible] hace constar que los datos contenidos en la Guía N° 1168658 del anverso de este Formulario corresponde a los animales habilitados en este docum[illegible] [illegible]ente dentro del territorio Nacional en el plazo de validez que fue concedido.

JARA MARTINEZ VIDAL — Sello — 1003 San Alberto (CODIGO Y NOMBRE DE LA UNIDAD ZONAL)

Nombre y Apellido del responsable por la expedición

N° CLD:

PUESTO DE CONTROL OBLIGATORIO	PUESTO DE CONTROL OBLIGATORIO	PUESTO DE CONTROL OBLIGATORIO	PUESTO DE CONTROL OBLIGATORIO
PUESTO: FECHA: HORA:	PUESTO: FECHA: HORA:	PUESTO: FECHA: HORA:	PUESTO: FECHA: HORA:



SERVICIO NACIONAL DE CALIDAD Y SALUD ANIMAL

S E N A C S A

CERTIFICADO OFICIAL DE TRANSITO DE ANIMALES Nro. 100307882

I. ORIGEN

PROPIETARIO 696541 GARAY PERALTA HECTOR VIDAL — DEPART: 10 ALTO PARANA; DISTRITO: 1005 HERNANDARIAS; LOCALIDAD 100502 PASO ITA (HERNANDARIAS)

ESTABLECIMIENTO 1005020026 GARAY PERALTA HECTOR VIDAL

SENACSA Certifica que:

1. Los animales fueron vacunados contra la Fiebre Aftosa en fecha 28/07/2010 revacunados en fecha ____
2. Los animales han permanecido en el territorio nacional, por lo menos 3 meses antes del sacrificio o desde el nacimiento, en el caso de los animales menores de 3 meses de edad.
3. Los animales provienen de un establecimiento que no se encuentra bajo restricción oficial por motivos sanitarios, donde no hubo brote de Fiebre Aftosa en los 60 días anteriores y en un radio de 25 Km, en los últimos 30 días.

II. DETALLE

ANIMALES EN TRANSITO

VACAS	VAQUILLAS	NOVILLOS	TOROS	DESMAMANTES MACHO	DESMAMANTES HEMBRA	TERNEROS/AS	BUEYES	BUBALINOS	TOTAL
		6							6

FINALIDAD

CRIA	ENGORDE	FERIA DE INVERNADA	FERIA DE REPRODUC	FERIA DE CONSUMO	FAENA	EXPOSICION
					X	

NRO. BOL. MARCAS: 213896 -

DISEÑO MARCAS: YG

TRANSPORTE UTILIZADO

AUTOMOTOR	FLUVIAL
X	

III. DESTINO

Por tanto se autoriza el traslado hasta: 10 ALTO PARANA (CODIGO Y NOMBRE DEL DEPARTAMENTO) 1001 CIUDAD DEL ESTE (CODIGO Y NOMBRE DEL DISTRITO)

100101 RADIO URBANO (CDAD DEL ESTE) (CODIGO Y NOMBRE DE LA LOCALIDAD)

Consignado a 2819800 PAREDES SANABRIA ARNALDO (CODIGO Y NOMBRE DEL PROPIETARIO CONSIGNATARIO) 1001019002 MATADERO KM 10 (CODIGO Y NOMBRE DEL ESTABLECIMIENTO DESTINO)

El presente certificado tiene una validez hasta 30 de Diciembre de 2010

de conformidad con lo dispuesto en los artículos N° 47 y N° 61 de la Ley 2426/04 y art. N° 20 y 22 de la Ley 808/96

Observación: Ninguna.-

IV. SOLICITANTE

Fecha de expedición: 22 de Diciembre de 2010

GLORIA LOVERA — 3687110 — Gloria Lovera

Nombre y Apellido — Nro. de Cédula de Identidad — Firma

Se expide el presente Certificado para los fines pertinentes, por el cual se hace constar que los datos contenidos en la Guía N° 1168658 del anverso de este Formulario corresponde a los animales habilitados en este documento, los cuales fueron controlados oficialmente dentro del territorio Nacional en el plazo de validez que fue concedido.

JARA MARTINEZ VIDAL — Firma — 1003 San Alberto (CODIGO Y NOMBRE DE LA UNIDAD ZONAL)

Nombre y Apellido del responsable por la expedición

SENACSA UNIDAD ZONAL CIUDAD DEL ESTE

N° CLD

PUESTO DE CONTROL OBLIGATORIO	PUESTO DE CONTROL OBLIGATORIO	PUESTO DE CONTROL OBLIGATORIO	PUESTO DE CONTROL OBLIGATORIO
PUESTO: FECHA: HORA:	PUESTO: FECHA: HORA:	PUESTO: FECHA: HORA:	PUESTO: FECHA: HORA:

17.4 ANNEX 4: Certificate of approval of the last compliance audit of the Environmental Impact Study Management Plan- Hernandarias

AUDITORIA AMBIENTAL
CUMPLIMIENTO DEL PLAN DE GESTION AMBIENTAL

PROYECTO AGROPECUARIO, FORESTAL (MANEJO FORESTAL, REFORESTACIÓN), SISTEMA DE DRENAJE, Y PUESTO DE CONSUMO DE COMBUSTIBLE

Proponente: **DESARROLLOS MADEREROS S.A.**

LUGAR: Tacuru pucú (km 32 Super Carretera)

DISTRITO: Hernandarias y Minga Guazú

DEPARTAMENTO: Alto Paraná

FINCA N°: 1.338 y otros

PADRON N°: 2.243 y otros

SUP. TOTAL: 13.688,6 ha.

AUDITOR:
ING. CHRISTIAN SCHREIBER
Registro SEAM Nº I - 969

TELEFAX: 677-432

Asunción - Paraguay

Año 2022

17.5 ANNEX 5: Certificate of approval of the last audit of compliance with the Environmental Impact Study-Tapytá Management Plan.

TEKOHA RESÃI
SECRETARÍA DEL AMBIENTE

TETÃ REKUÁI
GOBIERNO NACIONAL
Jajapo ñande rapere ko'ãga guive
Construyendo el futuro hoy

Nº 211556

RESOLUCIÓN DGCCARN AA N° 340/2020.

POR LA CUAL SE APRUEBA EL INFORME DE AUDITORIA DE CUMPLIMIENTO DEL PLAN DE GESTION AMBIENTAL ELABORADO POR EL CONSULTOR AMBIENTAL CHRISTIAN ADOLFO SCHREIBER MENDOZA CON REG. CTCA N° I-969, CORRESPONDIENTE AL PROYECTO "AGROPECUARIO, FORESTAL (MANEJO FORESTAL, REFORESTACIÓN), SISTEMA DE DRENAJE, Y PUESTO DE CONSUMO DE COMBUSTIBLE", CUYO PROPONENTE ES DESARROLLOS MADEREROS S.A., Y SU REPRESENTANTE LEGAL RICARDO RODOLFO KIRILUK, QUE SE DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON FINCA N° 7271, PADRON N° 7533, UBICADA EN EL LUGAR DENOMINADO EA. TAPYTA, DISTRITO DE SAN JUAN NEPOMUCENO, DEPARTAMENTO DE CAAZAPA.

Asunción, 29 de Enero de 2020.

VISTO: El Informe de Auditoria de Cumplimiento del Plan de Gestión Ambiental Expediente SIAM DGCCARN N° 6521/2019 de fecha 13/12/2019, presentado al Ministerio del Ambiente y Desarrollo Sostenible, por el Consultor Ambiental CHRISTIAN ADOLFO SCHREIBER MENDOZA con Reg. CTCA N° I-969, correspondiente al Proyecto "AGROPECUARIO, FORESTAL (MANEJO FORESTAL, REFORESTACIÓN), SISTEMA DE DRENAJE, Y PUESTO DE CONSUMO DE COMBUSTIBLE", cuyo proponente es DESARROLLOS MADEREROS S.A., y su representante legal RICARDO RODOLFO KIRILUK, que se desarrolla en la propiedad identificada con Finca N° 7271, Padrón N° 7533, ubicada en el lugar denominado Ea. Tapyta, Distrito de SAN JUAN NEPOMUCENO, Departamento de CAAZAPA.

CONSIDERANDO: Que, el Proyecto fue evaluado por el Técnico Evaluador Ma. José Alderete Cuyoso, quien Dictamina a favor de la aprobación de la Auditoría del cumplimiento del Plan de Gestión Ambiental del Proyecto, según Dictamen Técnico N° 314/2020, de fecha 6/01/2020, el mismo fue revisado y verificado por el Director Adjunto de Evaluación de Impacto Ambiental, Ing. Agr. Hans Hellman, quien recomienda su aprobación.

Que, el presente Proyecto se ha ajustado la Resolución SEAM N° 201/15 "Por el cual se establece el procedimiento de evaluación del Informe de Auditoría del cumplimiento del Plan de Gestión Ambiental para las obras o actividades que cuentan con Declaración de Impacto Ambiental en el marco de la Ley N° 294/93 "De Evaluación de Impacto Ambiental", y sus Decretos Reglamentarios N° 453/13 y 954/13".

Que, el responsable del Proyecto ha presentado el Informe de Cumplimiento de las Medidas Ambientales, conforme a la actividad que desarrolla y que fueran establecidas en el Estudio aprobado por DECLARACION DGCCARN N° 3434 /2015 de fecha 4 de noviembre del 2015 y el anterior informe de auditoría aprobado por Resolución DGCCARN AA N° 4049/2015 de fecha 15 de diciembre de 2017.

Que, el proyecto cuenta con mapa de uso alternativo con los siguientes usos: Total 7.363,7 has (100%), Bosque Nativo Bajo Manejo 1.904,0 has (25,86%), Área de Protección 328,2 has (4,45%), Área a Reforestar 918,0 has (12,47%), Tala Rasa Reforestación 675,5 has (9,17%), Área Reforestada 2.932,2 has (39,82%), Campos Bajos 305,8 has (4,15%), Cuerpos de Agua 3,5 has (0,05%) Infraestructura y caminos 296.5 has (4,03%).

Que, cuenta con Providencia N° 74180/2019 de fecha 02/01/2020 de la Dirección de Geomática – Departamento de Geoprocesamiento de la Calidad Ambiental y los Recursos Naturales, donde de acuerdo al análisis cartográfico, los mapas presentados cumplen con la normativa vigente, Ley N° 422/73 Forestal y reglamentaciones, Ley N° 4241/10 y reglamentaciones, Ley N° 2524/04 y sus ampliaciones y la Ley N° 6256/18; que prohíbe las actividades de transformación y conversión de bosques de la Región Oriental, No se encuentra dentro de Áreas Silvestres Protegidas, No afecta Comunidades Indígenas, Linda con la reserva Tapyta.

Que, Resolución N° 455/19 en su capítulo 6.1.5. De las adecuaciones para las estaciones existentes. Las estaciones de servicios, gasolineras, puestos de Consumo Propio que se encuentran existentes y que no cumplen con las disposiciones de esta norma, sea en cuanto a uso del suelo, ubicación, distancias y superficie mínima del terreno, quedarán exentos de estos requisitos. Sin embargo deberán adecuarse obligatoriamente, dentro de los plazos establecidos por la Autoridad Competente, a las exigencias establecidas en esta Norma, referente a los tanques, equipos e instalaciones para seguridad y protección ambiental.

Que, la Consultora Ambiental manifiesta en el estudio presentado que el proyecto no ha sufrido modificaciones, ni alteraciones.

Que, el responsable del proyecto ha manifestado bajo Declaración Jurada la veracidad de las informaciones presentadas en el Informe de auditoria Ambiental, así como toda la documentación que se adjunta al mismo.

17.6 ANNEX 6: Catalog of native species of the Selva Paranaense used in the *project Mixed planting of native and non-native species in Paraguay-I (BCR-PY-451-14-001)*

Scientific name:	*Balfourodendron riedelianum*
Common name:	**Guatambú**
 *Picture:* Cambium	
State of conservation:	At risk
Nature of the leaf:	Perennial
Height at maturity (m)	From 20 to 35 meters
DBH (cm):	From 40 to 90 centimeters
Sun tolerance:	Intermediate
Tolerance to waterlogging:	Download
Remarks:	Species present in the upper stratum of the high forest, with intermediate behavior between heliophyte and sciophyte, with slow to moderate growth. In the past it has been subjected to intense logging, as it has a hard wood of about 810 kg/m^3 , strong but at the same time flexible, with excellent characteristics for joinery.

Scientific name:	*Inga laurina*
Common name:	**Ingá**

Picture: Cambium

State of conservation:	Minor concern
Nature of the leaf:	Perennial
Height at maturity (m)	5 to 12 meters
DBH (cm):	5 to 25 centimeters
Sun tolerance:	Low, sporophyte
Tolerance to waterlogging:	Media
Remarks:	Legume used in the recovery of degraded lands for its contribution of nitrogen to the soil. In the wild it occupies the undergrowth of the Paraná rainforest. The fruit has a sweet pulp that is edible by humans and animals.

Scientific name:	*Cordia trichotoma*
Common name:	**Peterevy or Black Parrot**
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Expires
Height at maturity (m)	From 20 to 30 meters
DBH (cm):	From 40 to 100 centimeters
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	Low.
Remarks:	Pioneer species with a wide geographical distribution and frequent presence in the upper stratum of tall forest. Very suitable for forestry, although the seeds lose their germination power quickly, so it is advisable to sow them immediately after collection, or keep them in cold storage until planting in spring. It is a honey tree, with semi-hard and semi-heavy wood (650 kg/m^3).

Scientific name:	*Rollinia emarginata*
Common name:	**Aratiku**
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Perennial
Height at maturity (m)	From 5 to 10 meters
DBH (cm):	From 10 to 40 centimeters
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	Medium, hygrophilous
Remarks:	Wood not very dense, soft and of little use. Fruit suitable for human consumption, sweet taste; the leaves are taken in infusion.

Scientific name:	***Enterolobium*** *contortisiliquum*
Common name:	**Pacará or Timbó colorado** (not to be confused with Timbó blanco, *Albizia inundata*)
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Expires
Height at maturity (m)	From 15 to 40 meters
DBH (cm):	From 60 to 250 centimeters
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	Medium, hygrophilous
Remarks:	It is the largest native species of the Paraná basin. Very fast growth (up to 2,5 m in height and 4 cm in diameter per year). Light wood (360 kg/m^3) resistant to water and rot. High tannin concentration (6,2%).

Scientific name:	*Pterogyne nitens*
Common name:	**Yvyraro**
 *Picture:* Cambium	
State of conservation:	Near threatened
Nature of the leaf:	Expires
Height at maturity (m)	From 20 to 35 meters
DBH (cm):	From 60 to 95 centimeters
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	Download
Remarks:	Fast growth (up to 2 m/year) and heavy wood (700 to 800 kg/m^3) that has historically been widely exploited for its mechanical strength and resistance to rot.

Scientific name:	*Cedrela* fissilis
Common name:	**Missionary cedar**
 *Picture:* Cambium	
State of conservation:	Vulnerable
Nature of the leaf:	Semicaduca
Height at maturity (m)	From 20 to 35 meters
DBH (cm):	From 40 to 80 centimeters, although specimens of up to 120 centimeters have been measured.
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	It needs deep and humid soils.
Remarks:	This species is vulnerable to the plague of the shoot butterfly (*Hypsiphyla grandella*), which is aggravated if planted at high density. To avoid this, it should be planted at low density and combined with other species. Semi-heavy wood (550 kg/m^3) with excellent dimensional stability after drying, which is why it has historically been overexploited in the native forest.

Scientific name:	*Eugenia* uniflora
Common name:	**Ñangapiry**
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Perennial in subtropical zone
Height at maturity (m)	From 5 to 12 meters
DBH (cm):	From 20 to 30 centimeters
Sun tolerance:	Low, stiophytic, typical of intermediate strata
Tolerance to waterlogging:	Media
Remarks:	Cherry fruit, suitable for animal and human consumption (although with laxative effects).

Scientific name:	*Handroanthus heptaphyllus* (formerly *Tabebuia heptaphyllus*)
Common name:	**Black Lapacho**
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Perennial
Height at maturity (m)	Up to 40 meters
DBH (cm):	Up to 150 centimeters
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	Medium, it occupies low and humid soils, dominating the upper stratum of these forests.
Remarks:	High density wood (900 to 1.000 kg/m^3) and high strength, highly valued. There are still 300-year-old beams in the Jesuit missions in an acceptable state of preservation.

Scientific name:	*Peltophorum* dubium
Common name:	**Yvyrapyta or fistula reed**
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Expires
Height at maturity (m)	From 20 to 35 meters
DBH (cm):	From 40 to 200 centimeters
Sun tolerance:	Tall, heliophyte
Tolerance to waterlogging:	Download
Remarks:	Very fast growth (up to 3 m in height and 2 cm in diameter per year). Nitrogen-fixing and suitable for poor soils.

Scientific name:	*Apuleia* leiocarpa
Common name:	**Grapia**
 *Picture:* Cambium	
State of conservation:	Minor concern
Nature of the leaf:	Expires
Height at maturity (m)	From 20 to 32 meters
DBH (cm):	From 30 to 80 cm
Sun tolerance:	Intermediate
Tolerance to waterlogging:	Low, needs well-drained soils at high altitudes
Remarks:	Slow initial development. High density wood (750 to 850 kg/m^3)

NOTE: This Project Document (PD) shall be completed following the instructions included. However, it is important to highlight that these instructions are complementary to the BCR STANDARD, and the Methodology applied by the project holder, in which more information on each section can be found.