UNITÁN AFFORESTATION AND REFORESTATION OF GRAZING LANDS PROJECT MONITORING REPORT

Project title	Unitán Afforestation and Reforestation of grazing lands project
Project ID	2610
Monitoring period	16-August-2021 to 09-August-2024
Original date of issue	12-February-2025 is the date the monitoring report was completed following the completion of the audit
Most recent date of issue	01-July-2025 is the date on which the document was most recently submitted
Version	1.6
***VCS Standard* Version**	4.7 VCS Standard Version
Prepared by	Josefina Uijt den Bogaard - ProSustentia

CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity "Unitán Afforestation and reforestation of grazing land project" (hereafter, "Unitán project") is an afforestation project on extensive cattle grazing pastures area and abandoned agricultural lands, using native (*Schinopsis balansae*) and exotic species (various varieties of Eucalyptus including Eucalyptus gxc) aiming to produce, as a priority product, logs for tannin industry and secondarily, fuelwood. The project is located in a region where commercial forestry plantations are not common, or even non-existent. The afforestation with this species prevents the use of timber from native forests.

Unitán project is carried out in 5 properties located in Chaco and Formosa province, in the Northeast region of Argentina (the host country), on degraded grassland as a consequence of many decades of extensive cattle grazing and set aside agriculture land by previous owners. This degradation is expected to continue in the absence of the project. From September 2016 until the time of PDD elaboration, a total area of 894.83 ha of the project was effectively planted. As of that day, 461.35 ha more have been planted, adding to a total of 1,356.18 ha at the end of this monitoring period (after cartographic adjustment). In addition, there is an area of 293.22 ha of planned plantation till 2025. The area of degraded grasslands to be effectively planted and to be included within Unitán's project boundary is then 1,649.40 ha.

The project utilizes two main species: *Schinopsis balansae*, a native species, and Eucalyptus (different varieties but mainly gxc (defined as hybrid) and *cloeziana* (defined as various), occupying 16 % and 84 % respectively for the currently planted area, and with rotation periods of 40 years, 10 and 20, respectively. Biomass for this monitoring period was estimated based on the forest inventory conducted between June 12th and August 9th of 2024, meaning this second monitoring period is from August 16th, 2021 to August 9th, 2024.

In 2022, during a dry summer, 239.62 ha of Eucalyptus were burnt. Due to high temperatures and strong winds, the fire rapidly expanded despite activating the corresponding fire management plan. The event took place on January 13th 2022, during southern hemisphere summer. This area has already fully recovered and the sprouts will be managed according to the Forest Management Plan. During 2023, further 8.38 ha were burnt under the same circumstances and are fully recovered.

The project sequesters CO_2 through forest plantation in grassland areas, generating net anthropogenic removals by sinks that can be measured, monitored and verified. The long-term average GHG benefit (LTA) is determined by averaging the expected total GHG benefit for the length of the project where a whole rotation and harvest takes place (51 years: from 16/09/2016 – until 15/09/2067). The total GHG benefit expected at the end of crediting period is 142.756 tCO_2e. The sum of the expected GHG benefit annually when divided by 51 years (period for estimating LTA) results in 120.432 tCO_2e. Reaching average annual VERs of 2,361 tCO_2e. During this monitoring period, a total of 54,023 tCO2e were removed from the atmosphere.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation/ verification	16-September-2016-- 15-August-2021	VCS	AENOR	5
Verification	16-August-2021-09-August-2024	VCS	ICONTEC	3

1.3 Sectoral Scope and Project Type

Sectoral scope	14 (Agricultural, Forestry, Land Use)
AFOLU project category[1]	Afforestation, Reforestation and Revegetation (ARR)
Project activity type	Establishment of forest on land that had previously been under grassland and set aside agriculture

1.4 Project Proponent

Organization name	Unitán SAICA
Contact person	Ariel Lopez Mato
Title	Vice-president
Address	Paseo Colón 221 P. 10; CABA - Argentina
Telephone	+ 54 11 4331 5540/47
Email	alm@Unitán.net

1.5 Other Entities Involved in the Project

Organization name	ProSustentia
Role in the project	VCS certification consultant
Contact person	Federico Moyano

[1] *See Appendix 1 of the* VCS Standard

Title	Director
Address	San Martín 543, 3rd i, Buenos Aires, Argentina
Telephone	+54911-36338125
Email	fmoyano@prosustentia.com

1.6 Project Start Date

Project start date	16/09/2016
Justification	Is the date when the activities that lead to the generation of GHG emission removals (soil preparation in Margarita Belén plots) were first implemented[2].

1.7 Project Crediting Period

Crediting period	☐ *Seven years, twice renewable* ☐ *Ten years, fixed* X *Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)* 40 years (the project lifetime will be of 40 years and the period for LTA calculation is 51 years)
Start and end date of first or fixed crediting period	16/09/2016 to 15/09/2056

1.8 Project Location

Unitán´s area covers a total of 3,331.6ha located in the North of Argentina distributed in four departments of Chaco and Formosa provinces (Figure 1, Table 1). As mentioned above, the Unitán Project is a fraction of Unitán´s total area, planning to reach a specific effective planted area of 1,649.40 ha comprising 5 properties, between owned and leased areas: Doña Virginia, Irineo, Sociedad Rural, Don Antonio, Puerto Tirol (Ex-Glombosvky). This is clearly seen in the table below wherein the names, areas and unique geographical locations of the already planted properties are detailed.

The planting activities will be completed through 2016 to 2025, both in owned and leased properties. From September 2016 until December 2020, a total area of 894.83haof the project

[2] Bill from Martina, Osvaldo Rubén to Unitán that evidence the works at Margarita Belén. Available to the VVB at verification in the shared drive folder “Project_general” reference n°2.

was effectively planted. As of that day, 461.35 ha more have been planted, adding to a total of 1,356.18 ha at the end of this monitoring period (after cartographic adjustment).

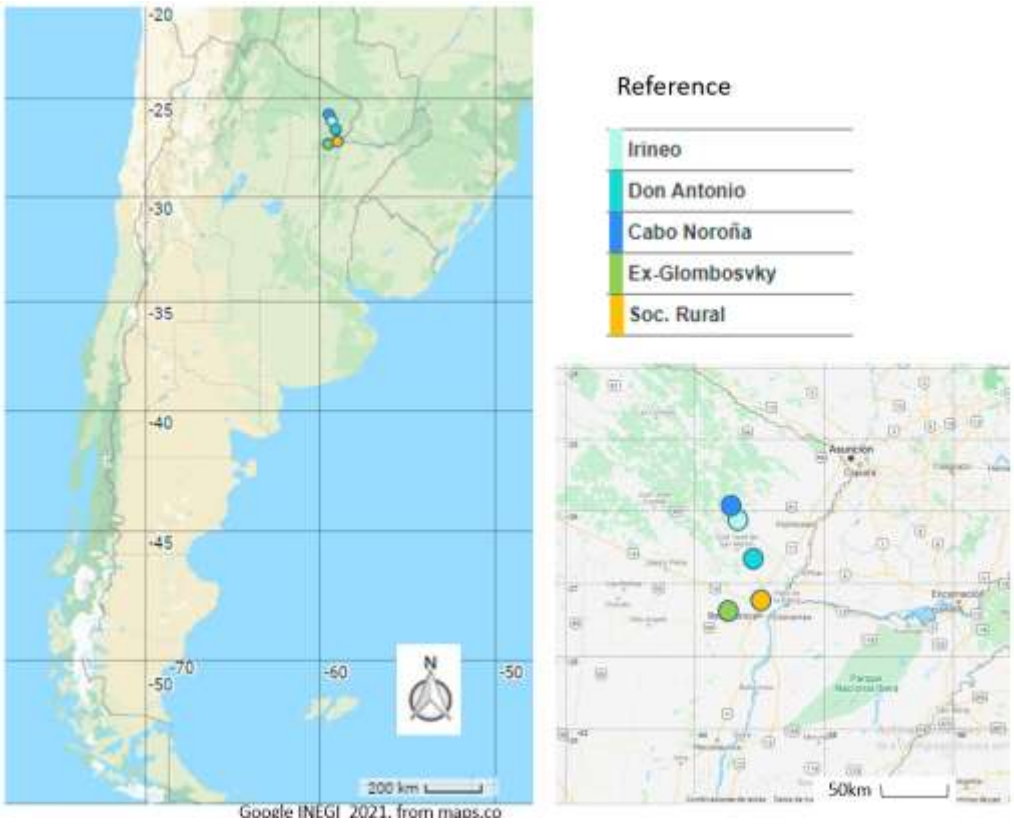
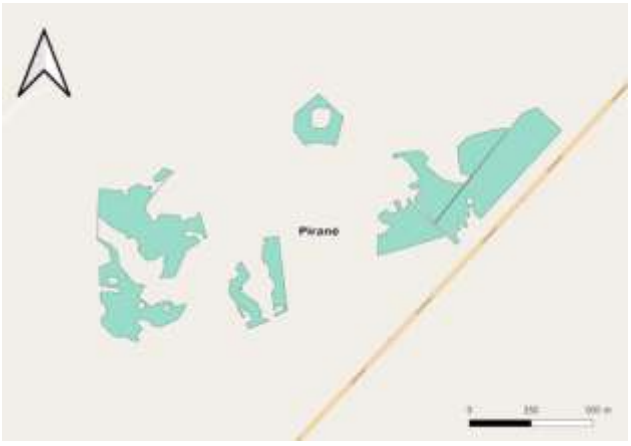


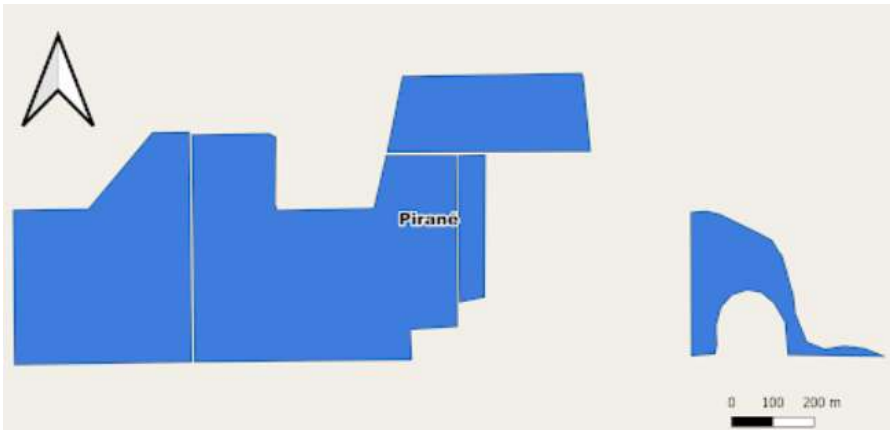
Figure 1. Properties' location in host country with further detail below (a to e).

1a) Irineo



1b) Don Antonio

1c) Doña Virginia



1d) Ex.-Golmbosvky

1e) Soc. Rural

Table 1: Detailed information on properties and current plantations within project boundary.

Province and Department	Property name	Geographic location		Total area (ha)	Planted area (ha)
		Latitude	Longitude		
1ro de Mayo, Chaco	Sociedad Rural	-27°14´35.51"	-58°58´58.33"	225.6	127.28
San Martín, Chaco	Don Antonio	-26°40´41.98"	-59°06´7.55"	195.2	111.76
Libertad, Chaco	Ex Glombovski	-27°25´07.7"	-59°08´53.74"	2,346.9	1013.14
Pirané, Formosa	Doña Virginia	-25°55´49.47"	-59°24´39.65"	141.0	65.31

Pirané, Formosa	Irineo	-26°07´11.44”	-59°18´53.04”	358.8	38.68

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	AR-ACM 0003	Afforestation and reforestation of lands except wetlands	02.0
Tool		Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities	V.01
Tool	AR-TOOL 14	Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities	04.2
Tool	AR-TOOL 12	Estimation of carbon stock and change in carbon stocks in dead wood and litter in A/R CDM project activities	03.1
Tool		Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities	01.1.0
Tool	AR-TOOL 15	Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity	2.0
		Calculation of the number of sample plots for measurements within A/R CDM project activities	2.1.0
Tool		Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity	4.0.0

The tools “Estimation of carbon stock and change in carbon stocks in dead wood and litter in A/R CDM project activities”, Version 03.1 and “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities” Version 01.1 were not considered as only above and

belowground biomass carbon stocks will be accounted for. In the case of soil carbon stocks, the exclusion follows the conditions on the "Procedure to determine when accounting of the soil organic carbon pool may be conservatively neglected in CDM A/R project activities" Version 1.0.

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.10.2 Registration in Other GHG Programs

Was the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☒ Yes ☐ No

If yes:

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☒ Yes ☐ No

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through the Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☒ Yes ☐ No

Evidence of the public statement provided in appendix 7.

1.12 Sustainable Development Contributions

During these two first monitoring periods, the plantation of 1294.7 ha took place with native and non-native species, generating local job and training opportunities as well as first carbon removals. At the same time the company has worked on different projects with communities in the project area, such as tree plantation events, training and resources donations, among others. All these activities have resulted in a series of SD contributions listed in the table below (table 2), in line with the national SDGs[3]. Evidence of the project's SD contributions are provided throughout the document and in the appendix 2 to this report[4].

- SDG 4: the project proponent collaborates with local schools and institutions with supplies in order to contribute to an increase in education quality and education on sustainable development.

- SDG 8: new quality jobs are created. Switching to forestry plantation activities has generated new labor positions in Chaco and Formosa, where forestation is not common practice when compared to previous activities, including new labor qualifications. Moreover, these jobs are fully in compliance with labor rights providing high quality jobs in the area, with no forced labor, modern slavery and/or human trafficking.
- SDG 11: the project proponent interacts with the community providing resources for its development, including training, cultural events, as well as trees plantation activities to improve green spaces at the project influence area, resulting in a contribution for promoting sustainable cities and communities.

- SDG 13: through the reforested areas, native and non-native species of trees remove CO_2 from the atmosphere and increase the resilience of the previously degraded areas.
- SDG 15:

[3] SDG for Argentina available at: https://www.argentina.gob.ar/politicassociales/objetivos-de-desarrollo-sostenible

4 Evidence also included in Drive shared folder "SDG"

- Conservation of biological diversity: with the plantation of native species and domestication studies that generate valuable information to expand native commercial plantations of *Schinopsis balansae*.
- Promoting an integrated management scheme with the ecosystem in privately owned land, reducing pressure over natural forest, specifically those dominated by *Schinopsis balansae*, which are harvested for the tanning industry.
- Degraded ecosystems restoration: the presence of trees also contributes to responsible soil management that reduces further erosion. The plantations manage a good undergrowth forest that protects both the soil and the fauna, maintaining forest ecosystem health and vitality.

Table 2: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	4.7	Participation through collaborations in activities driven by sustainable education to local communities	Implemented activities to increase indicator	Collaboration in 3 activities (tree plantation and environment driven event)	Participation in 3 activities
2)	8.7	8.7.1 Proportion and number of children aged 5–17 years engaged in child labour, by sex and age	Implementation activities to maintain	No child labour in the project	No child labour in the project
3)	8.8	Level of compliance with national labour rights	Implemented activities to increase indicator	100 % of jobs in line with national labour rights in the project	100 % of jobs in line with national labour rights in the project
4)	11b	Number of participations in activities to implement mitigation and adaptation measures to climate change in local communities	Implemented activities to increase indicator	Tree donations and participation in at least 1 plantation yearly	4 trees´ plantations
5)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase indicator	By afforesting 461.35 ha of native and non-native species, the project has removed 54.772 tCO_2 from the atmosphere during the monitoring period	Removed 66.107 tCO_2 from the atmosphere
6)	15.2	Progress towards sustainable forest management: Areas with native species plantations (ha)	Implemented activities to increase indicator	43.36 ha afforested and reforested with native species	211.23ha afforested and reforested with native species

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
7)	15.2	Progress towards sustainable forest management: Afforested areas (ha)	Implemented activities to increase indicator	461.35 ha afforested	1,356.18ha afforested

1.13 Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description. Still, there is sensitive information in files that should not go public, such as financial analysis.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	The company has been located for more than 100 years in the area, so the stakeholders impacted by the project have been selected from those identified throughout the years. Specifically, stakeholder mapping and analysis has taken place in relation to the project activity. The project proponent had identified all internal stakeholders involved in the project (these include employees and contractors). Secondly, external stakeholders within the project´s influence were identified (neighbors, local authorities, schools, security authorities, among others). In this line, before the project validation, the project proponent visited the neighboring areas in order to identify and contact possible new stakeholders outside the well-studied cities surrounding the main company´s industrial activity -the project is located mainly in rural areas but for two of the five properties-. Last, all other relevant stakeholders were mapped (NGOs, regional authorities, academic institutions, among others). The process included a snowball method, which consisted of asking relevant local stakeholders (employees, local authorities, for example) to assist in identifying other interested stakeholders in order to avoid leaving out any relevant stakeholders The stakeholders are grouped according to common characteristics: Regional government; Local government; Private sector; Research institutions; Neighbors;

	Education institution; Others; Project developer team. For the full list of stakeholders more likely to be impacted by the project are included in Appendix 3.
Legal or customary tenure/access rights	On the one hand, project implementation does not affect the property rights of local stakeholders or their resources as the project area is private land. Also, it must be stated that within the project area (private lands) there have been no conflicting tenure rights. No stakeholder lives within the premises or makes use of the resources. The project area and surrounding area is composed of different private properties. On the other hand, both provinces, Chaco and Formosa, have laws that protect native people's land rights. In Formosa the law 426[5] and 574 decree[6] and in Chaco the law 562-W[7]. The purpose of 426 law is the social and cultural preservation of native people communities, the defense of their heritage and traditions, the improvement of their economic conditions, their effective participation in the national and provincial development process, and their access to a legal system that guarantees them ownership of land and other productive resources on equal terms with other citizens. Law 562-W objective is the improvement of the living conditions of indigenous communities, through their access to land ownership and the allocation of the necessary resources to reactivate their economies, the preservation, defense and revaluation of their cultural heritage, their social development and their effective participation in Provincial and National affairs. Project implementation does not affect the property rights of local stakeholders or their resources as the project area is private land. No Indigenous People (IPs), Local Communities (LCs), and customary rights holders have been identified (see Section 2.3)

[5] Legislatura de la provincia de Formosa. Ley 426: Ley integral del aborigen. https://faolex.fao.org/docs/pdf/arg133985.pdf

[6] Legislatura de la provincial de Formosa. Decreto 574: reglamentario de la ley integral del aborigen. https://faolex.fao.org/docs/pdf/arg134016.pdf

[7] Cámara de Diputados de la Provincia del Chaco. Ley 562-W- Ley de las comunidades indígenas. https://digesto.legislaturachaco.gob.ar/Documentos/Ley/VistaPublicaLey/847?AjaxGridReglamentarias-sort=DocRelacionadoTitulo-desc&AjaxGridAnexos-sort=NombreArchivo-desc&AjaxGridComplementarias-sort=Id-desc

Stakeholder diversity and changes over time	In Chaco, unlike the rest of Argentina, urbanization has recently been concentrated not in large cities but in intermediate cities[8]. The project lands are located near Chaco province capital city, Resistencia (Chaco province capital city), and low population cities in the same province called Puerto Tirol (Chaco province), Margarita Belén (Chaco province), and Pampa Almirón (Chaco province). It is also near Villa Dos Trece, an urbanization located in Formosa Province. Particularly, Chaco province urbanization process was slower than in the rest of the country until the 70s decade. After that people moved from rural areas to cities, following the same tendencies than in other areas of Argentina and even with a more accelerated trend. The last national census in Argentina was performed in 2022, however most of the data is not available at local government scale. For that reason, the information presented here will consider the previous census, performed in 2010 (Secretaría de Obras Públicas, 2024[9]). By this year the sociodemographic characteristics of the urbanizations listed before were: • **Resistencia,** San Fernando Department, is the Capital of Chaco province. It was founded in 1878 by the National Government as part of the campaigns to conquer Argentine territory. The campaign implied the occupation of the area by immigrants' families, principally Italians. Before that, in 1865, a town of "Criollos" called San Buenaventura del Monte Alto, where people lived from extracting wood from native forests who live together with tobas tribe[10]. In 2010 Resistencia was populated by 291.720 inhabitants and 77.871 dwellings. Most of them had connections to public water networks (99%) and sewage drainage network (56%). Only 11% of the dwellings had unmet basic needs. San Fernando Department, where Resistencia is located, had 400.053 inhabitants in 2010, and it was expected to increase to 461.965 by 2025. • **Puerto Tirol**, Libertad Department, was one of the first settlements founded in Chaco, as it is near Parana River basin.

[8] Ramirez L, Pértile V (without date). El proceso de urbanización del Chaco, expansión urbana y cambios de usos en ciudades intermedias de la provincia del Chaco, Argentina. Sexto seminario ipur-bat, Políticas urbanas, gestión territorial y ambiental, Universidad Nacional del Nordeste. https://repositorio.unne.edu.ar/bitstream/handle/123456789/1697/RIUNNE_AC_Ramirez_L-Pertile_V.pdf?sequence=1&isAllowed=y

[9] Secretaría de Obras Públicas (2024). Gobiernos locales. https://snop-ppo.obraspublicas.gob.ar/municipalities

[10] Cantero E. (2015). Resistencia : origen presente de su nombre. Una reflexión en tránsito entre lo discursivo, lo público y lo político. Folia histórica del Nordeste 23. DOI: https://doi.org/10.30972/fhn.02337

It was founded in 1890[11]. The presence of several industrial facilities formed a typically industrial town at the beginning of the 20th century. The decline of industrial activities in the province at the end of that century led to a decline in this profile, and with it its population and economic activity. However, since the 1980s there has been a demographic upturn as it is near Greater Resistencia[12], By 2010 Puerto Tirol had 10.876 inhabitants and 2.746 dwellings. 86% of them had connection to public water network supply and 49% sewage drainage to public network. Only 13% of the dwellings did not have basic needs satisfied. Libertad Department had 12.419 inhabitants in 2010, Puerto Tirol was its main urbanization in terms of population, and it was expected to increase to 15.709 by 2025[13]. Nowadays there is a textile industry, besides some of the industries common to the region (tannery, sawmills, and cow meat related industries)[9].

- **Margarita Belén**, Primero de Mayo Department, was founded in 1890[14] had 6.512 inhabitants and 1.811 dwellings, most of them were connected to public water network supply (82%), but none of them were not linked to public sewage sludge network. Only 11% of the dwellings had unmet basic needs. Primero de Mayo Department had 10.542 inhabitants in 2010, and it was expected to increase to 13.406 by 2025[15].

- **Pampa Almirón**, Libertador General San Martín Department, had 1.758 inhabitants and 437 dwellings. 76% of them were connected to public water networks, but only 2% were linked to sewage drainage network (2%). In this urbanization there were more people with basic needs not satisfied than in the others, 18% of the dwellings. Libertador General San Martin Department had 60.499 inhabitants in 2010, and it was expected to increase to 72.552 by 2025[16].

- **Villa Dos Trece**, located in Pirané Department was founded in 1927, The municipality is characterized by being a melting of

[11] Diario norte (2022). Puerto Tirol, una localidad pujante que celebra 134 años de cultura e identidad. https://www.diarionorte.com/220739-puerto-tirol-una-localidad-pujante-que-celebra-134-anos-de-cultura-e-identidad-

[12] Beveraggi R (2022). Quebrachales Fusionados, primera fábrica taninera que se instaló en el Chaco. Chaco24News. https://chaco24news.com.ar/quebrachales-fusionados-primera-fabrica-taninera-que-se-instalo-en-el-chaco/

[13] INDEC (2010). Censo Nacional de Población, Hogares y Viviendas.

[14] Cámara de Diputados de la Nación (2022). Proyecto de resolución 132° aniversario de Margarita Belén. https://www4.hcdn.gob.ar/dependencias/dsecretaria/Periodo2022/PDF2022/TP2022/2179-D-2022.pdf

[15] INDEC (2010). Censo Nacional de Población, Hogares y Viviendas.

[16] INDEC (2010). Censo Nacional de Población, Hogares y Viviendas.

	different races, being the convergence of "Criollos" from the Province of Corrientes and immigrants who arrived through the Province of Chaco, mostly from the Volga area, Poles, Yugoslavians, Bulgarians, in smaller proportion[17]. In 2010 Villa Dos Trece had 4.675 inhabitants distributed in 1.273 dwellings. Most of the houses were connected to public water network (99%), but few of them had connections to sewage drainage (13%). Only 14% of the dwellings had basic needs not satisfied. Pirané Department had 67.331 inhabitants in 2010, and it was expected to increase to 70.917 by 2025[18]. The economy of the town is based on cotton production, and fruit and vegetable production in lower proportion. Livestock, pig and cattle production are also present, the last two animals as productive alternatives for stallholders. Honey production is also an economic activity in the place[19]. As Margarita Belén and Pampa Almirón are smaller settlements there is few information about their origins, and changes over time. Since the last verification process major changes have not occurred in the context of the settlements near the project sites. The only changes in the make-up include only an update in the different authorities that represent the institutions identified. No other mayor change has occurred in the stakeholders identified.
Expected changes in well-being	The project is in Chaco Húmedo ecoregion, within Chaco Region, which is characterized for being one of the areas of the country hardest hit by poverty and its consequences. In the main urbanizations of Chaco more than 50 % of households are below the poverty line and in Formosa's cities more than 30 % of them are in the same condition[20]; more than 50% of the population in both provinces have not completed secondary school[21]; 30 % of Chaco's households and 40 % of Formosa's dwellings do not have connection to sewage network[22]. Population´s well-being depends on jobs located in the main cities Resistencia and Formosa,

[17] Villa dos trece Municipality (2024). Historia. https://villadostrece.gob.ar/
[18] INDEC (2010). Censo Nacional de Población, Hogares y Viviendas.
[19] Villa dos trece Municipality (2024). Economía. https://villadostrece.gob.ar/
[20] INDEC (2024). Incidencia de la pobreza y la indigencia en 31 aglomerados urbanos. Condiciones de vida 8:7. ISSN 2545-6660. https://www.indec.gob.ar/uploads/informesdeprensa/eph_pobreza_03_2442F61D046F.pdf
[21] INDEC (2023). Censo Nacional de Población, Hogares y Viviendas 2022 Resultados definitivos Educación. ISBN: 978-950-896-632-2. https://www.indec.gob.ar/ftp/cuadros/poblacion/censo2022_educacion.pdf
[22] INDEC (2023). Censo Nacional de Población, Hogares y Viviendas 2022 Resultados definitivos Condiciones habitacionales de la población, los hogares y las viviendas. ISBN: 978-950-896-632-2 https://www.indec.gob.ar/ftp/cuadros/poblacion/censo2022_condiciones_habitacionales.pdf

as well as the industrial jobs located in Puerto Tirol and primary activity in the rural areas.

Regarding primary activity, it is affected by the environmental conditions of Chaco Húmedo ecoregion, with only 7.5 % of cultivable land. These areas have been occupied since the XX century by small and medium farmers. Livestock production has been widespread in Formosa and Chaco since the same time, mostly associated with big enterprises which are in areas with availability of pastures (Morello, Matteucci, Rodriguez, Silva 2012)[23]. This may imply that primary production is associated with a concentration of production or subsistence activities.

There is environmental degradation and the abusive exploitation of natural resources. Historically, native forest have been managed as a non-renewable natural resource, without considering its possible regeneration. The method used is based on the extraction of the best individuals, with the oldest and sickest specimens remaining for repopulation (Morello, Matteucci, Rodriguez, Silva 2012)[24]. The quebracho colorado was exploited for the tannin extract industry and for railway sleepers; in addition, other hardwoods such as lapacho, urunday and guayacán were also exploited.

In the absence of sustainable silvicultural management of the forest, there has been not only forest deterioration, but also social. The installation of a logging company that only wanted to get rich in the short term, the initial increase in the population and their wellbeing due to the generation of new sources of work was followed, as the resource ran out, by a decrease in salaries and a reduction in jobs, until the company was abandoned and closed down, leaving the people without work and livelihood, and the forest depleted of resources (Morello, Matteucci, Rodriguez, Silva 2012)[25]. As a result of this overexploitation of forest resources, some 7,500,000 ha of quebrachales in the Humid Chaco have been depleted, while the remaining areas occupied by forests are currently showing significant degrees of fragmentation and deterioration (Ginzburg and Adamoli, 2006)[26].

Although there are confirmed existence of indigenous communities surveyed by the Institute of Indigenous Affairs (INAI)[27] in the province

[23] Morello J, Matteucci S, Rodriguez A, Silva M (2012). Ecorregiones y complejos ecosistémicos argentinos. I a ed. - Buenos Aires: Orientación Gráfica Editora. ISBN 978-987-1922-00-0

[24] Morello J, Matteucci S, Rodriguez A, Silva M (2012). Ecorregiones y complejos ecosistémicos argentinos. I a ed. - Buenos Aires: Orientación Gráfica Editora. ISBN 978-987-1922-00-0

[25] Morello J, Matteucci S, Rodriguez A, Silva M (2012). Ecorregiones y complejos ecosistémicos argentinos. I a ed. - Buenos Aires: Orientación Gráfica Editora. ISBN 978-987-1922-00-0

[26] Ginzburg R and Adámolí J (2006). "Situación ambiental en ei Chaco Húmedo". Capítulo de libro. En: Brown, A., U. Martínez Ortiz, M. Acerbi yJ. Corcuera (Eds.), "La Situación Ambiental Argentina 2005", Fundación Vida Silvestre Argentina. Buenos Aires, 103-113.

[27] Available at: https://www.argentina.gob.ar/derechoshumanos/inai/mapa

	(see Figures 2, 3, 4, 5 and 6), they are urbanized, and these communities have no productive or sacred link with the properties that have been included in the project. All the plots are owned by the proponent, and there are no legal conflicts in these areas. There is no indigenous community directly impacted by this project in any forest management unit so it can be said that no negative impacts have been found on any indigenous community by the project.
Location of stakeholders	The project is located both in rural areas where a variety of activities take place, but mainly cattle breeding and agriculture activities were established after forest degradation. Moreover, the stakeholders are mainly located near cities where jobs are demanded for the industrial and service sector. Figures 2, 3, 4, 5 and 6 summarize the urbanizations and indigenous organizations near project locations. These communities are urbanized. Puerto Tirol is the place located in a more populated area, as it is near to Resistencia, capital of Chaco Province and Puerto Tirol Urbanization. Sociedad Rural field is located near Margarita Belén, Don Antonio near Pampa Almirón and Irineo near Villa Dos Trece. Doña Virginia is surrounded by fields and there is no settlements near it.
Location of resources	The territories and resources involved in the project activities are private property. There are no territories or resources owned by stakeholders or customary access involved in the project activities

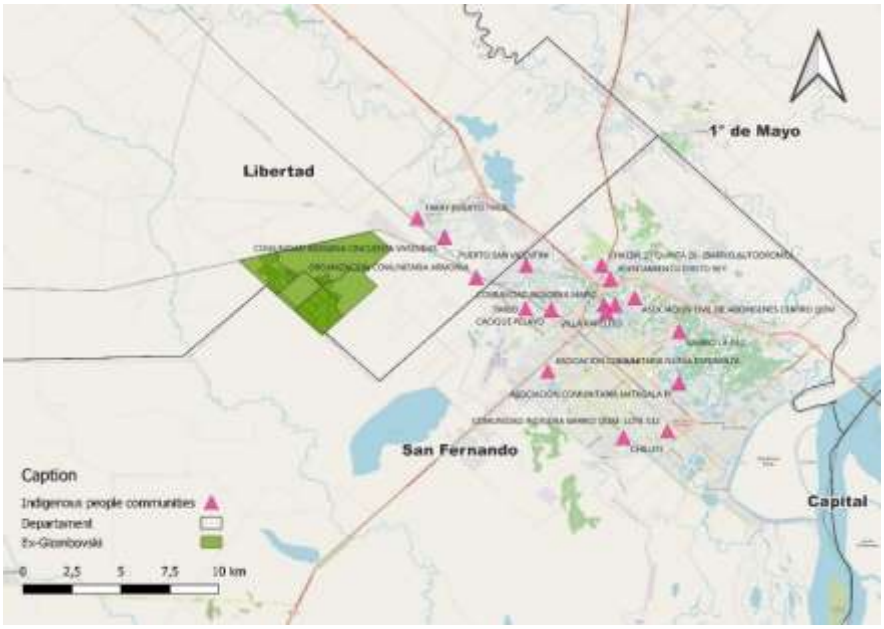


Figure 2. Main urbanizations and communities near Ex-Glombovski property[28].

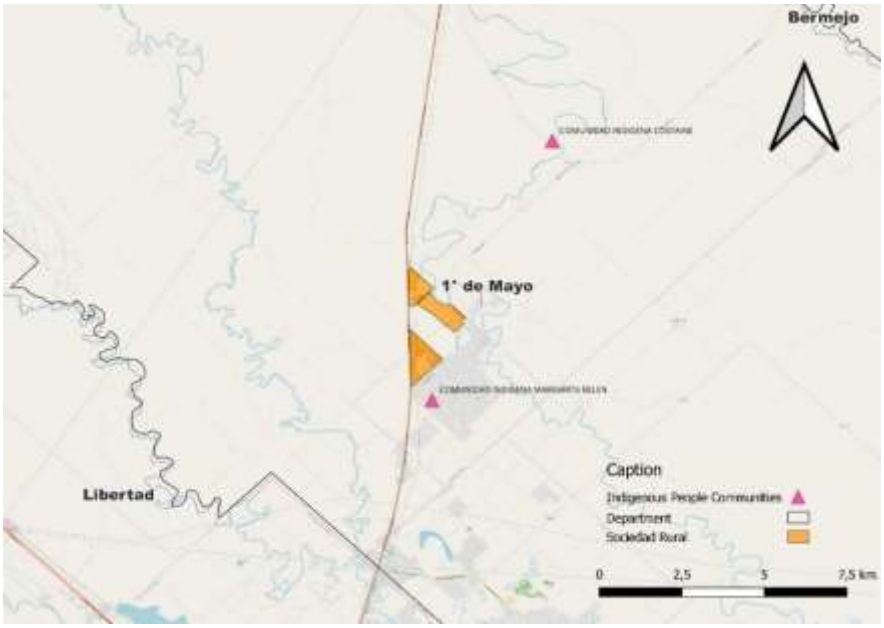


Figure 3. Main urbanizations and communities near Sociedad Rural property[29].

[28] Information about indigenous people community was obtained and adapted from: Ministry of Justice of Argentina (2024). List of indigenous communities - 20240223. Accessed: April 18, 2024. Available at: https://datos.jus.gob.ar/dataset/listado-de-comunidades-indigenas/archivo/f9b57566-3e7c-4449-b984-49a26897eb77?filters=

[29] Information about indigenous people community was obtained and adapted from: Ministry of Justice of Argentina (2024). List of indigenous communities - 20240223. Accessed: April 18, 2024. Available at: https://datos.jus.gob.ar/dataset/listado-de-comunidades-indigenas/archivo/f9b57566-3e7c-4449-b984-49a26897eb77?filters=

Figure 4. Main urbanizations and communities near Irineo property[30].

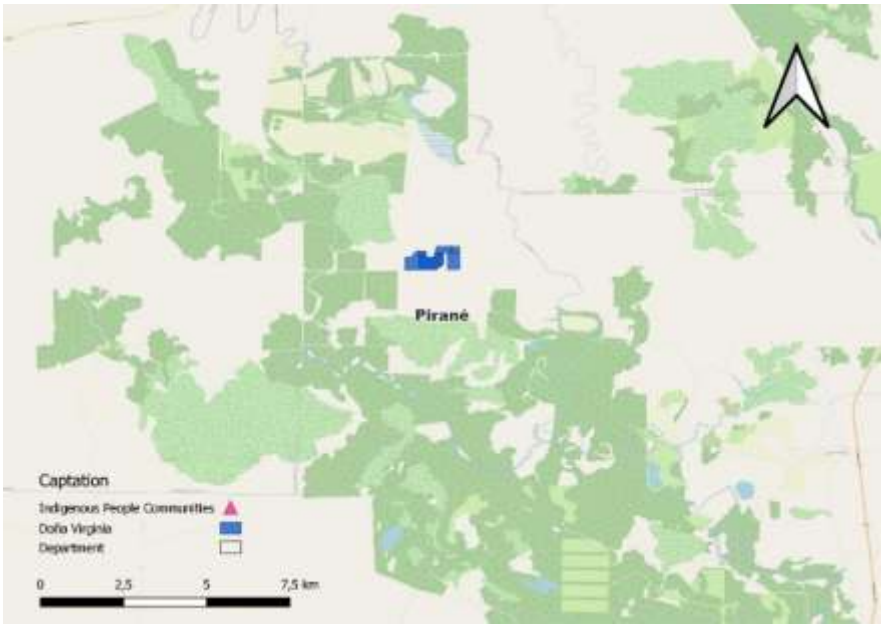


Figure 5. Main urbanizations and communities near Doña Virginia property[31].

[30] Information about indigenous people community was obtained and adapted from: Ministry of Justice of Argentina (2024). List of indigenous communities - 20240223. Accessed: April 18, 2024. Available at: https://datos.jus.gob.ar/dataset/listado-de-comunidades-indigenas/archivo/f9b57566-3e7c-4449-b984-49a26897eb77?filters=

[31] Information about indigenous people community was obtained and adapted from: Ministry of Justice of Argentina (2024). List of indigenous communities - 20240223. Accessed: April 18, 2024. Available at: https://datos.jus.gob.ar/dataset/listado-de-comunidades-indigenas/archivo/f9b57566-3e7c-4449-b984-49a26897eb77?filters=

Figure 6. Main urbanizations and communities near Don Antonio property[32].

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	The project proponent has participated in different events, where it presented the project update. Evidence provided in appendix 4 and shared folder with VVB during verification[33]. Moreover, stakeholders have visited the project site where the project is described and project proponent has been interviewed for different local media (radio and newspaper). Moreover, meetings with local authorities have taken place in this period. Finally, a summary and communication of the verification process has been delivered to stakeholders and the contact information was shared, for comments[34].
Date(s) of stakeholder consultation	14-July-2021

[32] Information about indigenous people community was obtained and adapted from: Ministry of Justice of Argentina (2024). List of indigenous communities - 20240223. Accessed: April 18, 2024. Available at: https://datos.jus.gob.ar/dataset/listado-de-comunidades-indigenas/archivo/f9b57566-3e7c-4449-b984-49a26897eb77?filters=

[33] Evidence on the different events and media communications available to VVB in Google Drive shared folder "Stakeholder>Communication"

[34] Evidence of the summary receipt confirmation from the different stakeholders available in Google Drive shared folder "Stakeholder>Communication>Project summary reception evidence"

Communication of monitored results	Information on this monitoring period has been provided to stakeholders through a summary letter accompanied by a meeting with local references prior to the verification. See evidence in shared folder[35], as well as the mentioned communication in the media.
Consultation records	At that time, the consultation was recorded and transcript.
Stakeholder input	One of the comments received during the stakeholder´s consultation was a request to extend the information and generate synergies with other actors. In this line, the project proponent has signed agreements with different research institutions such as INTA, UNAF, UNSE and IFA36 in order to work together on forestry matters. Moreover, the project is open to visits and has received around 28 groups in the last 4 years.

2.1.3 Free, Prior, and Informed Consent

Consent	Not applicable to this project as there are no IPs, LCs, or customary rights holders, so no transparent agreement was sought. No ongoing or unresolved conflicts are present in the project area or related to the activity.
Outcome of FPIC	Not applicable to this project. The project has not encroached on land, relocated people without consent, and forced physical or economic displacement.

2.1.4 Grievance Redress Procedure

Grievances received	Resolution and outcome
NA	The contact information for comments is easily accessible to stakeholders as it is both available on the organization´s webpage[37], as well as in written forms available at the company´s offices and properties. The project proponent has more than 100 years in the area and is well known by the community. The procedure is included in the Forest Management Plan available in the company´s webpage and a copy can be found in the company´s office.

[35] See previous reference
[36] All signed agreements available for VVB during validation in shared drive folder “Stakeholders>agreement”
[37] Contact information available in webpage: https://www.unitan.net/es-contact-us.html

	Moreover, workers can receive the comments and guide the stakeholder on the corresponding process. Anyway, it must be stated that the project is located in a rural area with limited population density and/or neighbours; only two of the five properties are located near towns. Any grievance received and resolved will be published in Unitan´s webpage.

2.1.5 Public Comments

Summary of comments received	Actions taken
No comments were received during the public comment period on Verra´s webpage	Not applicable
During the public comment, one participant (a school teacher) asked for the project to further extend the information and generate synergies with other actors	In this line, the project proponent has signed agreements with different research institutions such as INTA, UNAF, UNSE and IFA[38] in order to work together on forestry maters. Moreover, the project is open to visits and has received around 28 groups in the last 4 years.

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

Unitán has an extended experience in the forest industry and working with local communities in the project area. Firstly, Unitán has been working with native forest management for the tanning industry (in the last period Unitán limited extrictly to buying supplies from timber producers). Unitán has been located for more than 100 years in Pto. Tirol, and has worked with the surrounded communities. Secondly, before the start of the proposed project (1990-2014), Unitán has been doing research in small scale forest plantations for Schinopsis, Eucalyptus and Pinus, giving the team specific experience. Unitán has a professional, highly specialized and a fully independent team composed by 1 administrative coordinator; 2 forest field supervisor; 2 forest/agriculture engineers as duty managers; 10 operators; 1 engineer and 2 technicians in the environmental administrative area; 2 engineers in communication system support and an independent group at the nursery composed by: 4 operators under the supervision of one forestry technician. It has an Institutional Relations area, composed of 2 people, in charge of coordinating and implementing projects with the communities.

[38] All signed agreements available for VVB during validation in shared drive folder “Stakeholders>agreement”

2.2.2 Risk assessment

	Risk identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	- Low to moderate toxicity from agrochemicals for humans if exposed directly without protection (case of accident)	Weeds will be controlled with total translocable herbicides using doses recommended by the manufacturers. All the herbicides used are permitted by Argentina's legislation. All products are used under strict controls on purchase and storage, dispatch and application, and the final disposal of packaging. In addition, all agrochemical operators are trained and use PPE.
Risks to stakeholder participation	No risk identified	The project takes place in private property and communication of the project´s evolution takes place throughout the monitoring period so no risks to stakeholder participation compared to baseline is identified.
Working conditions	- Significant toxicity from agrochemicals for humans if exposed directly without protection (case of accident). - Insects and animals bites risk. - Significant risk of injuries related to noise exposure, cuts, entrapment and crushing if PPE is not used and safety procedures are not followed. - Moderate electrical risk if preventive maintenance is not performed.	Weeds will be controlled with total translocable herbicides using doses recommended by the manufacturers. All the herbicides used are permitted by the legislation of the Argentina. All products are used under the control of purchase and storage, dispatch and application, and the final disposal of packaging. In addition, all agrochemical operators are trained and use PPE. Insect and animal bites risks are mitigated with an emergency procedure which ensures a prompt

	Risk identified	Mitigation or preventative measure(s) taken
		medical attention in emergencies. Employees are trained on the risk of contact with animals and insects. They are also provided with boots to avoid snake bites, as weall as a well mantained first aid kit, anti-snake oil and repellents. The biolocial agents contamination risk is associated with soil manipulation. It is prevented by providing the employees with nitrile gloves. Thermal load risk is privented by training the personnel and implementing administrative measures to reduce exposure. Hydration points are also established. As employees use heavy machinery and sharp tools to perform their daily activities, there is a significant risk of accidents if equipment is not used properly. To prevent accidents employees are trained in saffety and security, as well as on secure driving. Equipment and vehicles are also maintained frequently in order to avoid flaws. As mentioned before employees are also provided with PPE. Electrical risk is avoided by doing periodical mantainance of infraestructure. Annual controls are also performed in order to ensure everything works properly.

	Risk identified	Mitigation or preventative measure(s) taken
		If a faillure is detected it is repeared[39].
Safety of women and girls	No risk identified	The project has not identified any risks to the safety of women and girls compared to baseline. The project is in private property in rural areas, with little population density.
Safety of minority and marginalized groups, including children	No risk identified	The project has not identified any risks to the safety of minority and marginalized groups including children compared to baseline. The project is in private property in rural areas, with little population density.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	- Low to medium possibility of bioaccumulation from agrochemical uses - Agrochemicals runoff on ground and water if applied not considering optimal climate conditions and doses - The air in the project area can be impacted by burning fossil fuels, blasting of soil and emissions from the engines of agricultural equipment, as well as a risk of an increase in forest fires	The agrochemicals used are all allowed by national legislation. They are applied by trained operators, using the corresponding PPE, and follow strict controls on purchase, storage, dispatch and application management standards and legislation, as well as final waste disposition. Moreover, it should be noted that the doses are those recommended by the manufacturers, but because only the planting rows are treated, 50% or less per actual hectare is applied. Besides this, there are no water bodies around the plantation fields where entrainment of chemicals could

[39] See risk assessment for workers in Google Drive shared folder "S&H>2024_Evaluación de riesgos laborales - Forestación"

	Risk identified	Mitigation or preventative measure(s) taken
		take place, as well as of eroded soil particles. Emergency response plans are mainteined. They are complemented with training and education programs on forest fires management. Fire fighting and emergency equipment can be found in all fields, for example, movile water bombs, firewalls and fireextinguishers. There is a methodology for cleaning flammable plant material, maintenance of suitable roads, water tanks of 5000 and 10000 liters and training for all personnel affected by the project is ensured[40]. In the same way, the residues of pruning and thinning are not be burned, thus avoiding the emission of greenhouse gases, and potential fire risks.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified[41]	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	The project proponent or any other entity involved in project design or implementation is not involved in any form of discrimination or sexual harassment. Unitán is a registered company, compliant

[40] More information available for VVB during verification in Google Drive shared folder "S&H>fire equipment"
[41] The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

		with local and national regulations regarding discrimination (National Law 23,592), with the certifications as evidence. Moreover, non-discrimination is part of the company´s policy, providing the same working opportunities without gender, color or religion considerations[42].
Sexual harassment	No risk identified	The project proponent or any other entity involved in project design or implementation is not involved in any form of discrimination or sexual harassment. Unitán is a registered company, compliant with local and national regulations regarding discrimination (National Law 23,592), with the registration certifications as evidence. Moreover, non-discrimination is part of the company´s policy, providing same working opportunities without gender, color or religion considerations.
Gender equity in labor and work	No risk identified	The project proponent or any other entity involved in project design or implementation is not involved in any form of discrimination or sexual harassment. Unitán is a registered company, compliant with local and national regulations regarding discrimination (National Law 23,592), with the registration certifications as evidence. Moreover, non-discrimination is part of the company´s policy, providing same working

[42] Evidence for VVB during verification and information on company´s policy in the general Forestry Managemet Plan, see previous reference, section 5.4

		opportunities without gender, color or religion considerations.
Forced labor	No risk identified	Unitán checks the employee nominee of the contractors it hires and that they all comply with the legal workforce requirements.
Child labor	No risk identified	Unitán checks the employee nominee of the contractors it hires and that they all comply with the legal workforce requirements.
Human trafficking	No risk identified	Unitán checks the employee nominee of the contractors it hires and that they all comply with the legal workforce requirements.

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	All the plots are owned by Unitán except for one rented, and there are no legal conflicts in these areas. There is no indigenous community or other customary right holder directly impacted by this project in any FMU so it can be said that no negative impacts have been found on any indigenous community, or other, by the project. Although there are confirmed existence of indigenous communities surveyed by the Institute of Indigenous Affairs (INAI)[43] in both provinces, it can be confirmed that these communities have no productive or sacred link with the properties that have been included in the project.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken

[43] https://www.argentina.gob.ar/derechoshumanos/inai/mapa

No risk is identified	Although there are confirmed existence of indigenous communities surveyed by the Institute of Indigenous Affairs (INAI)[44] in both provinces, it can be confirmed that these communities have no productive or sacred link with the properties that have been included in the project. All the plots are owned by Unitán except for one rented, and there are no legal conflicts in these areas. There is no indigenous community directly impacted by this project in any FMU so it can be said that no negative impacts have been found on any indigenous community by the project.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The project takes place in private property lands and has no influence over outside lands. Moreover, as mentioned in sections 2.1 and 2.3.3, there are no IPs, LCs, or customary rights holders or conflicts regarding property rights.

2.3.5 Benefit Sharing

Summary of the benefit sharing plan	Not applicable as there is no impact over property rights
Benefit sharing during the monitoring period	Not applicable as there is no impact over property rights

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure(s) taken during the monitoring period
Impacts on biodiversity and ecosystems	There is a moderate degree of risk to the flora, fauna and landscape. The project activity is developed in a productive establishment in which	The project does not include areas where native forests were present at least 10 years prior to the start date. Moreover, it does not impact biodiversity corridors. The project

[44] https://www.argentina.gob.ar/derechoshumanos/inai/mapa

	Risk identified	Mitigation or preventative measure(s) taken during the monitoring period
	transformation of the natural environment occurred many years ago. In this line, the project converts a degraded area, where continuous extensive livestock activity was carried out, into an ARR project activity. The impact on these factors will be of a variable intensity over time according to the stage of the project. However, the presence of wild species is expected, even those with some degree of threat.	includes the plantation of native species, reducing pressure over native forests and positively impacting biodiversity and ecosystem in the area. Regarding non-native species, these are not considered invasive species, so there is no risk of affection to local ecosystem in this regard. There exists a moderate degree of risk to the flora, fauna and landscape. The project activity is developed in a productive establishment in which transformation of the natural environment occurred many years ago. In this line, the project converts a degraded area, where continuous extensive livestock activity was carried out, into an ARR project activity. The impact on these factors will be of a variable intensity over time according to the stage of the project. However, the presence of wild species is expected, even those with some degree of threat.
Soil degradation and soil erosion	The area before the project was moderately degraded due to extensive cattle raising.	The ploughing will be the minimum essential to be able to form with the camels that will ensure a greater thickness of soil of the surface layer and the greater aeration of the root system and therefore better defense against water accumulations. In order to reduce emissions and all the impacts of mechanical tasks, a “taipero” equipment has been acquired that

	Risk identified	Mitigation or preventative measure(s) taken during the monitoring period
		in the same operation performs vertical tillage.
Water consumption and stress		The hydrological cycle is not expected to be negatively impacted. Moreover, there are no lagoons or watercourses in the area of the plantation where entrainment of chemicals could take place, as well as of eroded soil particles.

2.4.1 Rare, Threatened, and Endangered species

Species or habitat	According to IUCN red list Formosa and Chaco provinces there are two endangered species located in Chaco province. *Matilebias toba,* is considered Critically Endangered and according to IUCN it is only known from its type locality *"temporary ponds on Route 11, north to Río de Oro, Chaco province". However,* IUCN states that it has never been collected again after its original description despite several samplings in the area. It is more frequent in Paraguay *(IUCN 2024[45])* and the probability of being found in the project area is low. The other species, *Ctenomys bonettoi* is classified as Endangered. According to IUCN and "Categorización de los mamíferos de Argentina" the main threat is agriculture surface extension, mainly due to soybean plantations (Bidau 2018[46], Parada 2019[47]). Moreover, this species inhabits sandy soils, where the project plantation does not take place.
Areas needed for habitat connectivity	The project will not adversely impact habitats for rare, threatened, or endangered species. The project area is not located in or adjacent to habitats for rare, threatened, or endangered species. As it was mentioned before (section

[45] IUCN (2024). Matilebias toba, https://www.iucnredlist.org/species/176514970/176515205
[46] Bidau, C.J. (2018). *Ctenomys bonettoi*. *The IUCN Red List of Threatened Species* 2018: e.T5799A22192271. https://dx.doi.org/10.2305/IUCN.UK.2018-1.RLTS.T5799A22192271.en.
[47] Parada A. (2019). Tuco Tuco Chaqueño. Categorización de mamíferos de Argentina, Sociedad Argentina para el estudio de los mamíferos y Ministerio de Ambiente y Desarrollo Sostenible de Argentina. https://cma.sarem.org.ar/sites/default/files/pdf_fichas/Ctenomys%20bonettoi.pdf

	2.1.1), the region where the project is located has a historical use, which consists in land exploitation through agriculture and livestock production activities so the endangered species are not expected to be found. See explanation in the following Table.

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified. Changes in land use change have already potentially impact the rare, threatened, or endangered species and their habitats.	Before the afforestation and reforestation activities took place, in Puerto Tirol an environmental impact assessment (EIA) was conducted in order to evaluate if there was any impact on the environment including endangered and native species. This EIA is in line with the local law 25.080 which requests to present this kind of study for any new mayor afforestation project with plots larger than 100ha. For example, in Puerto Tirol EIA it is stated that the landscape was modified many years ago and transformed into a grassland with predominance of *Graminae* and *Ciperaceae* species. The massive feedstock breading in the area, which occurred before the project, promoted the permanence of nonnative species like *Cynodon dactylon.* In consequence native fauna was already affected. However, nowadays some native animals' species are seen in project fields, for example: *Polyborus plancus, Veniliornis passerinus, Cairina moschata, Egretta alba, Jabiru mycteria, Rhea americana, Hydrochaeris hidrochoerus but which are not among the rare, threatened or endangered species.* The only identified activity that has

		a potential risk is the increase in vehicular traffic, which can be prevented with training in safe driving.
Areas for habitat connectivity	No risk identified.	Grassland areas will be maintained around low areas and property boundaries. It is expected that these areas will maintain and protect species, as well as their habitats and the areas necessary to maintain habitat connectivity. In project fields where native old trees remain alive, they will be protected. In Puerto Tirol there is a relic of native forest which is maintained as a biodiversity reserve also. Moreover, the plantation of native species in the properties will enhance habitat connectivity for those species forest dependent.

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Schinopsis balansae	Native	In order to ensure tannin provision in the mid-term from sustainable sources and reduce native forest pressure	No adverse effect as it is a native species in the area
Eucalyptus hybrid (gxc)	Non-native	In order to ensure wood provision in the short-term from sustainable sources and reduce native forest pressure for energy generation, as well as rapid carbon removal with known adaptation to the area.	The hybrid species used is not within the local list of non-native invasive species. Still it includes the variety *grandis x camaldulensis* and *Eucalyptus camaldulensis* is classified as category 2 under the local list of non-native invasive species meaning it is a "controlled

			use species"[48]. In this sense, the project complies with Resolution n° 31 of Law 25.080 which states that project proponents are responsible for the non-native regeneration outside the plantation limits. In this line, it is responsible for its control in neighboring roads and lands immediately after emergence. If this is not possible, it must be informed to the provincial application authority and to the forest industry development direction. In this line, the project proponent implements monitoring of invasion, and control measures including the extraction of invasive individuals. This can be done manually or mechanically depending on the size.
Eucalyptus various (Cloeziana and Corymba)	Non-native	In order to ensure wood provision in the short-term from sustainable sources and reduce native forest pressure for saw wood	No adverse effect as it is not considered an invasive species There is no classification within the invasive species official list for this species. Still, the projects comply with the Resolution n°32 of Law 25.080 conditions, which includes a control over non-native regeneration outside the project´s limits.

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
Not applicable	No invasive species exist in the project area

	Risks identified	Mitigation or preventative measure(s) taken

48 https://www.argentina.gob.ar/sites/default/files/lista_oficial_eei_boletin_oficial_con_nombres_comunes_0.pdf

Invasive species	No risk identified	No invasive species were identified in the project area

2.4.3 Ecosystem conversion

This standard establishes a set of specific requirements for project eligibility, among which stands out the AFOLU project categories eligibility (VCS-Methodology requirements V4.7).

In order to demonstrate the project as Afforestation, reforestation and revegetation (ARR) category, the project participants shall provide evidence that the land within the planned project boundary has not been cleared of native ecosystems within the 10-year period prior to the project start date.

First, it must be stated that grassland vegetation dominating before project start is not the native ecosystem of the land within project boundaries. The native condition was modified due to native forest exploitation and the introduction of beef cattle due to a relocation of livestock production out of the Pampean areas of Argentina and into the north of the country. Both Formosa and Chaco, located in the northwest, have undergone structural and geographical changes as a result of the transformation of the agricultural sector of Argentina due to agricultural displacement[49] [50].

Both forest and grassland in the region have been historically impacted by agriculture activities. Cattle breeding in the region dates from 1552 with livestock entry from Brazil which quickly adapted to the subtropic conditions by changing to a smaller size (due to more fibrous grass)[51]. In more recent history, the NEA (Northeast region of Argentina), and particularly Chaco and Formosa, increased its cattle stock as a result of the shift of the agricultural frontier in the first decade of the 21st century, reaching 25% of the livestock national stock[52] (Rearte 2002/05), being the NEA the second region in importance regarding livestock breeding[53]. "*From the 1990s until 2007, all the productive regions of Chaco recorded increases in their livestock stocks, although this trend was higher in the Central-Eastern part of the*

[49] Di Paola, M. M (2005) Expansión de la frontera agropecuaria. Apuntes Agroeconómicos. ISSN 1667-3212 Año 3 - N°4. Available at: https://www.agro.uba.ar/apuntes/wp-content/uploads/2020/03/expansion-de-la-frontera-agropecuaria.pdf

[50] Gomez Lende, S. (2018) Destrucción de bosques nativos y deforestación ilegal: el caso Argentino (1998-2016) Papeles de Geografía, 64 (2018), 154-180.

[51] Chiossone G.O. (2018). Reconocimiento y manejo de ambientes naturales del Chaco Húmedo Formoseño. Buenas prácticas para una ganadería sustentable de pastizal. Kit de extensión para las Pampas y Campos. Fundación Vida Silvestre Argentina. Buenos Aires. Available at: https://www.avesargentinas.org.ar/sites/default/files/kit_pampas__cartilla_reconocimiento_y_manejo_de_ambientes_naturales_del_chaco_humedo_formoseno.pdf

[52] Rearte, D. (2002/05) La integración de la ganadería Argentina. ed. PAN Producción Animal I. INTA, Balcarce quoted in reference n° 37.

[53] Chiossone, G. (2006) Sistemas de producción ganaderos del noreste argentino: Situación actual y propuestas tecnológicas para mejorar su productividad. Available at: https://www.produccion-animal.com.ar/informacion_tecnica/origenes_evolucion_y_estadisticas_de_la_ganaderia/65-Guillermo_Chiossone.pdf

province, which reached 1.8 million heads in 2007 and 2008[54]*"*. This cattle breeding area in Chaco is located the region known as Centro-oriental.

For the departments where the project takes place, the agriculture exploitations´ land use in 2002[55] was reported occupied in a 93% by natural grassland and native forest, while only 3% is implanted ecosystem, this is explained by the fact that the economic activities have been mainly characterized by the exploitation of natural ecosystems like wood harvest[56] and cattle breeding on native grassland and native forest both in Chaco and Formosa with low technology and inputs[57] [58]. These exploitations are widely described for the region in different publications, stating the level of degradation of forest and grasslands throughout 100 years of agriculture activities[59] [60]. Degradation has led to an imbalance of such magnitude that it has favoured the proliferation of economically undesirable species[61] together with soil erosion by exposing the soil to extreme precipitations and temperatures, with the loss of native species habitat[62].

In 1974, Morello[63] described the area as stratified vegetation with a tall canopy of trees dominated by quebracho colorado (*Schinopsis lorentzii, S. balansae*), quebracho blanco (*Aspidosperma q.blanco*), timbó (*Entorolobium contortisiliquum*), urunday (*Astronium balansae*); quayacán (*Casalpinia paraguariensis*); lapacho (*Tabebuia ipe*); and a middle canopy with algarrobos (*Prosopis alba, P. nigra*), vinal (*Prosopis ruscifolia*) and chañar (*Geoffroea decorticans*). All species exploited for its wood quality for years and affected during fire practices in areas of cattle breeding[64]. Hence, the non-forest areas

[54] Cuadra, D.E. (2016) Regiones productivas de la Provincia de Chaco. 1816-2016 Bicentenario de la Declaración de la Independencia Argentina actas del XIV encuentro de profesionales y licenciados en geografía de Formosa. Volumen 1. 14 Y 15 de octubre de 2016. Formosa Capital. ISBN 978-987-1604-49-4 EDITORIAL EDUNAF.

[55] National agriculture census 2002

[56] See reference 40

[57] In the report Formosa 2015. El plan de inversiones que conduce a la visión de provincia de largo plazo it is stated: "Formosa's cattle farming is concentrated in the eastern region, which is home to almost 75% of the province's cattle stock. More than 90% of the cattle farms are oriented towards breeding, with rudimentary approaches, little incorporation of technology, based on herding on natural pastures and woodland, without rational grazing and lacking in the planning of fodder reserves to ensure an adequate nutritional level throughout the year"

[58] D´Agostini, A. 1997. Los pastizales del parque Chaqueño; manejo y productividad. Conferencia. 3ª Jornada Regional de Manejo de Pastizales Naturales. AER INTA San Cristóbal, Sta. Fe.

[59] Chiossone G.O. (2018). Reconocimiento y manejo de ambientes naturales del Chaco Húmedo Formoseño. Buenas prácticas para una ganadería sustentable de pastizal. Kit de extensión para las Pampas y Campos. Fundación Vida Silvestre Argentina. Buenos Aires. Available at: https://www.avesargentinas.org.ar/sites/default/files/kit_pampas__cartilla_reconocimiento_y_manejo_de_ambientes_naturales_del_chaco_humedo_formoseno.pdf

[60] Plan de Gestión Integrada de Riesgos Agropecuarios de la Provincia del Chaco. Ministerio de Hacienda y Finanzas Pública, Chaco - p. 12

[61] OAS (2004): "Características de la explotación rural chaqueña" www.oas.org/usde/publications/unit/oea22s/ch14.htm

[62] See reference 46

[63] Morello, J. y Adamoli, J. (1974) Las grandes unidades de vegetación y ambiente del Chaco Argentina quoted in Morello et al (2005) Un siglo de cambios de diseño del paisaje: el chaco argentino. I Jornadas Argentinas de Ecología de paisajes

[64] Oliva, Gabriel (2019) Manejo de pastizales naturales en Argentina. Presentación en XXV Reunión del Grupo Técnico Regional del Cono Sur en mejoramiento y utilización de los recursos forrajeros del área Tropical y Subtropical

present in the project´s properties are not natural ecosystems but a transition from already impacted lands.

Secondly, in terms of forest lands, the land eligibility is demonstrated through the use of satellite imagery showing that vegetation on the project land has been below the forest threshold, according to the definition of native forest adopted by Argentina[65], up to 10 years prior to project start date. In this regard, the table below (table 3) provides the details of the adopted definition:

Table 3: Forest adopted definition for Argentina

A single minimum tree crown cover value between 10 and 30 per cent	A single minimum land area value between 0,05 and 1 hectare	A single minimum tree height value between 2 and 5 metres
20%	0,5 ha	3 mts

In order to confirm the absence of forest and define project boundary, a chrono sequence of Landsat surface reflectance images was used. Despite these images having a low resolution (30 m), they are available for a wide range of dates. Thus, analyzing images of different dates between the plantation date and 10 years before the absence of forest during that 10-year period for the proposed plots was assessed.

In order to illustrate the land use of the properties and selection of plots according to the absence of forest 10 years prior to the project start date, different kinds of images for every field in the properties were analyzed. Google Earth images downloaded from Google Earth Pro for the nearest available dates between the 10-year period, and Landsat images built from the median value per pixel across a stack of valid pixels during January and June. Those plots where neither the Google Earth images nor the Landsat images contain forest, were selected for the project area, and are where the plantations take place. Regarding the few scattered trees on the project area, the tree crown cover of the land is still far below 20% of the threshold value of forests in Argentina and would remain so under continuation of current management.

Moreover, in the joint template during the validation of the project images were presented in section 3.2 (figure 9 to 13) which represent the land cover for the whole properties between the plantation date and 10 years before in order to select the proposed boundary where plots were not cleared of native ecosystems at the time the project started, nor 10 years prior.

	Risks identified	Mitigation or preventative measure(s) taken

[65] Classification proposed by FAO through the FRA 2000 (Evaluation of Forest Resources as to year 2000) adapted to the characteristics and particularities of Argentina, specified in Law No. 26,331 of Minimum Budgets for Environmental Protection of Native Forests, its Regulatory Decree No. 91 / 2009 and COFEMA Resolution No. 230/2012

Ecosystem conversion	No risk identified	As stated in the text before, there was no native ecosystem conversion in the project area

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

From September 2016 until the time of PDD elaboration, a total area of 894.83 ha of the project was effectively planted. Since then, 461.35 ha more have been planted, adding to a total of 1,356.18 ha at the end of this monitoring period. The project utilizes two main species: *Schinopsis balansae*, a native species, and Eucalyptus (different varieties but mainly gxc (defined as hybrid) and *cloeziana* (defined as various). During this monitoring period, the 7 % of planted areas were native species, reaching a total of 16 % of planted areas and 84 % for non-native species.

Thinning did not take place during this period as is planned for the end of year 2024 for individuals between 6 and 8 years. Moreover, no harvest took place as Schinopsis has a rotation period of 40 years, while Eucalyptus is planned to be harvest at age 10 (hybrid) and 20 (various).

Biomass for this monitoring period was estimated based on the forest inventory conducted between June 12th and August 9th of 2024, meaning this second monitoring period is from August 16th, 2021 to August 9th, 2024.

In 2022, during a dry summer, 239.62 ha of Eucalyptus were burnt in Ex-Glombovski property. Due to high temperatures and strong winds, the fire rapidly expanded despite activating the corresponding fire management plan. The event took place on January 13th 2022, during southern hemisphere summer. The event was reported four days later to the authorities[66]. This area has already fully recovered, with sprouts that will be managed according to the Forest Management Plan. 22 % of the previously verified ERR are estimated to have been lost, but the current ERR values show that no reversal tool place, having fully occurred the emitted carbon. During 2023, further 8.38 ha were burnt under the same circumstances and are fully recovered.

3.2 Deviations

3.2.1 Methodology Deviations

There are no methodology deviations in the monitoring period for the project.

3.2.2 Project Description Deviations

During this monitoring period the project has deviations from the validated PDD to inform which do not impact the applicability of the methodology, additionality or the appropriateness of the

[66] See fire report in Google Drive shared folder “Loss event report>Incendio informe 17.1.24”

baseline scenario, and the project remains in conformance with the applied methodology as stated in section 3.21 of VCS Standard V. 4.7. These are:

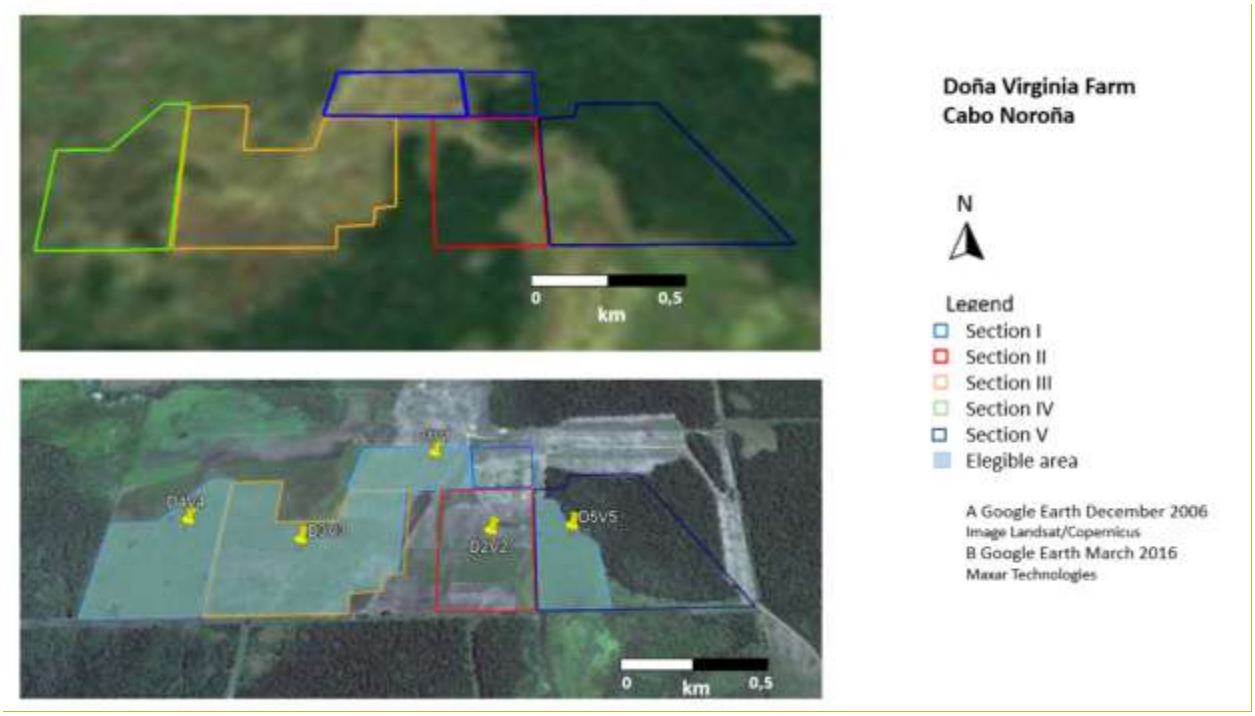
1) **Project area**

a. **Total farm area**

The total area for the farms has suffered some cartographic adjustments but these do not affect the project eligibility. The total farm area actually does not represent the project area, but just the area the project operates within. In this line, in the PDD there was a mistake in the Doña Virginia total area reported in table 4 of the PDD, which does not coincide with the shp file. It is now adjusted and detailed in the table below. For all other farms, if rounded to the nearest whole number, there are no differences:

Farm	Total area at PDD (ha)	Total area at MR (ha)
Don Antonio	*195*	*195.2*
Doña Virginia	*205*	*141.0*
Irineo	*359*	*358.8*
Soc. Rural	*225.6*	*225.6*
Glombovski	*2,347*	*2,346,9*

Moreover, there is one of the Doña Virginia´s farm plot that was missing in the reported PD figure 12, but included in the kmz files. It corresponds to plot V with 37.28 ha adding up to a total of 141 ha for the farm. Only 8.11 ha from that section is included in the project area complying with the land´s eligibility criteria as shown below.



b. Project area with plantation

Due to cartographic adjustments, a fire event (further described in Section 3.1), new plantations among others, the project area with planted area has been updated as shown in table 4. It can be seen that the total area planted is not the total projected in the PDD for these period.

Table 4. Area effectively planted (2016-2024) and comparison with the area at validation (ha)

Plantation year	Properties	Species	Area at validation (ha)	Area at verification (ha)	Comment
2016	Don Antonio	*Schinopsis balansae*	81,2	72.88	Carto adjust.
	Sociedad Rural & Don Antonio	*Eucalyptus hybrid*	35,8	57.05	Species correction
	Sociedad Rural	*Eucalyptus various*	25		Species correction
2017	Don Antonio & Irineo	*Schinopsis balansae*	20,1	21.6	Carto adjust.
	Ex-Glombovski	*Eucalyptus hybrid*	44,7	3.8	Fire
2018	Irineo	*Schinopsis balansae*	16	9.24	Carto adjust.
	Ex-Glombovski & Soc. Rural	*Eucalyptus hybrid*	212,6	118.65	Fire
	Ex-Glombovski & Soc. Rural	*Eucalyptus various*	3,2	54.77	Species correction
2019	Doña Virginia	*Schinopsis balansae*	65	44.01	Species correction
	Ex-Glombovski Soc. Rural	*Eucalyptus hybrid*	166,5	40.19	Fire
2020	Irineo	*Schinopsis balansae*	20,8	23.63	Carto adjust
	Ex-Glombovski	*Eucalyptus hybrid*	194	20.14	Carto adjust
2021	Don Antonio & Ex-Glombovski & Soc Rural	*Eucalyptus hybrid*	-	189.22	New plantation
	Don Antonio	Euca1125/Quebracho125	-	194.4	New plantation
	Don Antonio	Euca1000/Quebracho250	-	10.12	New plantation

2022	Ex-Glombovski	*Eucalyptus hybrid* 2017 regrowth	-	1.67	After fire Sprout
		Eucalyptus hybrid 2018 regrowth	-	40.95	After fire sprout
		Eucalyptus various 2018 regrowth	-	28.56	After fire sprout
		Eucalyptus hybrid 2019 regrowth	-	15.45	After fire sprout
		Eucalyptus hybrid 2021 regrowth	-	123.57	After fire sprout
	Sociedad Rural & Ex-Glombovski	*Eucalyptus hybrid*	-	31.12	New plantation
	Ex-Glombovski	*Schinopsis balansae*	-	156.17	New plantation
2023	Sociedad Rural	*Eucalyptus hybrid*	-	22.06	New plantation
	Ex-Glombovski	*Eucalyptus hybrid* 2018 regrowth	-	47.25	After fire sprout
	Doña Virginia	*Schinopsis balansae*	-	8.38	New plantation
		TOTAL	**884.9**	**1356.18**	

As mentioned, these deviations in planted project area is a change in the project design that do not have an impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario as it is expected to change throughout the project crediting period and increase in time.

c. Total project area

The total project area has been updated taking into consideration that the eligible project properties validated have been updated. This means a reduction in total area from 2,348.7 ha to 1649.40 ha. LTA values have been adjusted accordingly (see deviation 3).

2) Forest management plan

The project is behind schedule with the planned area planted. Moreover, the new plantation area has incurred in differences to the management plan. In this sense, different planting densities have been further detailed and stratified, than previously described. Still, the main densities used and which cover a higher percentage of the project area are those initially described (833 for *Schinopsis balansae*; 2500 for *Eucalyptus hybrid*; and 1250 for *Eucalyptus various*). This is detailed below:

Species	Plantation design	Density
Schinopsis balansae	4*3	833
	3.5*3.5	816
	3.5*1.5	1632
Eucalyptus hybrid	2*2	2500
	2.5*2	2000
	3*2	1666
	4*2	1250
	Various	1250-1428
Eucalyptus various	2*2	2500
	4*2	1250

Additionally, during 2021 stratum of Eucalyptus hybrid mixed with *Schinopsis balansae* at two different densities were planted, a stratum that was not previously considered in the project design. This is to further analyse Schinopsis´ response to different growing conditions, contributing to the native species domestication analysis.

Moreover, thinning and harvest have been delayed, in this sense, thinning of Eucalyptus will take place at year 6 to 8, while the harvest of the Eucalyptus hybrid will take place in year 10. *Schinopsis balansae* plantation´s management did not suffer modifications[67].

Additionally, given the project area has suffered a fire event the area and the strata have been modified in order to represent the changes. In this sense, table 5 shows the new stratum, from the initial 22, now there are 29. Additionally, 6 substratum based on densities were included as well.

Table 5. Strata changes during this monitoring period

Species	Year of plantation	Density	Stratum at validation	Stratum at verification
Eucalyptus hybrid	2016		1	1
Eucalyptus hybrid	2017		2	2
Eucalyptus hybrid	2018	2*2	3	3.1
Eucalyptus hybrid	2018	4*2		3.2
Eucalyptus hybrid	2019		4	4
Eucalyptus hybrid	2020		5	5
Eucalyptus hybrid	2021	4*2	6	6.1
Eucalyptus hybrid	2021	2,5*2		6.2
Eucalyptus hybrid	2022	4*2	7	7.1
Eucalyptus hybrid	2022	2,5*2		7.2
Eucalyptus hybrid	2023	4*2	8	8.1
Eucalyptus hybrid	2023	2,5*2		8.2
Eucalyptus gxc	2024		9	9
Eucalyptys gxc	2025		10	10
Eucalyptus various	2016		11	
Eucalyptus various	2018	2*2	12	12.1
Eucalyptus various	2018	4*2		12.2
Schinopsis balansae	2016		13	13
Schinopsis balansae	2017		14	14
Schinopsis balansae	2018		15	15
Schinopsis balansae	2019	3,5*3,5	16	16.1
Schinopsis balansae	2019	3,5*1,5		16.2
Schinopsis balansae	2020		17	17
Schinopsis balansae	2021		18	18
Schinopsis balansae	2022		19	19
Schinopsis balansae	2023		20	20
Schinopsis balansae	2024		21	21
Schinopsis balansae	2025		22	22
Euca/Quebracho 1125	2021	1125/125	-	23.1
Euca/Quebracho 1000	2021	1000/250		23.2
Eucalyptus hybrid 2017 regrowth	2022		-	24
Eucalyptus hybrid 2018 regrowth	2022	2500	-	25.1
Eucalyptys hybrid 2018 regrowth	2022	5000	-	25.2
Eucalyptus various 2018 regrowth	2022		-	26
Eucalyptus hybrid 2019 regrowth	2022		-	27
Eucalyptus hybrid 2021 regrowth	2022		-	28
Eucalyptus hybrid 2018 regrowth	2023		-	29

[67] An updated version of the forest management plan is available to VVB during verification in Google Drive shared folder “Project_general>Forest Management Plan”.

As mentioned, these deviations in the forest management plan is a change in the project design that do not have an impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. The changes are part of the project´s spirit which include studying the response of the species to different managements given the innovative aspect of the project working with native and non-native species in a non-forestry region.

3) Carbon sequestration projected and LTA

Both the management changes and the fire event are thought to impact the project´s growth and so a new carbon capture projection was calculated. In this line, both the management changes and the fire event are taken into consideration. These resulted in a reduction of the LTA reaching a value of 120.432tCO_2[68], 60 % lower than that calculated during validation. This value also takes into consideration the ex-post estimated, using the biomass values calculated from the forest inventory.

As mentioned, these deviations in the forest management plan is an update requested by the standard and does not have an impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

4) Monitoring plan

Given the same plots could not be identified, and in line with AR TOOL 14, during this monitoring period new plots were defined and marked to estimate biomass. In this line, the estimating change in carbon stock in trees between two points of time used for this monitoring period was not option b (Direct estimation of change by re-measurement of sample plots), but a: Difference of two independent stock estimations. For the next monitoring period, the same carbon estimation approach as described in the PD is expected, using the same monitoring plots (plus does new ones).

Moreover, the number of sample plots has changed due to the increase in the number of stratums and differences in the surface area. The number of plots for these monitoring period equal 399 plots, much higher than the initially expected plots for the project (149).

Table 6. Initially defined and current plot number by stratum

[68] LTA updated to date available in Google Drive shared folder: “Calculations>Unitan VCS_LTA ex-post”

Year	Species	Stratum	Area (ha)	Initial plots	N° Plots
2016	Eucalyptus hybrid	**1**	57,05	4,0	19
2017	Eucalyptus hybrid	**2**	3,80	3,0	2
2018	Eucalyptus hybrid	**3.1**	99,56	11,0	31
2018	Eucalyptus hybrid	**3.2**	19,09		2
2019	Eucalyptus hybrid	**4**	63,82	9,0	10
2020	Eucalyptus hybrid	**5**	189,22	10,0	56
2021	Eucalyptus hybrid	**6.1**	182,33	12,0	51
2021	Eucalyptus hybrid	**6.2**	12,07		4
2022	Eucalyptus hybrid	**7.1**	149,27	10,0	42
2022	Eucalyptus hybrid	**7.2**	6,90		2
2023	Eucalyptus hybrid	**8.1**	42,05	10,0	12
2023	Eucalyptus hybrid	**8.2**	5,20		2
2024	Eucalyptus hybrid	**9**		10,0	0
2025	Eucalyptus hybrid	**10**		10,0	0
2016	Eucalyptus various	**11**	0,00	2,0	0
2018	Eucalyptus various	**12.1**	48,60	1,0	13
2018	Eucalyptus various	**12.2**	6,17		4
2016	Schinopsis balansae	**13**	72,88	5,0	22
2017	Schinopsis balansae	**14**	21,60	2,0	7
2018	Schinopsis balansae	**15**	9,24	1,0	3
2019	Schinopsis balansae	**16.1**	41,54	4,0	12
2019	Schinopsis balansae	**16.2**	2,47		1
2020	Schinopsis balansae	**17**	20,14	1,0	6
2021	Schinopsis balansae	**-**		4,0	0
2022	Schinopsis balansae	**19**	22,06	10,0	7
2023	Schinopsis balansae	**20**	21,30	10,0	7
2024	Schinopsis balansae	**21**	0,00	10,0	0
2025	Schinopsis balansae	**22**		10,0	0
2021	Euca/Quebracho 1125	**23.1**	10,12		4
2021	Euca/Quebracho 1000	**23.2**	1,67		2
2022	Eucalyptus hybrid 2017 regrowth	**24**	40,95		15
2022	Eucalyptus hybrid 2018 regrowth	**25.1**	17,86		3
2022	Eucalyptys hybrid 2018 regrowth (5000)	**25.2**	10,70		3
2022	Eucalyptus various 2018 regrowth	**26**	15,45		7
2022	Eucalyptus hybrid 2019 regrowth	**27**	123,57		38
2022	Eucalyptus hybrid 2021 regrowth	**28**	31,12		10
2023	Eucalyptus hybrid 2018 regrowth	**29**	8,38		2
			1356,18	**149,00**	**399,0**

*The plots for the projected planted area will be defined on the next monitoring period given more changes could affect the number definition and will depend on the variability found in the stratums.

Additionally, there has been a change in the data and parameters available at validation. The density for eucalyptus has been changed from INTA Winck, R. et al, 2020 which reported density values for Eucalyptus grandis in general, to a more precise value based on the Eucalyptus clone used at year 5. The source is of public access, in the web of a regional nursery with information on the different clones sold[69].

[69] http://www.viverodonflorencio.com.ar/clones.htm

Data / Parameter	D_j
Data unit	t d.m. m^{-3}
Description	Density (over-bark) of tree species j
Source of data	Regional nursery for Eucalyptus main clones used; INTI-CITEMA wood density report for *Schinopsis balansae*[70]
Value applied	0.549 for Eucalyptus; 1.2 for Schinopsis
Justification of choice of data or description of measurement methods and procedures applied	The value for Eucalyptus represents an average of the two main clones used: 44 (0.540) and 78 (0.558).
Purpose of data	Calculation of project emissions
Comments	-

In terms of allometric equations, for the case of *Schinopsis* plantations, the equation used is provided by the National Institution for Agricultural Technology (INTA), based on a sample of 15 trees at Almirante Brown Department, Chaco for *Schinopsis* quebracho colorado Schlencht given the lack of data for *Schinopsis balansae*, but can be considered extrapolated to *Schinopsis* balansae. Given there is limited data available Atanasio et al. is considered over the Second National Native Forest Inventory (INBN2)[71] as the latest only counts with a general equation not differentiating by species, area, age, or others:

V_{TREE}= -0.09996+0.00057954*DBH^2 (V being stem volume over bark)[72]

This represents a deviation from the Joint PD-MR as it was stated that when the individuals were higher than 1,3mt the INBN2 allometric equation would be used.

This has been included in section 4.2 within the Vtree parameter.

Once again, all the deviations previously mentioned do not impact neither the applicability of the methodology and/or additionality, nor the appropriateness of the baseline scenario in line with section 3.21 of the VCS standard Version 4.7. The methodology applicability, in particular, is not affected with the changes and they seek to reduce uncertainties by increasing monitor plots, choosing more precise variables and equations related to the species used in the project.

3.3 Grouped Projects

It is not a grouped project

[70] INTI-CITEMA. Atencia, M.E (2003) Densidad de maderas (Kg/m3) ordenadas por nombre científico. Available at: https://www.inti.gob.ar/publicaciones/descargac/365

[71] Volume for *Schinopsis balasae:* Segundo Inventario Nacional de Bosques Nativos (INBN2). Informe Región Forestal Parque Chaqueño. Primera revision. 2020. Section with equation at: Annex 4. Table 34. Available at: https://www.argentina.gob.ar/ambiente/bosques/segundo-inventario-nacional-bosques-nativos.

[72] Source for the equation: PINBN analysis

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	D_j
Data unit	t d.m. m^{-3}
Description	Density (over-bark) of tree species j
Source of data	Regional nursery for Eucalyptus main clones used; INTI-CITEMA wood density report for *Schinopsis balansae* [73]
Value applied	0.549 for Eucalyptus; 1.2 for Schinopsis
Justification of choice of data or description of measurement methods and procedures applied	The value for Eucalyptus represents an average of the two main clones used: 44 (0.540) and 78 (0.558).
Purpose of data	Calculation of project emissions
Comments	In the case of Schinopsis, the current allometric equation results in biomass (kg) so density is not used.

Data / Parameter	*BEF2,j*
Data unit	Dimensionless
Description	Biomass expansion factor for conversion of stem biomass to above-ground biomass for tree species j
Source of data	Conservative value of 1.15 from AR-tool 14 for *Eucalyptus* and default values from Table 3A.1.10 of IPCC GPG-LULUCF 2003 for *Schinopsis*
Value applied	1,15 for *Eucalyptus*; 2 for *Schinopsis*
Justification of choice of data or description of	BEF varies with age, being the highest values for young plantations and the lowest for mature plantations. A conservative approach

[73] Winck, R. et al. (2020) Variación de la densidad básica de *Eucalyptus grandis* para diferentes edades y zonas agroecológicas de la Mesopotamia.
INTI-CITEMA. Atencia, M.E (2003) Densidad de maderas (Kg/m3) ordenadas por nombre científico. Available at: https://www.inti.gob.ar/publicaciones/descargac/365

measurement methods and procedures applied	was taken for *Schinopsis*, using temperate broadleaf values instead of tropical, taking into consideration the project is subtropical climate and that *Schinopsis* diameter is less than 10cm during the first 20 years. So, we are reducing and maintaining BEF to 2 (temperate broadleaf average and minimum range for tropical broadleaf) throughout the rotation.
Purpose of data	Calculation of project emissions
Comments	According to the A/R methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities", for ex post estimation the conservative default value of 1.15 will be used unless transparent and verifiable information can be provided to justify a different value. This applies for Eucalyptus where no allometric equation is used. Moreover, BEF will not be used when the allometric equation provides total aboveground biomass values.

Data / Parameter	CF
Data unit	dimensionless
Description	Carbon fraction
Source of data	GPG IPCC
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	Default value recommended by IPCC
Purpose of data	Calculation of project emissions
Comments	N/A

4.2 Data and Parameters Monitored

Data / Parameter	A_i
Data unit	ha
Description	Area of stratum I
Source of data	Monitoring of strata and stand boundaries was done using a Geographical Information System (GIS)

Description of measurement methods and procedures to be applied	Strata area were measured based on cartography documents, related with GIS.
Frequency of monitoring/recording	Before every forest inventory bearing in mind disturbances events that took place, or other.
Value monitored	

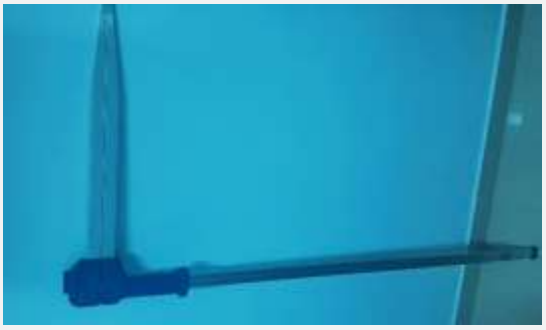
Year	Species	Stratum	Density	Area (ha)
2016	Eucalyptus hybrid	1	4*2	57,05
2017	Eucalyptus hybrid	2	4*2	3,80
2018	Eucalyptus hybrid	3.1	2*2	99,56
2018	Eucalyptus hybrid	3.2	4*2	19,09
2019	Eucalyptus hybrid	4	2*2	63,82
2020	Eucalyptus hybrid	5	3*2	189,22
2021	Eucalyptus hybrid	6.1	various	182,33
2021	Eucalyptus hybrid	6.2	2,5*2	12,07
2022	Eucalyptus hybrid	7.1	4*2	149,27
2022	Eucalyptus hybrid	7.2	2,5*2	6,90
2023	Eucalyptus hybrid	8.1	4*2	42,05
2023	Eucalyptus hybrid	8.2	2,5*2	5,20
2024	Eucalyptus hybrid	9		
2025	Eucalyptus hybrid	10		
2016	Eucalyptus various	11		0,00
2018	Eucalyptus various	12.1	2*2	48,60
2018	Eucalyptus various	12.2	4*2	6,17
2016	Schinopsis balansae	13	4*3	72,88
2017	Schinopsis balansae	14	4*3	21,60
2018	Schinopsis balansae	15	4*3	9,24
2019	Schinopsis balansae	16.1	3,5*3,5	41,54
2019	Schinopsis balansae	16.2	3,5*1,5	2,47
2020	Schinopsis balansae	17	4*3	20,14
2021	Schinopsis balansae	-		
2022	Schinopsis balansae	19	4*3	22,06
2023	Schinopsis balansae	20	4*3	21,30
2024	Schinopsis balansae	21		0,00
2025	Schinopsis balansae	22		
2021	Euca/Quebracho 1125	23.1	1125/125	10,12
2021	Euca/Quebracho 1000	23.2	1000/250	1,67
2022	Eucalyptus hybrid 2017 regrowth	24	4*2	40,95
2022	Eucalyptus hybrid 2018 regrowth	25.1	2*2	17,86
2022	Eucalyptys hybrid 2018 regrowth (5000)	25.2	2*1	10,70
2022	Eucalyptus various 2018 regrowth	26	2*2	15,45
2022	Eucalyptus hybrid 2019 regrowth	27	2*2	123,57
2022	Eucalyptus hybrid 2021 regrowth	28	2,5*2	31,12
2023	Eucalyptus hybrid 2018 regrowth	29	2*2	8,38
				1356,18

Monitoring equipment	Garmin GPS, model Montana, QGis version 3.32 and SW maps mobile phone app.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC

	procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of project emissions
Calculation method	The value was used in equations N° 3, 12 y 24 of the Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (Version 4.1)
Comments	-

Data / Parameter	$A_{PLOT,i}$,
Data unit	ha
Description	Total area of sample plots in stratum i
Source of data	Field measurement
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Frequency of monitoring/recording	During every forest inventory with no specific frequency.
Value monitored	For *Schinopsis* sample plots are squares of 400m^2 For *Eucalyptus* sample plots are squares of 300m^2
Monitoring equipment	50 mt measuring tapes with no series number 
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of

	these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of project emissions
Calculation method	The plots are located using GPS Garmin Montana and SW maps App used in a mobile phone, with previously loaded maps of the plots, each having its own coordinates recorded. The reference considered is the first tree which is marked with the plot number (when possible). Moreover, first and last tree of the rows are marked to identify the plots in the future. The georeference of the trees of each plot´s vertex is recorded.
Comments	-

Data / Parameter	DBH
Data unit	cm
Description	Diameter at breast height of tree
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	DBH is measured at 1.3 m above ground, over the bark. In case of stem deformation at this level, measurement was done over the deformation once the stem took its normal shape, with the purpose of being conservative. DBH was measured in all trees above 1.3 mts. within the plots.
Frequency of monitoring/recording	During every forest inventory, and for every tree within sample plots
Value monitored	Varies with plot, see file “ERR carbon calculation”
Monitoring equipment	

	The instrument used for measuring DBH was a Haglof caliper of 460 mm with no series number; with diameter accuracy, aluminium scales with clear digits anti-wear off, printed on both sides, light and robust.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied. A quality control procedure consisted in qualified personnel conducting the measurements in the first place, and the first control is conducted by contractor. Secondly, instruments are checked and tested before starting the verification process. Items checked: -Correct visualization if numbers in the calliper. -The straightness of the calliper and the lack of mechanical problems. The calliper length is not a problem since it is impossible the equipment stretches. Bark that is not stick to the stem is removed before measuring.
Purpose of the data	Calculation of project emissions
Calculation method	The trees are considered to be inside the plot if more than 50% of DBH is inside the plot. When the trees present sprouts or ramifications at measuring heights, the DBH of each is measured and recorded. Diameters are measured two times.
Comments	

Data / Parameter	ND
Data unit	cm
Description	Diameter at neck height of tree (10cm from ground land)
Source of data	Field measurements in sample plots

Description of measurement methods and procedures to be applied	This variable will be monitored for those plots with the presence of young individuals with heights less than 1.3mt.
Frequency of monitoring/recording	During every forest inventory, for every tree within sample plots
Value monitored	Varies with plot, see file "ERR carbon calculation"
Monitoring equipment	The instrument used for measuring DBH was a Haglof caliper of 460 mm with no series number; with diameter accuracy, aluminum scales with clear digits anti-wear off, printed on both sides, light and robust. In some cases a diametric tape is used. The team uses a 1.3mt calibrated rod in order to ensure that BDH measurements are made at the correct height.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of project emissions
Calculation method	In the case of young plantations of Schinopsis, a genus with slow growth periods, neck diameter was measured instead of DBH as the maximum height in some individuals within the plot was less than 1.3mts., based on Iglesias & Barchuk, 2010; Loguercio & Defossé 2001; Pérez-Cordero & Kanninen 2002 findings, where neck diameter or diameter at base height is considered more appropriate for young and/or small individuals74.
Comments	

Data / Parameter	R_j
Data unit	dimensionless
Description	Root-shoot ratio for tree species j
Source of data	Ex-ante: Table 3A.1.8 of IPCC GPG-LULUCF 2003.

[74] Iglesias, M.R & Barchuk, H. (2010) Estimación de la biomasa aérea de seis leguminosas leñosas del Chaco Árido (Argentina) Ecología Austral 20:71-79. Abril de 2010. Asociación Argentina de Ecología. Reference n° 86 in shared Google Drive folder

	Ex-post: Estimation of carbon stocks and change in carbon stocks of trees and shrubs AR Tool 14.
Description of measurement methods and procedures to be applied	According to IPCC 2003, the value of R depends on aerial biomass (t / ha). For ex-ante values less than 50 tonnes/ha 0.45 was used, for values between 50 and 150t/ha 0.35 was used and for over 150 0.2 was used. In the same line, to be conservative due to lack of data, R_j value for *Schinopsis* is considered 0.25 for all ages, which is both, the conservative recommended value for baselines and nearest value to mean subtropical primary forest R_j For ex-post estimations, R_j will be estimated using the recommended equation taken from the suggested equation from the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" and calculated based on estimated aboveground biomass for each verification period and not a default value for ranges of biomass: $R_j = \frac{e^{(-1.085+0.9256\times\ln b)}}{b}$ Where B is aboveground biomass content (t.d.m./ha). The aboveground biomass will be calculated per verification period.
Frequency of monitoring/recording	During every forest inventory, for every plot measured
Value monitored	Ex ante: Default values from IPCC guidelines for *Eucalyptus* in temperate forest according to above-biomass (t/ha): <50= 0.45 51-150= 0.35 >150 = 0.2 In the case of Schinopsis, the value 0.25 is used, based on average value for subtropical forest and conservative value from the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" Ex post: varies with measuring plot. See “ERR carbon calculation”
Monitoring equipment	Excel spreadsheet
QA/QC procedures to be applied	Calculations revised by third party within consultancy firm
Purpose of the data	Calculation of project emissions
Calculation method	Default values are used, so no calculations apply
Comments	

Data / Parameter	H
Data unit	m
Description	Height of tree
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied. In general, total height of 6-10 trees per plot area measured and the rest calculated based on a regression equation; in other cases all heights are measured. This is normal procedure in the forestry sector in Argentina, the study by Ferrere et al. (2022)[75] can be used as a reference. In relation to the height measurement, the following considerations according to each situation take place: 1. Trees with zero slope: To achieve a correct measurement, the operator must be located at a distance equivalent to the tree height. It is important to keep in mind that the distance taken with the tape measure is the one entered in the inclinometer. 2. Measurements with slope (positive or negative): In those cases where the tree base is located over the contractor's visual sight, the measurement and total height will be a result of the subtraction of the measurements. If the operator is over a hill, the height will be the sum of the measurements. 3. Trees that are dead, burned, or broken will be excluded from the measurement.
Frequency of monitoring/recording	During every forest inventory.
Value monitored	See file “ERR carbon calculation”

[75] Ferrere et al. (2022). *Ecuaciones para la estimación de altura y volumen en plantaciones de Eucalyptus dunnii en el norte de la Región Pampeana*. Document available to VVB during validation in shared folder “2. Annex documentation/Section 5/Section 5.2”. Document: “Ferrere et al. (2022)”. Available at: https://repositorio.inta.gob.ar/bitstream/handle/20.500.12123/13630/INTA_CIRN_InstitutodeSuelos_Lupi_Ecuaciones_para_la_estimacion_de.pdf?sequence=2&isAllowed=y

Monitoring equipment	 The equipment used includes topographic ruler of 7 mts. and a Sunnto clinometer in those plots with higher individuals.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of project emissions
Calculation method	Not all heights are measured. The main 6-10 trees are measured and the rest of the heights estimated using a polynomic regression line estimated using the values from the measured trees within the same stratum.
Comments	-

Data / Parameter	$V_{TREE,j,p,l}$
Data unit	m^3; dm^3 for Eucalyptus and kg for Schinopsis
Description	Stem volume and biomass of trees of species or group of species j in plot p in stratum l
Source of data	Ex-ante: Regional growth model (SIS eucalipto, EMBRAPA); local growth model for *Schinopsis balansae* (Gimenez, A.M. & Ríos, N., 1999)[76]

[76] For Schinopsis Gimenez, A.M. & Ríos, N . (1999) Crecimiento de Schinopsis quebracho-colorado Barkl. et Meyer, Anacardiaceae (Ref. 81 in shared Google Drive folder)
EMBRAPA. SIS EUCALIPTO. Available at: https://www.embrapa.br/florestas/transferencia-de-tecnologia/softwares-florestais

	Ex-post: For *Eucalyptus*, the equation used is the one recommended for Northeast region by the National Institution of Agricultural Technology (INTA) from Glade J (1984)[77] For the case of *Schinopsis balansae*, given there is limited data available, the allometric equation used is the one by Atanasio et al. 2013[78]
Description of measurement methods and procedures to be applied	For ex-ante estimations, m3 volume values are obtained from the sources. In the case of ex-post volume calculations, allometric equations are used with height and DBH values from the forest inventories. Atanasio allometric equation for *Schinopsis balansae* results in total biomass values (kg) while Glade J. results in volume in dm3 units.
Frequency of monitoring/recording	Ex-ante and during every forest inventory
Value monitored	Varies per individual. See Ex-ante estimation for detail and ERR calculation spreadsheets.
Monitoring equipment	Excel spreadsheet
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	The stem volume values (or growth simulators) are used to predict the plantation growth both for *Eucalyptus* and *Schinopsis balansae* in the case of ex-ante estimations while allometric equations are used to obtain volume and biomass tree values ex-post.
Calculation method	
Comments	For ex-post calculations, allometric equations will be used based on DBH and H values measured and estimated

[77] Reference from "Normas de inventario forestal para los planes de manejo predial. Proyecto de implantación de un modelo de desarrollo forestal sustentable en Argentina y Uruguay". INTA 2006 and "Curso: Principios técnicos para el cultivo de especies Forestales de Entre Ríos Planificación, Inventario y cubicación" INTA and Ministerio de Agroindustria, 2017. In reference N° 82 of shared Google Drive folder

[78] Atanasio, et al. (2013) Determinación de biomasa aérea en Quebracho Colorado Santiagueño (*Schinopsis* quebracho colorado Schlencht), en el Chaco Semiárido. ISSN 1669-6786 4to Congreso Forestal Argentino y Latinoamericano Iguazú 2013. PONENCIAS. Trabajo Nº 24. INTA. In reference N° 85 in shared Google Drive folder

Data / Parameter	Wi
Data unit	dimensionless
Description	Relative weight of stratum
Source of data	Area field measurements
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Frequency of monitoring/recording	During every verification event.
Value monitored	
Monitoring equipment	Excel - Microsoft Office based on data

Year	Sp	wi
2016	Eucalyptus hybrid	0,04
2017	Eucalyptus hybrid	0,00
2018	Eucalyptus hybrid	0,07
2018	Eucalyptus hybrid	0,01
2019	Eucalyptus hybrid	0,05
2020	Eucalyptus hybrid	0,14
2021	Eucalyptus hybrid	0,13
2021	Eucalyptus hybrid	0,01
2022	Eucalyptus hybrid	0,11
2022	Eucalyptus hybrid	0,01
2023	Eucalyptus hybrid	0,03
2023	Eucalyptus hybrid	0,00
2024	Eucalyptus hybrid	
2025	Eucalyptus hybrid	
2016	Eucalyptus various	
2018	Eucalyptus various	0,04
2018	Eucalyptus various	0,00
2016	Schinopsis balansae	0,05
2017	Schinopsis balansae	0,02
2018	Schinopsis balansae	0,01
2019	Schinopsis balansae	0,03
2019	Schinopsis balansae	0,00
2020	Schinopsis balansae	0,01
2021	Schinopsis balansae	
2022	Schinopsis balansae	0,02
2023	Schinopsis balansae	0,02
2021	Euca/Quebracho 1125	0,01
2021	Euca/Quebracho 1000	0,00
2022	Eucalyptus hybrid 2017 regrowth	0,03
2022	Eucalyptus hybrid 2018 regrowth	0,01
2022	Eucalyptys hybrid 2018 regrowth (5000)	0,01
2022	Eucalyptus various 2018 regrowth	0,01
2022	Eucalyptus hybrid 2019 regrowth	0,09
2022	Eucalyptus hybrid 2021 regrowth	0,02
2023	Eucalyptus hybrid 2018 regrowth	0,01

QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of project emissions
Calculation method	Ratio of the area of stratum i to the sum of areas of biomass estimation strata (i.e.Ai⁄A)
Comments	N/A

Data / Parameter	Si^2
Data unit	(t d.m. ha-1) ^2
Description	Variance of tree biomass per hectare across all sample plots in each stratum
Source of data	Tree biomass from field measurements
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Frequency of monitoring/recording	During every verification event.
Value monitored	See file “ERR carbon calculation”
Monitoring equipment	Excel - Microsoft Office based on measured data
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of project emissions
Calculation method	Equation 17 from AR-Tool 14

	$s_i^2 = \frac{n_i \times \sum_{p=1}^{n_i} b_{TREE,p,i}^2 - \left(\sum_{p=1}^{n_i} b_{TREE,p,i}\right)^2}{n_i \times (n_i - 1)}$
Comments	N/A

Data / Parameter	T
Data unit	Year
Description	Time period elapsed between two successive estimations of carbon stock
Source of data	Recorded time
Description of measurement methods and procedures to be applied	N/A
Frequency of monitoring/recording	Every verification and for every forest inventory period
Value monitored	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	If the two successive estimations of carbon stock are carried out at different points of time in year t2 and t1, (e.g. in the month of April in year t1 and in the month of September in year t2), then a fractional value is assigned to T.

4.3 Monitoring Plan

Monitoring will be organized according to the AR-ACM 0003 tool. All the data that are mentioned in this section will be collected and archived electronically and kept for 3 years after the end of last crediting period.

In this section, the actions that as a monitoring strategy will be a tool for improvement during the development of the project are objectified. Mainly to direct the management in the implementation of the corporate forestry policy by increasing the analysis and management capacity of the services and direct responsibilities over the forestation areas directly involved.

Unitán has set a forest management system for the Unitán project. The system includes a Monitoring Plan - which specifies (among other relevant information) the forestry inventory -, procedures and monitoring reports[79]. Procedures will be handed to third parties in charge of forest inventory. Therefore, both Unitán staff and third parties are aware of the importance that monitoring has and are committed to monitor the data correctly and consistently for the entire crediting period.

Unitán monitoring plan has been designed in line with the methodology AR-ACM 0003 and its applicable tools referenced in section 1.9 above in order to provide all relevant data necessary to verify: i) the applicability conditions listed under section 2.2 are met; ii) changes in carbon stocks in the pools selected; and iii) project emissions and leakage emissions.

When available, commonly accepted principles and practices of forest inventory and forest management in the host country are applied. Otherwise, as above mentioned, standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for inventory operations, including field data collection and data management are identified, recorded and applied (i.e.: SOPs from the "IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry 2003")[80].

The necessity to carry out a forest inventory arises from the impossibility of measuring the stocks of the total area of the project, so that it is necessary to take representative samples of the population. These samples, named sample units or sampling plots, are a relatively small proportion of the project area, established over the entire area in order to obtain estimations of the variables of interest.

The monitoring plan is designed to produce biomass stock estimates with a 90% confidence level in line with the precision requirements established in the "Estimation of carbon stocks of trees and shrubs in A/R CDM Project activities" version 04.2 tool.

Data collected will be archived for a period of at least two years after the end of the last crediting period of the project activity.

Sampling Plan

The forest inventory is carried out taking into account statistical predefined parameters, aiming at establishing the precision and the probability level of the results. The selection of the work methodology for developing forest inventory involves the determination of the following variables, in line with the Monitoring Plan:

- Sample size
- Sampling error
- Sampling process

[79] Available to VVB during verification in Google Drive shared folder "Project_general>Monitor Plan Unitan"

[80] Monitoring Plan available to VVB during validation same reference as previous footnote

- Sampling method.
- Mapping of the sampling,
- Capture of field data (indicating variables to be measured and instruments to be used).
- Calculation processes
- Statistical analysis, indicating precision and probability level used.

Project boundaries are defined at the beginning of project activity and updated along the crediting period,

Boundaries may vary or new strata may be created after disturbances effects (pests, droughts, fire) and boundaries will be redefined.

Geographic coordinates are established, recorded and archived. A Geographic Information System will be implemented with the following basic layers:

- Project boundaries
- Aerial photographs
- Infrastructure (nursery, roads, etc.)
- Permanent sampling plots

Other layers could be added in the future. The layers will be linked to several databases.

· Stratification

The stratification eliminates sources of variation that can mask the results of the inventory, once the variability inside the strata shall be lower than that of the whole population. Hence, it will be possible to obtain more precise statistics due to the population stratification. The stratification also facilitates the data collection and the processing of it per stratum, being also suitable for the planning and execution of the work on the field.

Stratification was initially done considering age class (plantation date 2016, 2017, 2018, ..., 2025); and species planted (*Schinopsis balansae*, *Eucalyptus gxc* & *Eucalyptus* various). Total project area was divided into 22 stratums.

It was anticipated that stratification could suffer subdivisions or merges in the case unexpected disturbances occur or insignificant intra-stratum variability is detected in the annual variation in carbon pools (e.g: forest fires). In this monitoring period, due to a natural fire event, new strata had to be defined:

Species	Year of plantation	Density	Stratum at verification
Eucalyptus hybrid	2016	4*2	1
Eucalyptus hybrid	2017	4*2	2
Eucalyptus hybrid	2018	2*2	3.1
Eucalyptus hybrid	2018	4*2	3.2
Eucalyptus hybrid	2019	2*2	4
Eucalyptus hybrid	2020	3*2	5
Eucalyptus hybrid	2021	varios	6.1
Eucalyptus hybrid	2021	2,5*2	6.2
Eucalyptus hybrid	2022	4*2	7.1
Eucalyptus hybrid	2022	2,5*2	7.2
Eucalyptus hybrid	2023	4*2	8.1
Eucalyptus hybrid	2023	2,5*2	8.2
Eucalyptus hybrid	2024		9
Eucalyptus hybrid	2025		10
Eucalyptus various	2016		-
Eucalyptus various	2018	2*2	12.1
Eucalyptus various	2018	4*2	12.2
Schinopsis balansae	2016	4*3	13
Schinopsis balansae	2017	4*3	14
Schinopsis balansae	2018	4*3	15
Schinopsis balansae	2019	3,5*3,5	16.1
Schinopsis balansae	2019	3,5*1,5	16.2
Schinopsis balansae	2020	4*3	17
Schinopsis balansae	2021		-
Schinopsis balansae	2022	4*3	19
Schinopsis balansae	2023	4*3	20
Schinopsis balansae	2024		21
Schinopsis balansae	2025		22
Euca/Quebracho 1125	2021	1125/125	23.1
Euca/Quebracho 1000	2021	1000/250	23.2
Eucalyptus hybrid 2017 regrowth	2022	4*2	24
Eucalyptus hybrid 2018 regrowth	2022	2*2	25.1
Eucalyptys hybrid 2018 regrowth	2022	2*1	25.2
Eucalyptus various 2018 regrowth	2022	2*2	26
Eucalyptus hybrid 2019 regrowth	2022	2*2	27
Eucalyptus hybrid 2021 regrowth	2022	2,5*2	28
Eucalyptus hybrid 2018 regrowth	2023	2*2	29

Added to the substratums classified based on plantation density, the total stratums at the end of the project are expected to be 29.

· **Sampling**

Design

The design includes the setting of the different variables to be used in the sampling, that is, the distribution of plots, setting their quantities and sizes, as well as the information analysis techniques. In this case, the design used was "Random", through the implementation of a rectangular grid and location of the plots in each stratum. The plots have been distributed over the area of interest to be inventoried in homogeneous units (lots), determining the dasometric parameters corresponding to the lots they represent.

The stratum are characterized by homogeneity in species, age, density, in order that the variability is absorbed within the batch and thus improve inventory precision.

Sample size

The sample size involves the number of plots to be distributed with a certain statistical criterion in every stratum. The representative number of plots of the total project area and of every stratum shall be previously decided in order to accomplish the predefined level of accuracy and precision.

The size of the sample plot is a trade-off between accuracy, precision, and time (cost) of measurement. The size is also related to the number of trees, their diameter and the carbon stock variance among plots. The plot should be large enough to contain an adequate number of trees per plot to be measured. IPCC Good Practice Guidance for LULUCF, Chapter 4.3 recommends using a single plot varying between 100 m^2 to 600 m^2, increasing the size from densely planted stands of 1000 trees per hectare to sparsely planted stands of multi-purpose trees.

Thus, taking into consideration the project-specific conditions and the IPCC guidance, rectangular plots of 300 m^2 have been selected for monitoring of stratums with *Eucalyptus* (densities between 1205 and 2500 plants/ha) and a size of 400 m^2 for stratums with *Schinopsis* due to lower densities (833 plants/ha) according to plant densities.

Plots number

Permanent sampling plots are used to measure and monitor changes in carbon stocks from the most relevant carbon pools over the time[81]. These are considered to be more efficient for estimating changes in carbon stocks by filtering out any variance due to plot effect. The plots will be located with GPS and although physically marked, they will be as invisible as possible to avoid any possible special treatments (e.g. during site and soil preparation, weeding, fertilization, harvesting, etc.) that could affect growth. They will also be prevented from being deforested over the crediting period.

The number of sample plots was first estimated according to the "Calculation of the number of sample plots for measurements within A/R CDM project activities" tool. The outcome for the estimation of number of sample plots with the tool was 43 for the whole project area, with value cero for some of the stratums. This number was increased in order to achieve a 10% significance. Calculations are archived as part of project documentation. The new number estimated for the whole project area was of a total of 149 sample plots. In the current monitoring period, due to new plantations and stratums defined after a fire event, the sample plots are described in the table 7 below, for each stratum:

Table 7: Plots detail per stratum for the planted areas

[81] During this monitoring period, as mentioned in the Project Description Deviation section, the plots are new as most of the previous ones were lost during the fire event.

Year	Species	Stratum	Area (ha)	N° Plots
2016	Eucalyptus hybrid	**1**	57,05	19
2017	Eucalyptus hybrid	**2**	3,80	2
2018	Eucalyptus hybrid	**3.1**	99,56	31
2018	Eucalyptus hybrid	**3.2**	19,09	2
2019	Eucalyptus hybrid	**4**	63,82	10
2020	Eucalyptus hybrid	**5**	189,22	56
2021	Eucalyptus hybrid	**6.1**	182,33	51
2021	Eucalyptus hybrid	**6.2**	12,07	4
2022	Eucalyptus hybrid	**7.1**	149,27	42
2022	Eucalyptus hybrid	**7.2**	6,90	2
2023	Eucalyptus hybrid	**8.1**	42,05	12
2023	Eucalyptus hybrid	**8.2**	5,20	2
2024	Eucalyptus hybrid	**9**		0
2025	Eucalyptus hybrid	**10**		0
2016	Eucalyptus various	**11**	0,00	0
2018	Eucalyptus various	**12.1**	48,60	13
2018	Eucalyptus various	**12.2**	6,17	4
2016	Schinopsis balansae	**13**	72,88	22
2017	Schinopsis balansae	**14**	21,60	7
2018	Schinopsis balansae	**15**	9,24	3
2019	Schinopsis balansae	**16.1**	41,54	12
2019	Schinopsis balansae	**16.2**	2,47	1
2020	Schinopsis balansae	**17**	20,14	6
2021	Schinopsis balansae	**-**		0
2022	Schinopsis balansae	**19**	22,06	7
2023	Schinopsis balansae	**20**	21,30	7
2024	Schinopsis balansae	**21**	0,00	0
2025	Schinopsis balansae	**22**		0
2021	Euca/Quebracho 1125	**23.1**	10,12	4
2021	Euca/Quebracho 1000	**23.2**	1,67	2
2022	Eucalyptus hybrid 2017 regrowth	**24**	40,95	15
2022	Eucalyptus hybrid 2018 regrowth	**25.1**	17,86	3
2022	Eucalyptys hybrid 2018 regrowth (5000)	**25.2**	10,70	3
2022	Eucalyptus various 2018 regrowth	**26**	15,45	7
2022	Eucalyptus hybrid 2019 regrowth	**27**	123,57	38
2022	Eucalyptus hybrid 2021 regrowth	**28**	31,12	10
2023	Eucalyptus hybrid 2018 regrowth	**29**	8,38	2
			1356,18	**399,0**

- Mapping

The location of the plots will follow the guidance given by the corresponding methodological tool, as well as IPCC Good Practice Guidance for LULUCF (2002), Chapter 4.3.

For the location of the sampling units, the assistance of the QGIS 3.32 Software will be used. Therefore, the digital format is compatible for uploading to GPS navigating equipment. For field measurements, instruments which guarantee precision are used. The DBH will be measured with a haglof calliper and the heights with the Sunnto clinometer. For the location of the plots, a Garmin Etrex Legend GPS navigator

and SW Maps verification application will be used, with the cartographies and plots to be measured previously loaded, so the forest inventory crews can reach the plots accurately.

- Measurements

Each pool will be measured following the methodology procedures and IPCC Good Practice Guidance for LULUCF (2003).

Each source of GHG emissions/removals will be estimated ex post according to the equations described in section 5 and based on the following methods and monitored parameters:

- C_{TREE} (carbon stocks in above and below ground biomass of trees)

It will be estimated based on random sampling method as described in section 3 of validation documentation. For this purpose, V_{TREE} (stem volume of tree) will be calculated applying a manual of procedures developed for local conditions, based on diameter at breast height (DBH) and height (H) measurement in each plot, added to belowground estimations based on default values to be used (see values in section 4.2).

- DBH measuring

By convention, the diameter is measured at 1.30 m from the ground level, so this measure remains standardized independently of the operator and its height. At this height the instrument is also easily to manage. The DBH is a direct measure from which it is possible to calculate the transverse area, the basal area, the individual and total volume, the growth and the form quotient of the tree, and other variables of interest. In the estimating processes that involve the use of regression functions, the DBH is always the first independent variable because of its easy assessment and for presenting normally a high correlation with the volume, weight and other dependent variables.

- ND measuring

In the case of young plantations of Schinopsis, a genus with slow growth periods, neck diameter was measured instead of DBH if the maximum height of some individuals within the plot were less than 1.3mts. Based on Iglesias & Barchuk, 2010; Loguercio & Defossé 2001; Pérez-Cordero & Kanninen 2002 findings, neck diameter or diameter at base height (DBH) is considered more appropriate for young and/or small individuals. All heights values are measured. ND corresponds to the diameter at 10cm from ground level. For those with bifurcations in the base, the quadratic diameter is calculated.

The same applies to young Eucalyptus individuals.

- H measuring

The height of a tree or portion of it is the linear distance along its principal axis, departing from the ground up to the top or up to another referential point, always in conformity with the type of height that is needed to measure. The height serves essentially for the calculation of volume and for the calculation of increases in height and in volume. Total Height refers to the distance between the ground and the apex along the principal axis.

- C_{DW} *(carbon stocks in deadwood):* this stock will not be calculated.

- C_{LI} (cabon stock in litter): is stock will not be calculated

Prior to the start of the inventory, all equipment used during the field work shall be checked and calibrated.

All plots are geo-referenced, using first tree in row 1 in direction to row 2. This first tree is marked with aerosol in order to facilitate future monitoring. All other three trees in plot corners are marked, visible only for monitoring purposes.

The plot is delimited using a 50mts measuring tapes. All trees with more than 50% within plot limit are considered, and at least 10 trees must be included within a plot, if not, third parties should communicate with the employee in charge of monitoring in order to define new plot size. The project will manage the sampling uncertainties evaluating and trying to reduce the type of errors.

Quality assurance and Quality control

The implementation of the monitoring plan includes a QA/QC system to minimize errors in measurement and data analysis, and to provide documentation and consistency in data archiving.

Quality Assurance measures are implemented, in order to verify that data quality objectives are met, and in general, to support the effectiveness of the QC system.

QA/QC plan includes procedures such as (1) hiring experienced third party contractors (2) assuring reliable field measurements, (2) documenting data entry and analysis techniques and (3) data maintenance and archiving.

Unitán has hired third party contractors for the forest inventory, with evidenced experiences but its own personnel will be in charge of monitoring their work. Some of activities aiming at achieving accuracy and precision of data, and transparency of procedures are:

- Development of a Monitoring plan, stating objectives and methodology for contractors to follow
- Clear staff responsibilities and raising awareness about the importance of producing reliable results;
- General training on field measuring for staff in charge of analysing inventories reports;
- Request fully document and archive field and processed data: to ensure data preservation, all relevant monitoring documents (data, data analyses, static factors, photos, images, GIS output and other data) will be stored in electronic and/or paper format and back-ups will be done periodically.

In addition, other measures include the following tasks:

- Measuring the geographical coordinates of the plot vertex with GPS.
- Complete the plot data in the observation sheet.

- Carry out the measurements of DBH and height as described in this document and record the data in the measurement sheet.

Figure 7 below shows an observation sheet used for monitoring during forest inventory

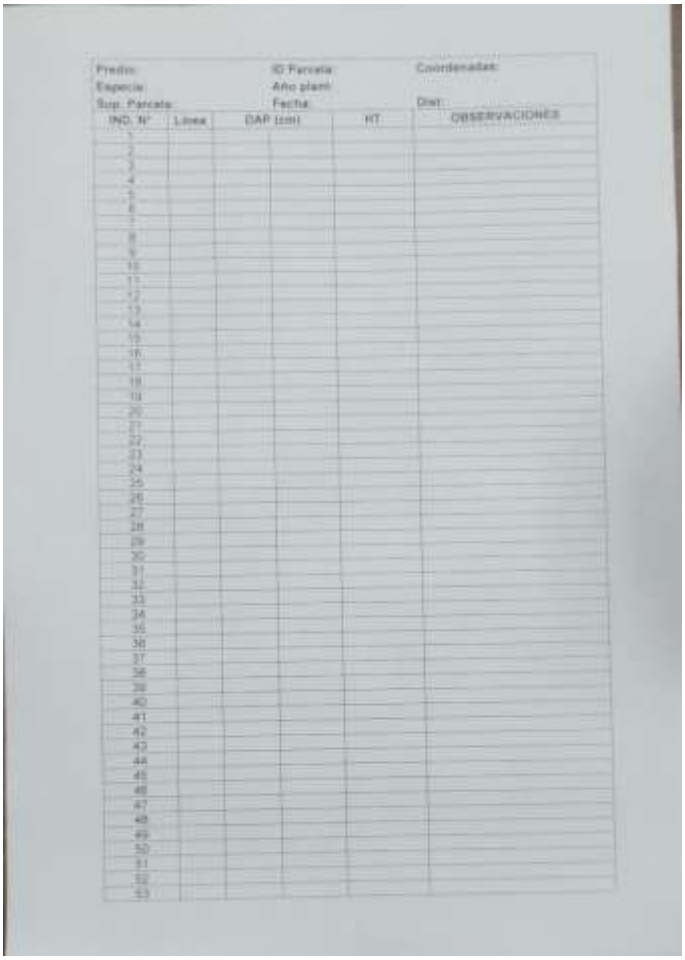


Figure 7: Observation sheet used during forest inventory

To control whether the measured data (DBH and height) of all plots have been correctly transferred to the Excel table and to minimize possible data transfer errors, the hired team of independent experts check whether the data (DBH and height) in the Excel table are realistic and consistent with the documentation sheet.

Plot quality control

To control whether the plots have been established correctly, two systems are used for plot identification: GPS and Cellular with the SW Maps application, for the location of the preliminary sampling points and the geo-referencing of the final points.

During the execution of the monitoring activities, one or more quality control checks may be carried out by Unitán on the service company on site, unannounced and as an audit. In this regard, the quality of the

measurements made in the field shall be checked randomly on measurements of 5% of the plots carried out, using the same data collection form and cross-checking with the attached form:

Fecha								
Establecimiento								
Auditor								
Parcela								
Especie								
Año								
Variables:	Aceptable (si/no)	Comentarios						
Ubicación								
Identificación								
Error DAP								
Error H								

	Individuo (n°)	**Medido**		**Control**		**Error**	
		DAP	**H**	**DAP**	**H**	**DAP**	**H**

The following aspects will be assessed:

- Location: the plot must be identifiable in the field and in accordance with the defined geographical location.
- Identification: the plot must be correctly identified and the area must correspond to the prescribed size.
- Measurement: the measurement sequence must be followed (first inventory data must match tree 1).
- Total height: differences of more than 5% in height measured with clinometer are not acceptable.
- DBH: differences of more than 3% in DBH measured with diameter tape are not acceptable.

- Based on the results obtained, a comparison will be made with the information sent by the inventory contractor, establishing an admissible criterion for variations in results as detailed in the table 8 below.

Table 8: Maximum deviations admitted in plot controls

Criteria	Max deviation admited
DBH	3%
Total H	5%

Considerations

- The contractor will be responsible for the training of the personnel related to the calibration of the instruments, measurement technique and classification of the inventory data, based on the previously established criteria.

- In case of detection of errors greater than the admissible ones, the service company will have to carry out again 100% of the plot.

- The following points are considered to be serious problems:

- Plots registered in the spreadsheet, but not located in the field.

- Plots with incorrectly reported area.

- Errors in the density of trees on the plot._____

Data Storing

Unitán will control the information reported by the contractor by checking the field sheets against the information reported in the calculation files. If differences are found, they will be corrected and the final values will be those considered for the calculation of captured carbon.

All monitoring data are stored electronically and on paper (if available), including the monitoring spreadsheets, the Excel table with the monitoring data, GPS data, data and maps stored and generated in the GIS, spreadsheets, etc.

Forest inventory values, estimations and calculations are stored in company´s cloud system, in special folder, as well as all other company´s information used in other certifications. This will be recorded for at least 5 years, or needed for verification uses.

Organizational structure, responsibilities and competencies.

The organizational structure and responsibilities of Unitán forestry team with regards to the monitoring system are as follow:

- **General Area Director:** has the overall responsibility of the forest project and thus, the monitoring plan;

- **Administrative Coordinator:** general supervision of personnel and approval of system documentation.

- **Property forest manager:** responsible for the operational management; resources monitoring; contractors and forestry inventories monitor; coordination and control of activities; supervision of technical operators; among other activities.

- **Technical operators**: provide access to contractors; supervising activities of contractor's staff inside the property; reporting finding to forests managers.

- **Contractor**: responsible for carrying out the forest inventory, digitalizing the spreadsheets, calculating biomass, redacting the inventory reports and reporting findings to property forest manager.

Project continuation and carbon conservation

As stated in the Non-Permanence Risk Report for the project, the PP´s objective is to continue the project for as many years as possible in order to provide supplies to its industry (both tannin and fuelwood) ensuring sustainable management in line with international demands, meaning the project will not finish once the crediting period is over. *Schinopsis balansae Engl*. has a long rotation period of 40 years or more, and there are very few commercial scale experiences due to this long term factor, and the historic general lack of knowledge on the species characteristics[82]. For this reason, previous to the project implementation, and since 1990, Unitán has been working in a research project planting small areas (average 10ha annually, with a maximum of 46ha in 1997), dedicated to study Schinopsis response and design the project accordingly, and with the intention to extend the project beyond the crediting period.

Moreover, there are many reasons to ensure that once a pasture land is converted into forestry it will remain that way in the long term:

- Due to an increase in the demand for timber and the lack of sustainable management of native forests, these areas are showing difficulty to recover; together with a potential customer´s demand, in the near future, on more sustainable management of resources the company is prone to find supply from plantations avoiding relying on native forest in the future.

- The main source of biomass for the energy plant is tannin industry wood waste but it is not enough, therefore, the company needs Eucalyptus plants to complete the biomass supply. Given the low area with forest plantations in the region, the project will become the main source of biomass for its plant.

- This goes in line with the provincial promotion of biomass plants, which will lead to an increase in industries and services related to forestry, further consolidating the activity and in the long term. If Unitán´s project was to be finished, land would continue under forestry activity by a third party.

[82] https://nordeste.conicet.gov.ar/quebracho-colorado-el-arbol-forestal-argentino-que-era-desconocido-para-la-ciencia/

The previous description shows that the demand for forestry products at a local level will continue in the long term. This, together with the government policies, will promote forestry production in the region, as the Unitán´s project. In summary, all the factors mentioned above represent arguments to ensure that the planted forest will continue after crediting period.

Nevertheless, if the cessation of plantation is the case after the final harvest, measures will be taken in order to manage the land accordingly to avoid carbon emissions.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Since continuation of an activity that has been applied without changes more than 20 years, predominately in the whole project area, it is assumed, in agreement with IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry (2003), Chapter 3 [83], that the net GHG removals by sinks in the baseline equals zero.

Baseline net GHG removals by sinks

According to methodology AR-ACM 0003 v.2.0, section 5.4, baseline net GHG removals by sinks are 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,

$\Delta C_{BSL,t}$	=	Baseline net GHG removals by sinks in year *t*; tCO_2-e
$\Delta C_{TREE\_BSL,t}$	=	Change in carbon stock in baseline tree biomass within the project boundary, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; tCO_2-e
$\Delta C_{SHRUB\_BSL,t}$		

[83] In the case of biomass it is mentioned in Section 3.4.1.1.1.2: "(Note: It is important, in deriving estimates of biomass accumulation rates, to recognize that net changes in biomass stocks will occur primarily during the first years (e.g. 20 years) following changes in management. After which time biomass stocks will tend towards a new steady-state level with little or no change in biomass stocks occurring unless further changes in management conditions occur)." For the case of soil C pools, the maintenance of the same land use, management and input practices imply the use of the same default values in table 3.4.5 for equation 3.4.8

	=	Change in carbon stock in baseline shrub biomass within the project boundary, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; tCO_2-e
$\Delta C_{DW\_BSL,t}$	=	Change in carbon stock in baseline dead wood biomass within the project boundary, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; tCO_2-e
$\Delta C_{LI\_BSL,t}$	=	Change in carbon stock in baseline litter biomass within the project boundary, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; tCO_2-e

As it was demonstrated in the PD during validation, the baseline scenario is the continuation of historic use of land, which consists of extensive cattle grazing and set aside cropland. This means that the project area without the project activity would have remained as pasture land.

Change in carbon stock in baseline tree and shrub biomass within the project boundary

The only existing trees within the Unitán project area are scattered individuals. Those scattered trees present in the project area should not be neither harvested, nor cleared, nor removed; will not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the project activity, and will not be inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored, all of the above throughout the crediting period of the project activity. Furthermore, their continued existence, consistent with the baseline scenario, will be monitored throughout the crediting period of the project activity. The picture bellow shows a scattered individual conserved within a Eucalyptus plot at Ex-Glombovski farm.

In the case of those shrubs-thickets harvested for different given reasons, as the baseline is cattle breeding and there is wide evidence that land would have been subjected to periodic cycles of clearing through slash-and-burn, or clearing-regrowing individuals with a roll pass the biomass is expected to have oscillates between a minimum and a maximum value in the baseline[84,85,86,87,88,89,90].

In summary, taking into consideration the conditions in the AR-TOOL 14 – Section 5 (11 "a" and 12 "f") are met, carbon stock in trees in the baseline can be accounted as zero.

[84] Adámoli, J. et al. (1990) Stress and disturbance: vegetation dynamics in the dry Chaco region of Argentina. Journal of Biogeography, volume 17, pages 491–500

[85] Anriquez, A. et al. (2005) Roller-chopping of shrub-thickets and soil quality in the Western Chaco, Argentina. CI. SUELO (ARGENTINA) 23 (2) 145-157.

[86] Martín, G.O, et al. (2022) El rolado como técnica de manejo de pastizales. Universidad Nacional de Tucumán. Facultad de Agronomía, Zootecnia y Veterinaria, 2023.

[87] Kunst, C. & Bravo, S. (2003) Ecología y régimen de fuego en la región chaqueña argentina. Capítulo 10 en Carbone, L. M, et al. Fuego en los Ecosistemas Argentinos. Sociedad Argentina de Botánica; Folium Relatos Botánicos; 3; 6-2021; 1-21

[88] Kunst, C., et al. (2013) Comportamiento del fuego en un pastizal del sitio ecológico 'media loma', región chaqueña occidental (Argentina). Sitio Argentino de Producción Animal

[89] Bogino, S.M., Bravo, M.B. (2014) Rolling impact on woody plant biodiversity and individual biomass of jarilla (Larrea divaricata) in the Dry Chaco in Argentina. Quebracho Vol.22(1,2):79-87

[90] Ledesma, R., Kunst, C.R (2018) Efecto del rolado de baja intensidad (RBI) sobre la distribución radical de pastos y leñosas en el Chaco occidental. Revista de Investigaciones Agropecuarias, ISSN 0325-8718, ISSN-e 1669-2314, Vol. 44, Nº. 2.

Change in carbon stock in baseline dead wood and litter biomass within the project boundary

Likewise, it is expected that the dead wood and litter carbon pools will not increase in the baseline. Finally, the change in carbon stock in SOC may be conservatively assumed to be nil since it is unlikely to increase in the baseline extensive.

In summary, and based on IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry (2003), given that the activity of the identified baseline scenario has been the same for the last decades, it is assumed that the net GHG removals by sinks in the baseline are nil.

$$DC_{BSL,t} = 0$$

5.2 Project Emissions

The monitoring period of this report is from August 16th , 2021 to August 9th, 2024, which is the date the last parcel from the inventory was measured. The actual net greenhouse gas removals by sinks were estimated using the following equation described in the methodology:

$$\Delta C_{ACTUAL} = \Delta C_P - GHG_E$$

Where,

ΔC_{ACTUAL} = Actual net greenhouse gas removals by sinks; tCO2-e

ΔC_p = Sum of the changes in above-ground and below-ground tree biomass, dead wood, litter and soil organic carbon stocks in the project scenario; tCO2-e

GHG_E = Increase in GHG emissions as a result of the implementation of the proposed A/R CDM project activity within the project boundary; tCO2-e

Stratification:

Stratification was defined according to section 5.3 of the "AR-ACM0003 A/R Consolidated Large Scale Methodology Afforestation and reforestation of lands except wetlands Version 02.0". The methodology states that if the distribution of biomass in the project area is not homogeneous, stratification should be performed to improve the accuracy of biomass estimation.

For actual net GHG removals, for the areas monitored under this monitoring event, apart from the stratification originally based on the project planting plan -considering the year of plantation- and the species combination, a sub-stratification was considered for planting densities, as well as new strata for the area affected by fires.

GHG project emissions:

According to methodology AR-ACM 0003 v.2.0, section 5.5, GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero.

The use of fire for site preparation and/or to clear the land of harvest residue prior to replanting will not take place as the project does not include harvesting, thus excluded from the project management. On the other hand, during this monitoring period, a natural fire event occurred, so the GHG project emissions from the event were calculated based on Methodological tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" Version 4.0 using equation 6 for Non-Co2 emissions resulting from forest fires.

$$GHG_{FF,t} = GHG_{FF\_TREE,t} + GHG_{FF\_DOM,t}$$

Where,

$GHG_{FF,t}$	= Emission of non-CO2 GHGs resulting from forest fire, in year t; t CO2-e
$GHG_{FF\_TREE,t}$	= Emission of non-CO2 GHGs resulting from the loss of aboveground biomass of trees due to forest fire, in year t; t CO2-e
$GHG_{FF\_DOM,t}$	= Emission of non-CO2 GHGs resulting from the loss of dead organic matter due to forest fire, in year t; t CO2-e

Emission of non-CO2 GHGs resulting from the loss of aboveground tree biomass due fire is calculated using the above ground biomass in trees of relevant strata in last verification and a combustion factor:

$$GHG_{FF\_TREE,t} = 0.001 * \sum_{i=1}^{M} A_{BURN,i,t} * b_{TREE,i,J_L} * COMF_i * \left(EF_{CH4,i} * GWP_{CH4} + EF_{N2O,i} * GWP_{N2O}\right) \quad (7)$$

Where,

$GHG_{FF\_TREE,t}$	= Emission of non-CO2 GHGs resulting from the loss of aboveground biomass of trees due to forest fire, in year t; t CO2-e
$A_{BURN,i,t}$	= Area burnt in stratum i in year t; ha

The area burnt was measured using GIS data based on the identified area after the fire event, adjusted based on the area affected identified during the forest inventory.

$b_{TREE\ i,tL}$ = Mean aboveground tree biomass per hectare in stratum i in year tL which is the year in which last verification was carried out before occurrence of the fire; t d.m. ha-1

Where aboveground biomass of living trees is not burnt by fire, $b_{TREE,i,t}$ may be set equal to zero.

Area affected by fire
(based on forest inventory in july 2024)

						Project emissions	
Species	YOP	Original stratum	New stratum	Area (ha)	Wi	btreei (tdm/ha) only ABG	ABG (tdm) verified burnt
Eucalyptus híbrido	2017	2	24	40,95	0,05	11,04	452,15
	2018	3	25	28,56	0,03	71,11	2621,80
			29	8,38	0,01		
	2019	4	27	123,57	0,14	30,73	3685,16
Eucalyptus varios	2021	6	28	31,12	0,04		
	2018	12	26	15,45	0,02	21,11	312,81

$COMF_i$ = Combustion factor for stratum i; dimensionless.

The value used is 0.45, the value used in the National GHG Emission Report[91] for cultivated forests and based on IPCC 2006 Guidelines.

$EF_{CH\ 4,i}$ = Emission factor for CH4 in stratum i; g CH_4 (kg dry matter burnt)-1

The value used is 0.68, the value used in the National GHG Emission Report[92] for cultivated forests and based on IPCC 2006 Guidelines.

$GWP_{CH\ 4}$ = Global warming potential for CH_4; dimensionless

Default value of 21 is used based on methodology tool.

[91] Table 562. *Parámetros y factores de emisión para la categoría 3C1 – Quema de biomasa* available in https://unfccc.int/sites/default/files/resource/argentina-bur5.pdf
[92] Table 562. *Parámetros y factores de emisión para la categoría 3C1 – Quema de biomasa* available in https://unfccc.int/sites/default/files/resource/argentina-bur5.pdf

$EF_{N\ 20,i}$ = Emission factor for N_2O in stratum i; g N2O (kg dry matter burnt)-1

The value used is 0.20, the value used in the National GHG Emission Report for cultivated forests and based on IPCC 2006 Guidelines as the case for methane emission factor.

$GWP_{N\ 20}$ = Global warming potential for N_2O; dimensionless

Default value of 310 is used based on methodology tool.

I = 1, 2, 3 … M strata

T = 1, 2, 3, … years elapsed since the start of the project activity

According to the toll, where PPs elected at validation not to account for dead organic matter pool, the dead organic matter stock is considered zero and non-CO2 GHG emissions from fire are not accounted; in this case dead wood is not included. Hence, $GHG_{FF\_DOM,\ t}$ are estimated as zero.

$$GHG_{FF,t} = GHG_{FF\_TREE,t} + GHG_{FF\_DOM,t}$$

$GHG_{FF,t}$ = 126.43 + 0

$GHG_{FF,t}$ = 126.43

Carbon stock changes:

ΔCP is the sum of the changes in above-ground and below-ground tree biomass, dead wood, litter and soil organic carbon stocks in the project scenario. Calculations are described below:

$$\Delta C_P = \Delta C_{TREE} + \Delta C_{DW} + \Delta C_{LI} + \Delta C_{SOC}$$

Where,

ΔC_p = Change in carbon stock in all selected carbon pools in the project scenario, tCO2-e

ΔC_{TREE} = Change in carbon stock in tree biomass in project, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; tCO2-e

ΔC_{DW} = Change in carbon stock in dead wood biomass in project, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; tCO2-e

ΔC_{LI} = Change in carbon stock in litter biomass in project, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; tCO2-e

ΔC_{SOC} = Change in carbon stock in SOC in project, in areas of land meeting the applicability conditions of the tool "Estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities", as estimated in the same tool; tCO2-e

Neither ex-ante estimations, nor this monitoring period estimations accounted for dead wood, litter and soil organic carbon pools in the project. Following is presented the equation used for the estimation of ΔCP:

$$\Delta C_P = \Delta C_{TREE}$$

Where:

ΔC_p = Change in carbon stock in all selected carbon pools in the project scenario; tCO2-e

ΔC_{TREE} = Change in carbon stock in tree biomass in project, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; tCO2-e

Biomass carbon pools

Above and below ground biomass have been estimated according to the AR TOOL 14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity Version 4.2". Carbon estimations in trees are based on field measurements of monitored parameters, described in section 4.1 for this monitoring period. Calculations are archived as part of the project verification and will be available for the verification team[93].

The aboveground biomass corresponds to tree biomass, no shrubs are considered for estimation. The method used for estimating change in carbon stock in trees is in section 8.1.1 of the mentioned tool: "Difference of two independent stock estimations", using estimation based on sample plots, in this case random stratified sampling.

[93] See calculation spreadsheet in shared folder "Calculations>ERR carbon calculations"

Plot biomass measurement

First, based on Appendix 1 (Methods of plot biomass measurement) of the tool, the plot biomass value was determined as follows, based on the results from the forest inventory for the monitoring period:

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

$$B_{TREE,p,i} = \sum_{j} B_{TREE,j,p,i}$$

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

Where,

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

$B_{TREE\ p,l}$ = Tree biomass in sample plot *p* of stratum *i*; t.d.m.

$A_{PLOT\ l}$ = Size of sample plot in stratum *i;* ha

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

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

Tree biomass (BTREE) is estimated using:

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

$$B_{TREEj,p,i,t} = V_{TREEj,p,i,t} * D_J * BEF_{2,J} * (1 + R_J)$$

Where:

$B_{TREE,j,p,i,t}$ = Biomass of tree of species j in sample plot p of stratum i, at mid-2021

f_j = Above-ground biomass of the tree returned by the allometric equation for species j relating the measurements of tree l to the above-ground biomass of the tree; t d.m.

Rj = Root shoot ratio for tree species j;dimensionless

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.

Note, if trees have grown as coppice regeneration after a harvest, then the value of R_j should be multiplied by a factor equal to $V_{harvest}/V_{tree}$ or 1, whichever is greater, where $V_{harvest}$ is the volume per hectare of trees harvested and V_{tree} is the volume per hectare of trees standing in the plot at the time of measurement

$V_{TREE,j,p,i,t}$ = Stem volume of tree species using field measurements of tree parameters (DBH, neck diameter, height), default values (tree shape factor) and complemented with worksheets data processing (interpolation of non-measured heights); m3.

In this case, the applied equation for stem volume estimation (V_{tree}) is an equation which considers DBH and H of the inventoried plantation.

For *Eucalyptus*, the equation used is the one recommended for Northeast region by the National Institution of Agricultural Technology (INTA) from Glade J (1984)[94]:

V_{TREE} (dm3) = exp(-3.11072 + 1.83316. LN(DBH)+ 1.07762 LN(H))

For the case of *Schinopsis balansae*, given there is limited data available, the allometric equation used is the one by Atanasio et al. 2013[95]:

[94] Reference from "Normas de inventario forestal para los planes de manejo predial. Proyecto de implantación de un modelo de desarrollo forestal sustentable en Argentina y Uruguay". INTA 2006 and "Curso: Principios técnicos para el cultivo de especies Forestales de Entre Ríos Planificación, Inventario y cubicación" INTA and Ministerio de Agroindustria, 2017. In reference N° 82 of shared Google Drive folder

[95] Atanasio, et al. (2013) Determinación de biomasa aérea en Quebracho Colorado Santiagueño (*Schinopsis* quebracho colorado Schlencht), en el Chaco Semiárido. ISSN 1669-6786 4to Congreso Forestal Argentino y Latinoamericano Iguazú 2013. PONENCIAS. Trabajo Nº 24. INTA. In reference N° 85 in shared Google Drive folder

Above-ground total biomass (t.d.m)= 0.05619*DBH^2.7152.

While the *Schinopsis* plantations are young and do not reach the minimum BDH values, a modified version of the allometric equation by Atanasio et al. 2013 will be used replacing DBH values in equation with neck diameter. Given for these verification period the plantations are young and some individuals are less than 1.3m tall, the biomass for these was estimated based on neck diameter, 10 cm above ground.

According to the methodology, for ex-post estimation, the volume equation used must be demonstrated to be appropriate for the purpose of estimation of tree biomass by applying the tool "Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in A/R CDM project activities". The appropriateness of the equations is demonstrated through the satisfaction of the following conditions, in the sense that the formula is very generic and applicable in any case:

- The equation has been used for volume estimation for the same specie for more than 10 year is commercial forestry industry, demonstrated by the fact that the equation for used for Eucalyptus is the one promoted by the national agroindustry Ministry and INTA for, at least, the last 15 years for commercial plantation inventories (as stated in reference 63).

- In the case of *Schinopsis* plantations, the equation used is provided by the National Institution for Agricultural Technology (INTA), based on a sample of 15 trees at Almirante Brown Department, Chaco for *Schinopsis* quebracho colorado Schlencht given the lack of data for *Schinopsis balansae*, but can be considered extrapolated to *Schinopsis* balansae. Given there is limited data available Atanasio et al. is considered over the Second National Native Forest Inventory (INBN2)[96] as the latest only counts with a general equation not differentiating by species, area, age, or others:

V_{TREE}= -0.09996+0.00057954*DBH^2 (V being stem volume over bark)[97]

D_j = Basic wood density of tree species j. This parameter was established as "available at validation", although changed in this verification, thus it was not measured or monitored. The value was corresponds to Clone 44 and 78 of Eucalyptus grandis, and a default value from INTI for *Schinopsis*[98]. In this last case, Dj is not used as the allometric equation results in total biomass values (kg).

$BEF_{2,j}$ = Biomass expansion factor for conversion of stem biomass to above-ground tree biomass, for tree species j (Pinus sp.); dimensionless.

[96] Volume for *Schinopsis balasae:* Segundo Inventario Nacional de Bosques Nativos (INBN2). Informe Región Forestal Parque Chaqueño. Primera revision. 2020. Section with equation at: Annex 4. Table 34. Available at: https://www.argentina.gob.ar/ambiente/bosques/segundo-inventario-nacional-bosques-nativos.

[97] Source for the equation: PINBN analysis

[98] INTI report Available at: https://www.inti.gob.ar/publicaciones/descargac/365+&cd=1&hl=es&ct=clnk&gl=ar

The BEF2 is to be used in connection to growing stock biomass data and not with increment data, as described in chapter 3.2 of the GPG for LULUCF (2003)). The value was also available at validation and not monitored. In line with the tool used, a conservative value of 1.15 is used for Eucalyptus. In the case of Schinopsis, the allometric equation used results in total above-ground biomass (kg) so BEF parameter is not used. Still a conservative approach will be taken, if needed, using temperate broadleaf values instead of tropical, taking into consideration the project is subtropical climate and that *Schinopsis* diameter is less than 10cm during the first 20 years. So, we are reducing and maintaining BEF to 2 (temperate broadleaf average and minimum range for tropical broadleaf) throughout the rotation.

A summary of key data used for calculations is detailed below:

		Key data	Reference
		0,47	IPCC "Good Practice Guidance for LULUCF", 2006. Table 4.3.
Biomass Expansion Factor (BEF)	*Eucalyptus*	1,15	IPCC "Good Practice Guidance for LULUCF", 2003. Table 3A.1.10. Annex 3A.1.
	Schinopsis balansae	2,00	Table 3A.1.10 of IPCC GPG-LULUCF 2003 for Schinopsis
Wood density (tn/m3)	*Eucalyptus hybrid*	0,549	Clone 44 and 78 Basic density average - Regional Nursery clone information sheet
	Eucalyptus various	0,549	Clone 44 and 78 Basic density average - Regional Nursery clone information sheet
	Schinopsis balansae	1,2	INTI-CITEMA wood density report for Schinopsis balansae
		fi=a*(-1,085+0,9256*lnBj/B	CDM_AR_tool_14. "Estimation of carbon stocks and change in carbon stocks of trees
		3,67	CDM_AR_tool_12. "Estimation of carbon stocks and change in carbon stocks in dead

		Comments	Reference
Eucalyptus gpc	*((DBH)+ 1.07762 LN(H))*	Volume with bark	Glade, J. (1984)
Eucalyptus various	*((DBH)+ 1.07762 LN(H))*	Volume with bark	Glade, J. (1984)
Schinopsis balansae		Total biomass dry weight	Atanasio, et al. 2013

Mean tree biomass per hectare in a stratum (b_{TREE}) and the associated variance (si^2) was estimated as follows:

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

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

Where,

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

n_i = Number of sample plots in stratum *i*

S_i^2 = Variance of mean tree biomass per hectare in stratum i; (t d.m. ha-1)

Strata biomass measurement

In line with this method, mean carbon stock in trees within the tree biomass estimation strata and the associated uncertainty was estimated as follows:

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

$$B_{TREE} = A \times b_{TREE}$$

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

$$u_C = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^{M} w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$$

Where,

C_{TREE} = Carbon stock in trees in the tree biomass estimation strata; tCO_2-e

CF_{TREE} = Carbon fraction of tree biomass; t C $(t.d.m)^{-1}$

A default value of 0.47was used.

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

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

b_{TREE} = Mean tree biomass per hectare in the tree biomass estimation strata; t.d.m ha^{-1}

w_i = Ration of the area of stratum *i* to the sum of areas of tree biomass estimation strata (i.e. $w_i=A_i/A$); dimensionless

b_{TREEi} = Mean tree biomass per hectare in stratum *i*; t.d.m. ha^{-1}

Uc = Uncertainty in C_{TREE}

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

s_i^2 = Variance of tree biomass per hectare across all sample plots in stratum *i*; (t.d.m. $ha^{-1)}$ ^2

n_i = Number of sample plots in stratum *i*

Summary results per stratum are shown below:

	Strata	Average AGB (Ton/ha)	Average AGB+BGB (Ton/ha)	Average C Tree (tCO2e/ha)	Standard deviation AGB Biomass (Ton/ha)	Area measured	Number plots
Eucalyptus hybrid	1	105,595	130,747	225,320	26,70	0,57	19
Eucalyptus hybrid	2	64,261	80,188	138,191	7,49	0,06	2
Eucalyptus hybrid	3.1	51,019	63,852	110,039	14,15	0,93	31
Eucalyptus hybrid	3.2	61,835	77,180	133,006	20,17	0,06	2
Eucalyptus hybrid	4	49,622	62,127	107,066	15,37	0,30	10
Eucalyptus hybrid	5	27,358	34,549	59,539	10,54	1,68	56
Eucalyptus hybrid	6.1	10,677	13,655	23,532	7,32	1,53	51
Eucalyptus hybrid	6.2	18,972	24,122	41,570	0,77	0,12	4
Eucalyptus hybrid	7.1	5,283	6,838	11,785	3,42	1,26	42
Eucalyptus hybrid	7.2	10,961	14,026	24,172	8,55	0,06	2
Eucalyptus hybrid	8.1	0,852	1,115	1,921	1,58	0,36	12
Eucalyptus hybrid	8.2	0,661	0,886	1,527	0,71	0,06	2
Eucalyptus hybrid	9						
Eucalyptus hybrid	10						
Eucalyptus various	11						
Eucalyptus various	12.1	46,370	58,120	100,160	12,71	0,39	13
Eucalyptus various	12.2	28,894	36,467	62,845	11,43	0,12	4
Schinopsis balansae	13	0,967	1,286	2,217	0,85	0,88	22
Schinopsis balansae	14	6,328	8,093	13,947	8,64	0,28	7
Schinopsis balansae	15	1,839	2,428	4,185	1,14	0,12	3
Schinopsis balansae	16.1	2,155	2,835	4,885	1,31	0,48	12
Schinopsis balansae	16.2	6,068	7,861	13,547	0,00	0,04	1
Schinopsis balansae	17	0,273	0,370	0,638	0,31	0,24	6
Schinopsis balansae	-						
Schinopsis balansae	19	0,274	0,375	0,646	0,14	0,28	7
Schinopsis balansae	20	0,022	0,032	0,056	0,01	0,28	7
Schinopsis balansae	21						
Schinopsis balansae	22						
Euca/Quebracho 1125	23.1	22,320	28,303	48,775	3,21	0,12	4
Euca/Quebracho 1000	23.2	18,324	23,307	40,166	3,85	0,06	2
Eucalyptus hybrid 2017 regrowth	24	18,795	23,889	41,169	5,15	0,45	15
Eucalyptus hybrid 2018 regrowth	25.1	25,871	32,732	56,408	2,30	0,09	3
Eucalyptys hybrid 2018 regrowth	25.2	18,923	24,038	41,426	5,77	0,09	3
Eucalyptus various 2018 regrowth	26	14,009	17,886	30,823	6,30	0,21	7
Eucalyptus hybrid 2019 regrowth	27	9,376	12,046	20,759	3,44	1,14	38
Eucalyptus hybrid 2021 regrowth	28	10,635	13,619	23,469	5,82	0,30	10
Eucalyptus hybrid 2018 regrowth	29	11,557	14,809	25,521	2,30	0,06	2
	Total general					12,62	399

Regarding uncertainty values, considering a tval of 1.966, the uncertainty assessed for CTREE was equal to 6.8 %, based on equation 2 of the used tool:

$$u_{\Delta C} = \frac{\sqrt{\left(u_1 \times C_{TREE,t_1}\right)^2 + \left(u_2 \times C_{TREE,t_2}\right)^2}}{|\Delta C_{TREE}|}$$

5.3 Leakage Emissions

As it has been stated in previous sections of this document, the methodology requires the assessment of sources of leakage due to activity displacement (conversion from grazing land to forestry). Application of the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" led to the conclusion that this source can be neglected.

The Project activity does not expect any displacement of agricultural activities present in the Project´s boundary before the beginning of it, thus leakage emissions are considered insignificant and hence accounted as zero. This is so as the total area under project activity is not afforested in the same year, first areas were planted in 2016, and the last ones in 2025. The impact of this staggered plantation plan substantially reduces the eventual grazing displacement, cattle that has to be moved to other areas can be put in farms that were not afforested or in areas that have more than two/three years with plantation owned by Unitán.

According to the methodology AR-ACM 0003 v.2.0, section 5.6, leakage emissions shall be estimated as follows:

$$LK_t = LK_{AGRIC,t}$$

Where:

LKt = GHG emissions due to leakage, in year *t*; tCO_2-e

$LK_{AGRIC,\,t}$ = Leakage due to the displacement of agricultural activities in year t, as estimated in the toll "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"; tCO_2-e

According to the "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" tool v.2, leakage emission attributable to the displacement of agricultural activities due to implementation of an A/R CDM project activity is estimated as the decrease in carbon stocks in the affected carbon pools of the land receiving the displaced activity.

Leakage emission attributable to the displacement of grazing activities under the following conditions is considered insignificant and hence accounted as zero:

a. Animals are displaced to existing grazing land and the total number of animals in the receiving grazing land (displaced and existing) does not exceed the carrying capacity of the grazing land;
b. Animals are displaced to existing non-grazing grassland and the total number of animals displaced does not exceed the carrying capacity of the receiving grassland;
c. Animals are displaced to cropland that has been abandoned within the last five years;
d. Animals are displaced to forested lands, and no clearance of trees, or decrease in crown cover of trees and shrubs, occurs due to the displaced animals;
e. Animals are displaced to zero-grazing system.

For the case of Unitán Project, condition "a" applies. For the only property with remaining animals present at time of plantation, cattle can keep grazing the land until the moment of plantation. Then, the cattle will be transferred to grazing lands within the same property or others owned by Unitán, but not within the project´s boundary. This scheme is possible given the effective area to

be covered with new forests and the rate of plantation. Regarding plantation rate, activities will be carried out in 9 years meaning that by the third year of plantations, the cattle could go back to the areas planted in the first year. If this area is not enough to hold 100% of the cattle then part of it could stay in other grazing lands within the property. Since the type of production carried out in this region is extensive, the carrying capacity of the grazing land was not reached before the project start date. Therefore, the cattle could be moved to the unplanted areas or to neighbour farms without exceeding the carrying capacity. During these monitoring period, cattle has been reintroduced in Don Antonio, Glombovsky and Doña Virginia farms.

In the case of the two properties with set aside croplands, these took place prior to Unitán buying the properties. Given the baseline analysis, where cattle breeding is the most preferable activity in the region, together with the fact that the cotton plantation activities had already been abandoned prior to Unitán acquiring the land it is concluded that the displacement of agricultural activities are considered insignificant and hence accounted as zero.

$LK_t = 0$

Beyond all, we believe the application of the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" is not necessary. The application of the "Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant", which was superseded by the previously mentioned tool, resulted in the conclusion that the project will not cause any displacement of the activity occurring before project implementation.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

Net anthropogenic GHG removals by sinks is estimated as the actual net GHG removals by sinks minus the baseline net GHG removals, minus leakage. The following general formula described in the methodology is used to calculate the net anthropogenic GHG removals by sinks of an A/R project activity, in t CO2-e:

$$C_{AR-CDM} = \Delta C_{ACTUAL} - \Delta C_{BSL} - LK$$

Where:

C_{AR-CDM}	=	Net anthropogenic GHG removals by sinks; tCO_2-e
ΔC_{ACTUAL}	=	Actual net GHG removals by sinks; tCO_2-e
ΔC_{BSL}	=	Baseline net GHG removals by sinks; tCO_2-e
LK	=	Total GHG emissions due to leakage; tCO_2-e

As previously mentioned, baseline emissions and leakage can be considered null for this verification period.

Based on the methodology and parameters detailed in section 4.1 to 5.3, for this monitoring period carbon stocks equal 61,156 tCO_2. Having used the methodology based on the difference of two independent stock estimations, change in carbon stock in trees is estimated as follows:

$$\Delta C_{TREE} = C_{TREE,t_2} - C_{TREE,t_1}$$

Where:

$C_{TREE,t1}$ = Carbon stock in trees as estimated at time t1; t CO2e

$C_{TREE,t2}$ = Carbon stock in trees as estimated at time t2; t CO2e

Bearing in mind that $C_{TREE,t1}$ equaled 11,335 tCO_2, net anthropogenic GHG removals by sinks, before uncertainty or project emissions discounts, equals 49,820 tCO_2e as a result of actual net GHG removals by sinks for the strata considered during this monitoring period, as there is no baseline removals nor leakage emissions. If project emissions are deducted, then the removals VCU equal 54.023, and 39.433 after buffer pool deductions.

Regarding buffer pool allocation, the table below summarizes the value considered:

State the non-permanence risk rating (%)	27 %	
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes	☐ No
For ARR and IFM projects with harvesting, state, in tCO_2e, the Long-term Average (LTA).	120.432	
Has the LTA been updated based on monitored data, if applicable?	☒ Yes	☐ No
State, in tCO_2e, the expected total GHG benefit to date.	70,373	

If a loss occurred (including a loss event or reversal), state the amount of tCO_2e lost:	3,041.82 tCO_2

In summary, total VCU issuance eligible per vintage for this second monitoring period are shown in the table below:

Vintage period	Baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Leakage emissions (tCO_2e)	Buffer pool allocation (tCO_2e)	Reductions VCUs (tCO_2e)	Removals VCUs (tCO_2e)	Total VCU issuance (tCO_2e)
16-Aug-2021 to 31-Dec-2021	0	-6,806	0	1,838	0	-6,806	4,967
01-Jan-2022 to 31-Dec-2022	0	-18,006	0	4,862	0	-18,006	13,144
01-Jan-2023 to 31-Dec-2023	0	-18,133	0	4,896	0	-18,133	13,236
01-Jan-2024 to 09-Aug-2024	0	-11,078	0	2,992	0	-11,078	8,086
Total	0	-54,023	0	14,588	0	-54,023	39,433

These are calculated on linear basis for the Net anthropogenic removals for the monitoring period, taking into consideration the days included for each year.

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
16-Aug-2021 to 31-Dec-2021	42,726	-6,806	-84.1	A higher surface was initially projected to be planted by this period.
01-Jan-2022 to 31-Dec-2022	39,546	-18,006	-54.5	Fire event that affected biomass of different vintages plus a higher surface was projected to be planted by this period.
01-Jan-2023 to 31-Dec-2023	49,288	-18,133	-63.2	Fire event that affected biomass of different vintages plus a higher surface was

				projected to be planted by this period.
01-Jan-2024 to 09-Aug-2024	-2,801	-11,078	495.5	No thinning nor harvest took place as initially stated.
Total	86,033	-54,023	-37.2	

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Section	Information	Justification
	No commercially sensitive information	

APPENDIX 2: SUSTAINABLE DEVELOPMENT GOALS – DONATIONS and EVENTS

SUSTAINABLE DEVELOPMENT GOALS – DONATIONS and EVENTS

Date	Recipient	Items donated	More information
July 13th, 2018	San Luis Rey parish	Clothes	"2018_Donation Parish"
August 23rd, 2020	San Luis Rey parish	Food	"2020_Donation Parish"
December 21st, 2020	Social Service "Hostería del Niño Jesús"	Food	"2020_Donation Hostería Niño Jesús"
May 11th, 2021	Local kindergarten	Two flags	"2021_Donation kindergarten"
May 31st, 2021	Caritas Argentina	Financial contribution	"2021_Donation Caritas"
August 14th, 2021	San Luis Rey parish	Food	"2021_Donation Parish"
August 17th, 2021	Manuel Belgrano School	Chalks	"2021_Donation Manuel Belgrano" and "2021_Donation Manuel Belgrano 2"
August 19th, 2021	Municipality of Puerto Tirol	Candies for the children's day celebration	"2021_Donation Municipality Puerto Tirol" and "2021_Donation Municipality Puerto Tirol 2"
August 20th, 2021	Free Baccalaureate for Adults "Indigenous Peoples"	School supplies	"2021_Donation Free Baccalaureate for Adults"
August 27th, 2021	Food pantry		"2021_Donation Merendero Móvil"
September 20th, 2021	Fundraiser "Más por menos"	Financial contribution	"2021_Donation Más por menos" and "2021_Donation Más por menos 2"
September 24th, 2021	Ferro Voley team	Food	"2021_Donation Ferro Voley"
October 6th, 2021	School N°57 in Puerto Tirol	Seedlings	"2021_Donation EFP N57"
December 14th, 2021	San Luis Rey parish	Food	"2021_Donation Parish 2"
December 20th, 2021	San Luis Rey parish	Financial contribution	"2021_Donation Parish 3"
June 7th, 2022	Caritas Argentina	Financial contribution	"2022_Donation Caritas"
July 29th, 2022	San Luis Rey parish	Food	"2022_Donation Parish"
September 20th, 2022	Fundraiser "Más por menos"	Financial contribution	"2022_Donation Más por menos"
December 15th, 2022	Free Baccalaureate for Adults Puerto Tirol	Medals for best average	"2022_Donation Free Baccalaureate for Adults"

2023	Anunciación de María parish	Clothes	"2023_Donation Anunciación de María Parish 5"
February 23rd, 2023	Anunciación de María parish	Swimming and teaching elements	"2023_Donation Anunciación de María Parish" and "2023_Donation Anunciación de María Parish 2"
March 16th, 2023	Domingo Fautino Sarmiento sports club	Financial contribution	"2023_Donation Domingo Sarmiento Club" and "2023_Donation Domingo Sarmiento Club 2"
July 21st, 2023	Anunciación de María parish	Clothes	"2023_Donation Anunciación de María Parish 3" and "2023_Donation Anunciación de María Parish 4"
February 23rd, 2024	Domingo Fautino Sarmiento sports club	Financial contribution	"2024_Donation Domingo Sarmiento Club"
April 12th, 2024	Domingo Fautino Sarmiento sports club	Financial contribution	"2024_Donation Domingo Sarmiento Club 2"
June 5th, 2024	Manuel Belgrano School	Disused crusher blades	"2024_Donation Manuel Belgrano"
June 10th, 2024	Domingo Fautino Sarmiento sports club	Financial contribution	"2024_Donation Domingo Sarmiento Club 3"
August 19th, 2024	San Luis Rey parish	Food	"2024_Donation Parish"
August 27th, 2024	Municipality of Formosa	Wooden posts	"2024_Donation Municipality Formosa" and "2024_Donation Municipality Formosa 2"
August 30th, 2024	Municipality of Puerto Tirol	Candies for the children's day celebration	"2024_Donation Municipality Puerto Tirol" and "2024_Donation Municipality Puerto Tirol 2"
Community events			
2022	Local tree plantation - Community	Trees	"2022_Donation Trees"
September 28th, 2022	Puerto Tirol environment event	Seedlings	"2022_Donation Seedlings"
2023	Local tree plantation - Community	Trees	"2023_Donation Trees" and "2023_Donation Trees 2"
2024	Puerto Tirol Sports Competition	Event inputs	"2024_Donation Sport Competition"

189

28/09/22

Se realizó la décima Marcha Aeróbica en Puerto Tirol por el cuidado ambiental

Distintas instituciones educativas de Puerto Tirol llevaron a cabo, junto a docentes, alumnos, padres y vecinos, una jornada de concientización sobre el cuidado del ambiente. Una de las actividades centrales fue la recorrida por los distintos murales emplazados en la localidad, acompañados por referentes de la Fundación Huaqo que guiaron el itinerario y explicaron el sentido de las obras en cada punto.

La siguiente parada fue en el club Independiente de Tirol, donde la empresa Unitán entregó plantines de árboles a los asistentes.

Hubo juegos, números artísticos y clase a cielo abierto. Los cursos de cada colegio recolectaron y entregaron residuos reciclables como cartones y envases de plástico y de vidrio.

Esta iniciativa fue declarada de interés provincial por la Honorable Cámara de Diputados de la Provincia del Chaco mediante Resolución 1739/22.

Los organizadores "agradecieron especialmente el acompañamiento de las supervisoras Simona Espósito y Cintia Stacul, de la Dirección Regional X-C a cargo de la profesora Griselda Quiles, a la empresa Unitán, Dirección de Tránsito del municipio de Puerto Tirol y al diputado provincial Hugo Sager.

La Marcha Aeróbica fue un éxito. Recorrieron murales de la localidad de Puerto Tirol, acompañados por la Fundación Huaqo.

También participaron niños en el evento que reunió a docenas de vecinos.

Evidence of participation in sustainable development education with learners and teachers of local communities (ODS 4.7)

Evidence of trees plantations with local communities to mitigate and adapt to climate change (ODS 11b)

Native and non-native plantations in project area. See sections 1.1, 3, 4 and 5 in this document, for evidence on the progress toward sustainable forestry (ODS 15.2) with area afforested and reforested and section 5 for evidence on ODS 13 regarding CO_2 sequestration.

APPENDIX 3: IDENTIFIED STAKEHOLDERS

N°	Name	Stakeholder type	Intitution/ profession	Province	Locality
1	Victor Franco	Regional Government	Forestry program	Formosa	Formosa
2	Raul Ritter	Private sector	Program REDD + and Unitán personel	Formosa	Formosa
3	Patricia Britos	Education Institution	Forest engineer School President	Formosa	Formosa
4	Dante Boldorini	Private sector	Contractor and neighbor	Formosa	Villa Dos Trece
5	Hugo Demchuk	Private sector	Contractor	Formosa	Villa Dos Trece
6	Andrés Armando Peyro	Private sector	Producer, neighbor, politician and rura	Formosa	Villa Dos Trece
7	Antonio Sbardella	Neighbor	Producer and neighbor	Formosa	Villa Dos Trece
8	Carlos Scheffer	Neighbor	Producer and neighbor	Formosa	Villa Dos Trece
9	Lorenzo Schmidt	Local Government	Villa 213 Mayor	Formosa	Villa Dos Trece
10	Daniela Boldorini	Private sector	Rural school director	Formosa	Villa Dos Trece
11	Daniel Eichenberger	Neighbor	Unitán personel	Formosa	Formosa
12	Ricardo Cristanchi	Neighbor	Unitán personel	Formosa	
13	Guillermo Bernal	Neighbor	Unitán personel	Formosa	
14	Carla Vega	Regional Government	Dirección de bosques	Formosa	Formosa
	LISTA DE ACTORES PAMPA ALMIRON				
15	Gladys lilian (picilli)	Regional Government	Pampa Almirón Mayor	Chaco	Pampa Almiron
16	Javier Waldemar Candela (jav	Private sector	Contractor and neighbor	Chaco	Pampa Almiron
17	Julio A martinez	Neighbor	Producer and neighbor	Chaco	Pampa Almiron
18	Rosso, Cesar	Neighbor	Producer and neighbor	Chaco	Pampa Almiron
19	Retamozo, Francisco	Project developer	Unitan personal	Chaco	Pampa Almiron
	LISTA DE ACTORES MARGARITA BELÉN				
20	Horacio Frey haciendas	Neighbor	Producer and neighbour	Chaco	Margarita Belén
21	Nestor Sosa	Private sector	Contractor	Chaco	Margarita Belén
22	De los Santos, Kevin	Project developer	Unitan personal	Chaco	Margarita Belén
23	Ivan Vera	Private sector	Contractor and neighbor	Chaco	Margarita Belén
24	Marcelo Repetto	Private sector	Producer (cattle breeder)	Chaco	Margarita Belén
	LISTA DE ACTORES PTO TIROL				
25	Gustavo Vazquez	Regional Government	Forest Director	Chaco	Pto. Tirol
26	Gabriela Acosta	Neighbor		Chaco	Pto. Tirol
27	Cr Hipolito Beveraggi	Regional Government	Undersecretary of Industry	Chaco	Pto. Tirol
28	Juan Lentati	Educacion Institution	Teacher	Chaco	Pto. Tirol
29	Maria Elina Serrano	Neighbor		Chaco	Pto. Tirol
30	Luis Holbash	Neighbor		Chaco	Pto. Tirol
31	Claudia Gronda	Neighbor		Chaco	Pto. Tirol
32	Araceli Arias	Education Institution	Teacher	Chaco	Pto. Tirol
33	Lucas Vera	National Government	DNDFI technician	Chaco	Pto. Tirol
	Lucas Vera	Research Institution	Universidad de Sgo del Estero - Forest	Chaco	Pto. Tirol
34	Marisa Osorio	Neighbor		Chaco	Pto. Tirol
35	Flavia Encinas	Neighbor		Chaco	Pto. Tirol
36	Pablo Stasewsky	Private sector		Chaco	Pto. Tirol
37	Humberto Pompert Bangher	Local Government	Puerto Tirol Mayor	Chaco	Pto. Tirol
38	Maria Natividad Canal	Neighbor		Chaco	Pto. Tirol
39	Norma Bordon	Neighbor		Chaco	Pto. Tirol
40	Alicia Mottirov	Education Institution	Vicedirectora Escuela de Educación T	Chaco	Pto. Tirol
41	Norma Silva	Education institution	Teacher	Chaco	Pto. Tirol
42	María Sanchez	Neighbor		Chaco	Pto. Tirol
43	Claudia Montiel	Neighbor		Chaco	Pto. Tirol
44	Marcelino Maidana	Neighbor		Chaco	Pto. Tirol
45	Nancy Cardozo	Neighbor		Chaco	Pto. Tirol
46	Raul Vera	Neighbor		Chaco	Pto. Tirol
47	Carlos Silva	Neighbor		Chaco	Pto. Tirol
48	Cristian Aquino	Neighbor	Unitán personel	Chaco	Pto. Tirol
49	Ricardo Campos Winkler	Neighbor	Unitán personel	Chaco	Pto. Tirol
50	Ariel Lopez Mato	Project developer	Unitán personel	Chaco	Pto. Tirol
51	Paola Bellucci	Project developer	Unitán personel	Chaco	Pto. Tirol
52	Silvio Battaglia	Neighbor	Unitán personel	Chaco	Pto. Tirol
53	Gustavo Ferrer	Neighbor	Unitán personel	Chaco	Pto. Tirol
54	Victor Vega	Research Institution	IIFA (Chaco)	Chaco	Resistencia
	LISTADO DE ACTORES - OTROS				
55	Edgardo Pagani	Project developer	Unitán personel	Bs. As.	Bs. As.
56	Martin Orcellet	Project developer	Unitán personel	Bs As.	Bs. As.
57	Antonio Gil	Project developer	Unitán personel		

APPENDIX 4: COMMUNICATION REGISTRY

Date	Media	Topic	More information
2021	Newspaper	Research in plantations	• Evidence "2021_Research in plantations"
July 20th, 2021	Radio 104.9 "Amadeus"		• https://ar.radiocut.fm/audiocut/entrevista-ariel-lopez-mato-unitan/
August 2nd, 2021	Newspaper "Diario Norte"	Reforestation	• Evidence "2021_Reforestation-Diario Norte" • Online: https://www.diarionorte.com/207848-unitan-reforesto-1600-hectareas-de-quebracho-colorado-y-eucaliptus
October 16th, 2021	Newspaper "Diario Norte"	Afforestation actions alongside kindergartens	• Evidence "2021_Afforestation actions kindergartens"
November 29th, 2021	Newspaper	Forestation	• Evidence "2021_Forestation Tirol"
December, 28th, 2021	Newspaper "Diario Norte"	Update in the certification process	• Online: https://www.diarionorte.com/213243-las-forestaciones-de-unitan-certificaran-bonos-de-carbono-en-el-2022-
February 24th, 2022	Radio AM1420 "Economía imperfecta"		• https://ar.radiocut.fm/audiocut/ariel-lopez-mato-en-economia-imperfecta-unitan/
March 2nd, 2022	Newspaper "El Comercial"	PEFC Chain of Custody Certification	• Evidence "2022_PEFC Certification-El Comercial" • Online: https://www.elcomercial.com.ar/14626-unitan-ha-sido-reconocida-con-una-nueva-certificacion-internacional
November 4th, 2022	Facebook "Federación Económica del Chaco"	Carbon credits and forestation in Unitán	• Evidence "2022_Federación Económica del Chaco"
January 4th, 2023	Newspaper "Diario Norte"	Carbon credits in Unitán	• Online: https://www.diarionorte.com/226377-a-traves-de-un-programa-de-forestacion-unitan-saica-certifico-bonos-de-carbono • Evidence "2023_Carbon credits in Unitán-Diario Norte"

Date	Media	Topic	More information
September 2nd, 2023	Newspaper "La Mañana"	Forestation plan	• Online: https://www.xn--lamaanaonline-lkb.com.ar/noticia/76540/la-fbrica-unitn-est-presente-en-ms-de-50-mercados-internacionales-y-avanza-con-su-plan-de-forestacin/ • Evidence "2023_Forestation plan-La Mañana"
November 10th, 2023	Newspaper "Libertad Digital"	Meeting with Governor of Chaco	• Evidence "2023_Meeting with Governor of Chaco-Libertad Digital" • Online: https://libertaddigital.com.ar/Notas/Nota/2013016867-zdero-se-reunio-con-directivos-de-la-taninera-unitan
March 6th, 2024	Newspaper "AgroPerfiles"	Carbon credits and reforestation in Unitán	• Online: https://agroperfiles.com.ar/bonos-de-carbono-y-reforestacion-firmes-objetivos-de-unitan/
August 13th, 2024	Aapresid congress	Unitán's productive development model	• Evidence "2024_Aapresid congress-AgroPerfiles" • Online: https://agroperfiles.com.ar/unitan-expuso-sobre-su-modelo-de-desarrollo-productivo/
October 10th, 2024	Email	Unitán's carbon certification project	• Evidence "2024_ Email Javier Waldemar"

VISITS to UNITÁN´S PROJECT REGISTRY

Date	Visitors	More information
2021	Council of Agronomist Engineers of Chaco	• "2021_Council of Agronomist Engineers"
May 18th, 2021	Electromechanical Engineering students from the National University of the Northeast (UNNE)	• "2021_UNNE"
June 2nd, 2021	Undersecretary of Labor and Undersecretary of Health	• "2021_Undersecretary of Labor and of Health"
July 1st, 2021	Provincial Deputy Livio Gutiérrez	• "2021_ Provincial Deputy Gutiérrez"
July 1st, 2021	Provincial Deputy Juan José Bergia	• "2021_ Provincial Deputy Bergia" and "2021_Provincial Deputy Bergia Facebook post"
July 1st, 2021	Provincial Deputy Liliana Spoljaric	• "2021_ Provincial Deputy Spoljaric"
July 29th, 2021	President of the National Institute of Industrial Technology (INTI), Rubén Geneyro	• "2021_INTI" and "2021_INTI Newspaper"
August 3rd, 2021	President of the Chaco Chamber of Foreign Trade, Pablo Stazewsky	• "2021_ Chamber of Foreign Trade"
August 20th, 2021	Representatives of the National University of the Northeast (UNNE)	• "2021_UNNE Representatives"
September 22nd, 2021	President of the Institute of Forestry and Agricultural Research (IIFA), Hector Ferrario	• 2021_IIFA"
December 7th, 2021	Representatives of the National University of the Northeast (UNNE)	• "2021_UNNE Representatives 2"
December 7th, 2021	Multiple visitors during 2021	• "2021_Multiple visitors Newspaper"
2022	Professors and students of Environmental Management of the Barranqueras Institute	• "2022_Barranqueras Institute"
March 10th, 2022	President of the Forestry and Agricultural Research Institute of the Chaco Province (IIFA)	• "2022_IIFA"
April 20th, 2022	National Deputy Gerardo Cipolini	• "2022_National Deputy"
May 16th, 2022	Multiple visitors	• "2022_Multiple visitors"
October 26th, 2022	Students of the Faculty of Forestry Sciences of the University of Santiago del Estero	• "2022_ University of Santiago del Estero" and "2022_ University of Santiago del Estero Newspaper"
November 14th, 2022	Forestry Engineer Sebastián Robbiani	• "2022_Forestry Engineer"
2023	Chemical Engineering students from the National Technological University	• "2023_National Technological University"
March 16th, 2023	Eng. Francisco Torres from the Argentine Forestry Association (AFOA)	• "2023_Argentine Forestry Association"
May 5th, 2023	Multiple visitors	• "2023_Multiple visitors"

Date	Visitors	More information
September 29th, 2023	Federal Investment Council (CFI)	• "2023_CFI"
2024	Delegate of the National Directorate of Industrial Forestry Development	• "2024_Delegate of the National Directorate of Industrial Forest"
May 23rd, 2024	Chemical Engineering students from the National Technological University	• "2024_National Technological University"
June 6th, 2024	Students from Felipe Varela School	• "2021_Felipe Varela"
June 13th, 2024	Dr. Omar López Mato	• "2024_Dr. Omar López Mato"
July 3rd, 2024	Students of the Higher Technical Degree in Environmental Management and Technical Degree in Social Economy and Local Development	• "2024_Technical Degree Students"

APPENDIX 5: DEMONSTRATION OF NO FOREST REPLACEMENT

Figures from the Joint PDD-MR reported at validation to demonstrate no forest replacement.

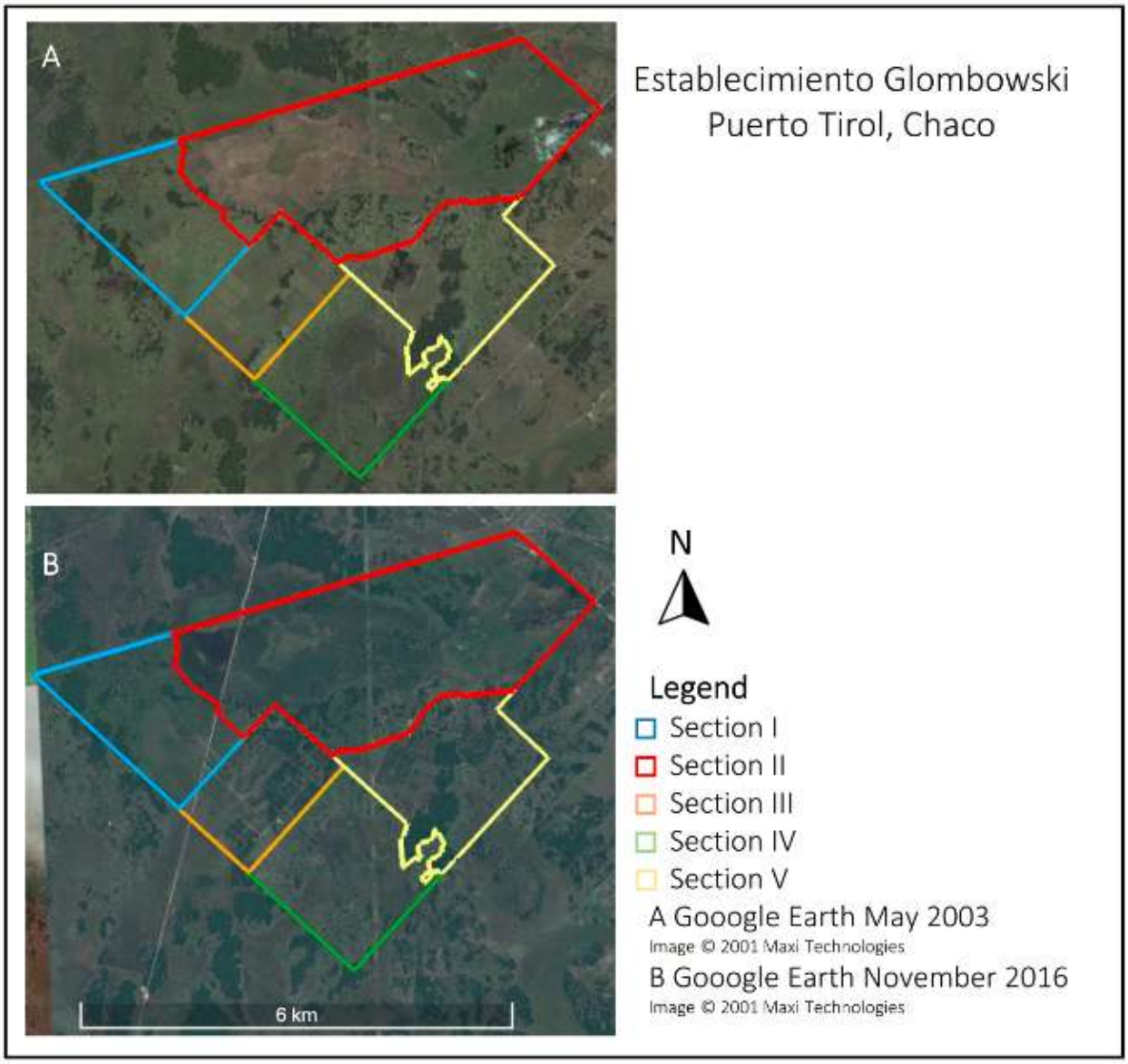


Figure 9. Satellite images for Ex-Glombosvky property sections for year 2003 and 2016

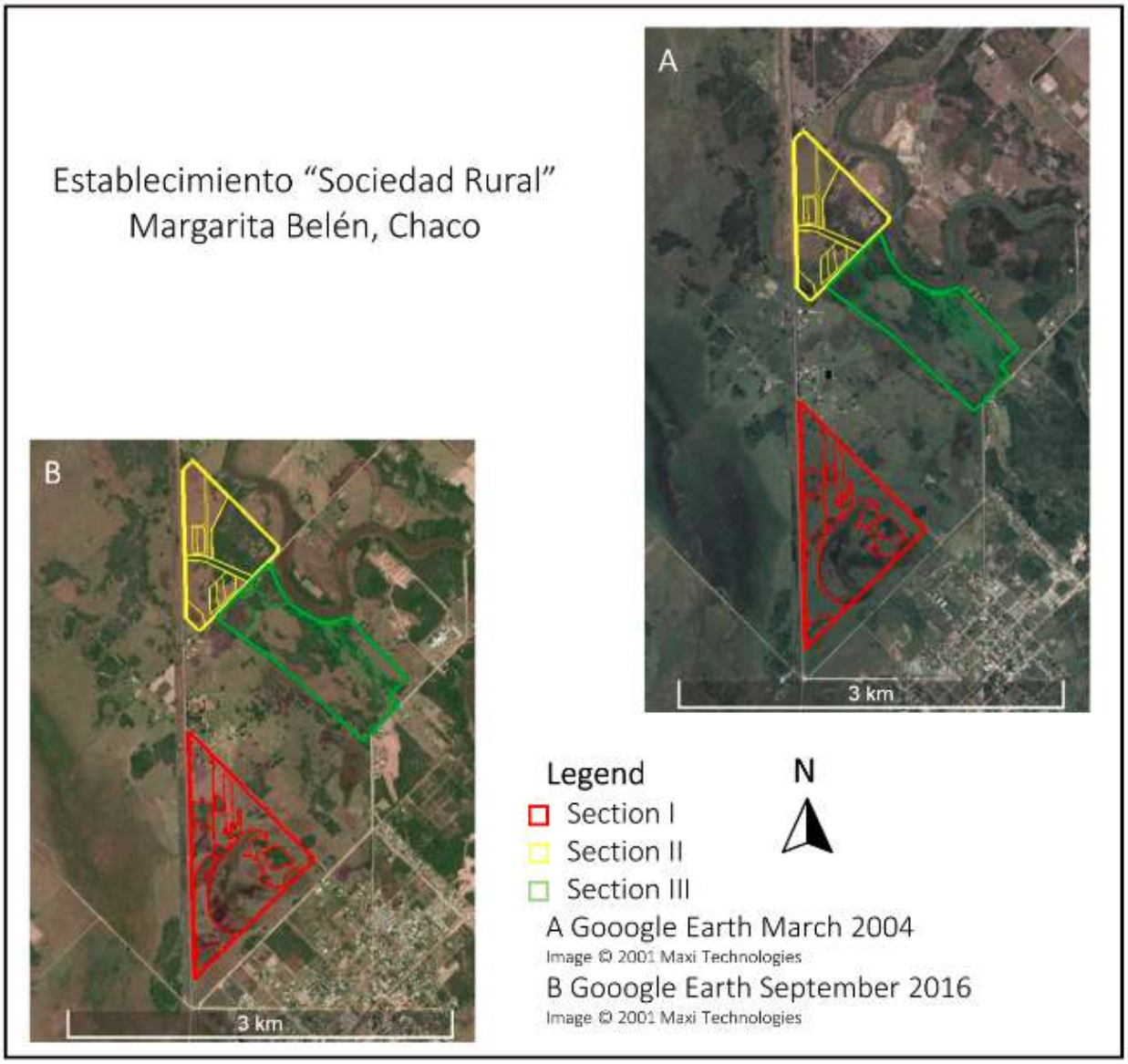


Figure 10. Satellite images for Sociedad Rural property sections for year 2004 and 2016

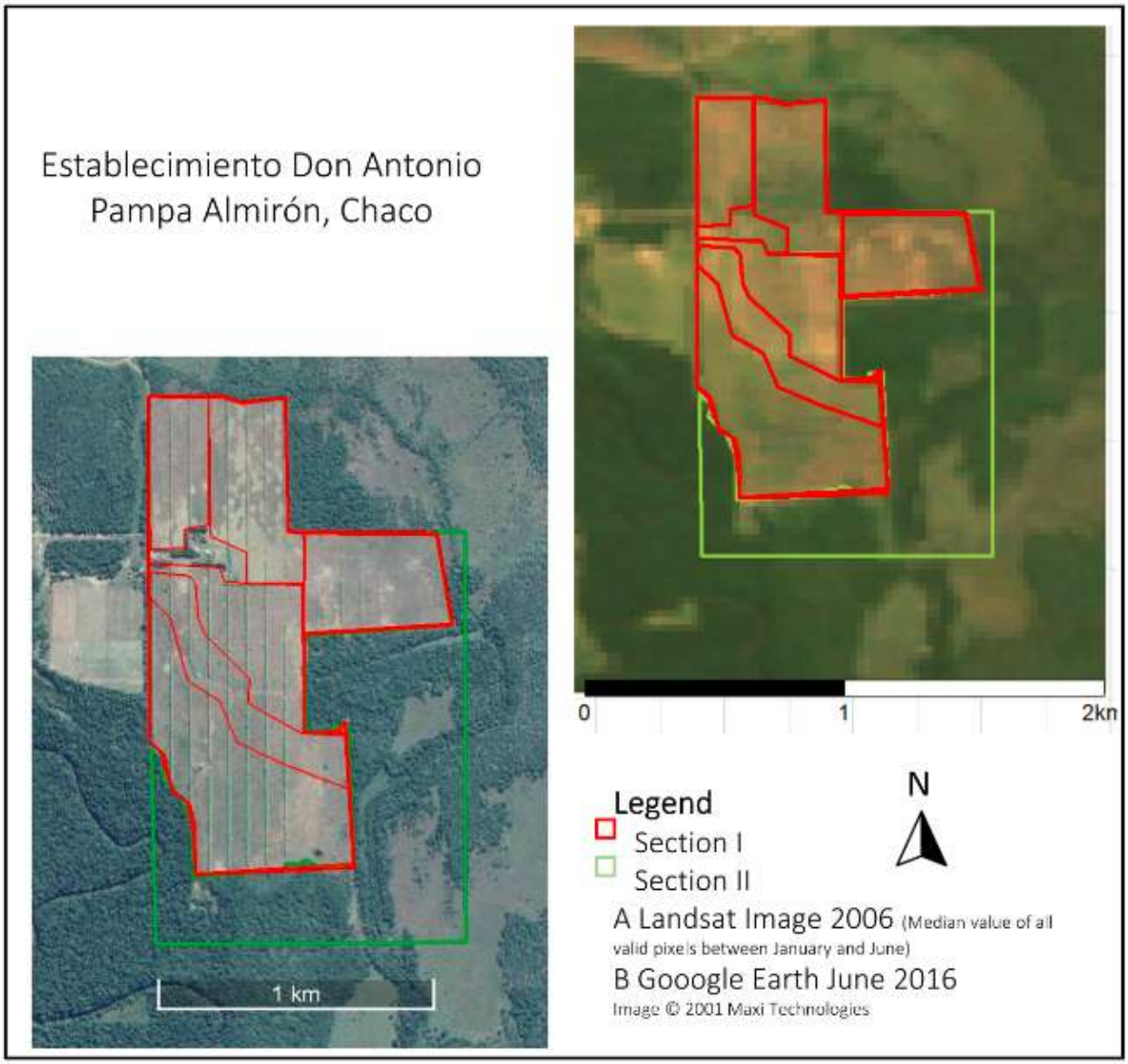


Figure 11. Satellite images for Don Antonio property sections for year 2006 and 2016

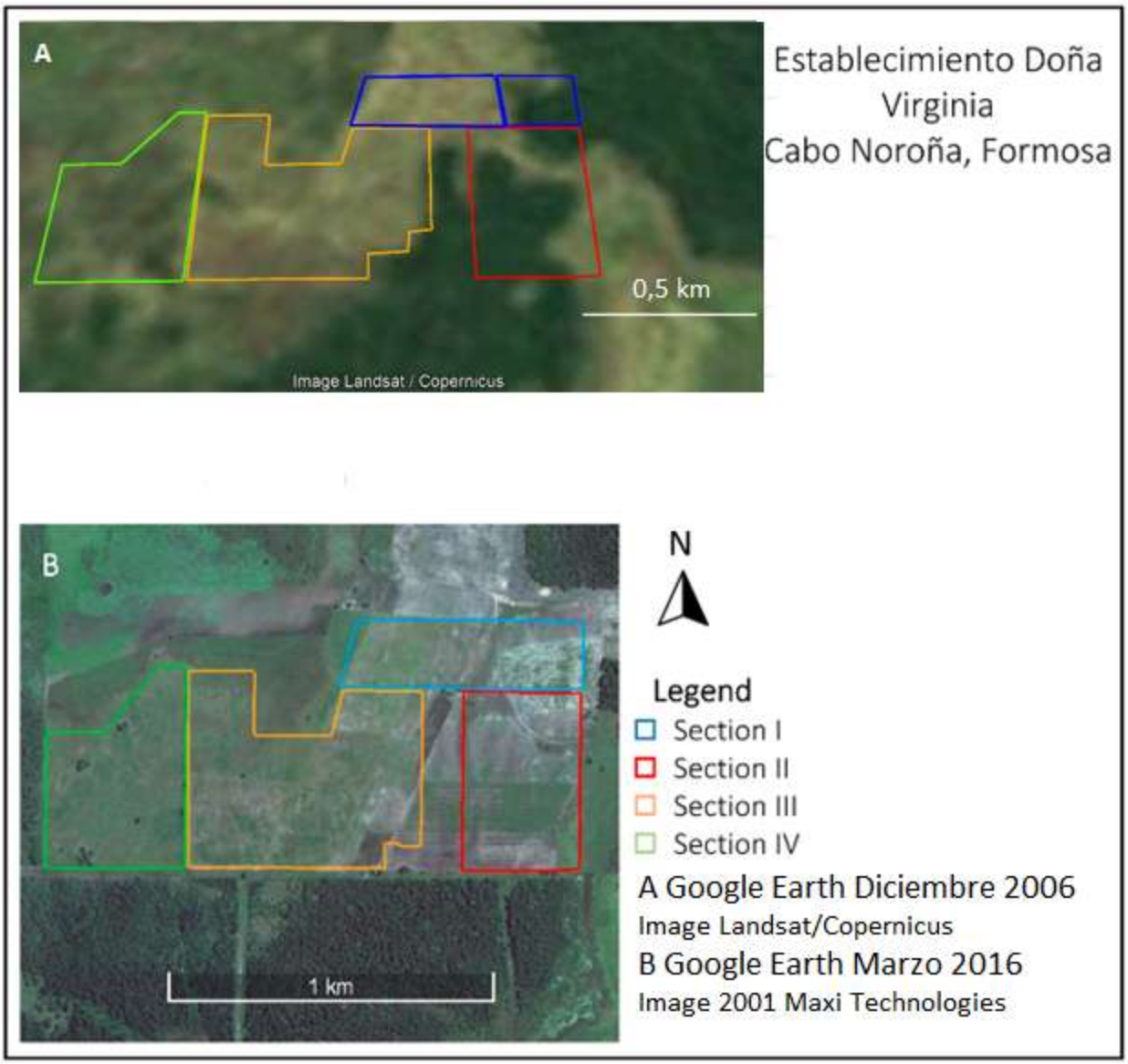


Figure 12. Satellite images for Doña Virginia property sections for year 2006 and 2016-.

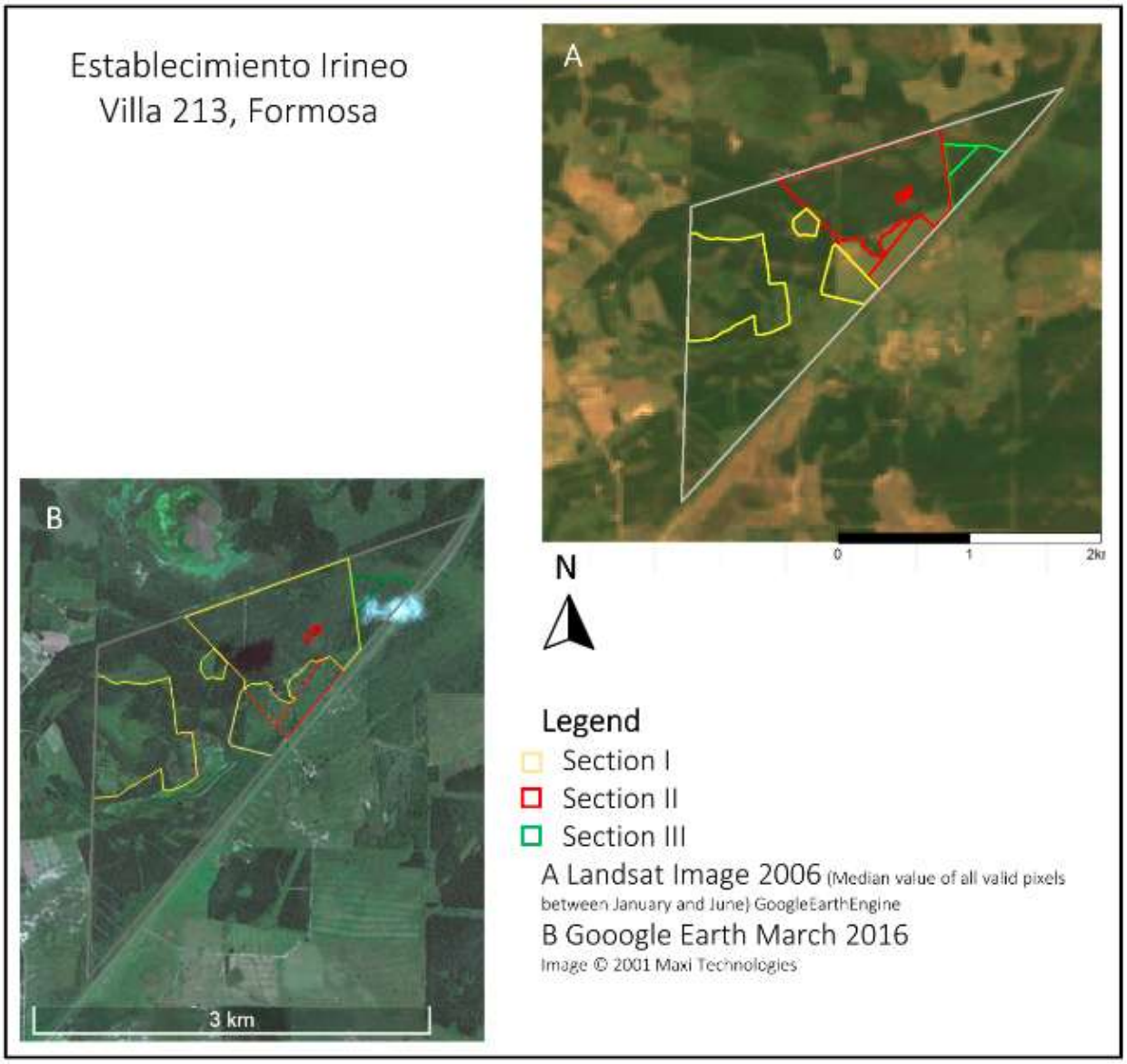


Figure 13. Satellite images for Irineo property sections for year 2006 and 2016

APPENDIX 6: GRIEVANCE REDRESS PROCEDURE

Given the project was registered under a previous version of the VCS Standard and that the PDD template did not include a detail of the grievance redress procedure, this appendix has been added to include section 2.1.4 of the joint PD/MR template form and detail the procedure for the project.

Development process	The grievance redress procedure was developed by the project proponent, taking into consideration current regulations and the ILO Conventions and is updated as needed. It was communicated during the public consultation and the procedure is accessible in the forest management plan.
Grievance redress procedure	Unitán has designed a form to register the complaints that come from the community regarding the plantation project and is available both at the farms as well as the company´s offices. Grievances may also be received through the webpage or company´s phone. In the event of complaints formulated by stakeholders, they will be registered in the mentioned form, and their response will be resolved within a period to be determined according to the type of grievance. Depending on the nature of the grievance, the area to be involved in its resolution. The Intitutional Relations Department will be responsible for handling and following the grievance redress procedure with the corresponding areas. Depending on the cause of the complaint or claim, the Institutional Relations Department may request the initiation of corrective action, according to UNITÁN SAICA guidelines. Once the complainant is informed of the solution to the problem or the actions that will be taken to prevent its recurrence, the Department closes the complaint or claim, it is signed by the parties. The grievance is published and filed. Step 5.4.9 of the Procedure states that if a resolution is not reached within the affected party and the corresponding area, a mediation stage will start and a third party mediator

will be involved. The mediator is chosen based on the nature of the grievance as it seeks to be someone with experience in the subject. The Intitutional Relations Department has 30 days to coordinate this mediation.

If the mediation referred to fails to reach an agreement, the parties will have the opportunity to pursue any administrative or judicial remedies they deem appropriate. These include:

i) initiate judicial proceedings (before the competent judicial body of the state),

ii) initiate arbitration proceedings before an arbitrator competent in the matter and impartial.

APPENDIX 7: EVIDENCE OF THE PUBLIC STATEMENT

PLAN DE MANEJO AMBIENTAL, FORESTAL Y SOCIAL

GALERÍA DE IMÁGENES

Unitán cumple con un ambicioso plan de forestación tanto en Quebracho Colorado como en diversas variedades de Eucaliptos (Cloeziana y otros híbridos). A la fecha tiene casi 3.000 hectáreas forestadas con unos 4.500.000 de árboles entre las provincias de Chaco y Formosa.

Nuestro compromiso es aumentar la superficie forestada en unas 300 hectáreas por año. Con esto alcanzará a totalizar 10.000.000 de árboles en unos años.

Unitán ha certificado este proyecto para la emisión de Bonos de Carbono (VCU), y es la primera empresa argentina en emitir Bonos de Carbono por forestación de especies nativas. Este proyecto, certificado por VERRA, implica fijar 330.000 toneladas de CO2. Se han incorporado a nuestras forestaciones el manejo silvopastoril, la actividad apícola y la plantación de gramíneas para mejorar aun mas la fijación de carbono y el mejoramiento de los suelos.

En esta Galería de Imágenes se pueden observar algunos de los procesos de preservación y reforestación en los que Unitán trabaja desde hace treinta años.

DECLARACION PUBLICA: "En el marco de la certificación, créditos de carbono pueden llegar a ser emitidos a través del proyecto 2610 del VCS para la remoción de gases de efecto invernadero asociado a Unitán y parte de sus productos fónicos."

Plan de Manejo Forestal, Ambiental y Social 2021.

El cultivo del quebracho colorado.

El Pacto de Gestión Forestal Sostenible.

Política de Cadena de Custodia PEFC.