



**Verified Carbon
Standard**

REFORESTATION WITH TEAK – CO₂E TEAKMEX

Document Prepared by

South Pole Carbon Asset Management Ltd

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Reforestation with Teak – CO₂e TEAKMEX is an afforestation, reforestation, and revegetation (ARR) grouped project located in the Mexican states of Tabasco, Chiapas, and Campeche. Its main objective is to mitigate climate change through carbon sequestration in teak (*Tectona grandis*) forest plantations. The project aims to promote the sustainable development of the forestry sector by providing fair job opportunities, recovering degraded soils from livestock and agriculture, and conserving natural forest areas within the project area to enhance and protect local biodiversity.

The project crediting period is 36 years, starting on June 30, 2013, and ending on May 31, 2049. On average, the project has a net emission removal potential of 25,329 metric tons of carbon dioxide equivalent per year (tCO₂e/yr),¹ with the total for the entire period being 911,831 tCO₂e.² The eligible project area has an extension of 6,246.07 hectares (ha), with the first project phase covering 3,743.06 ha of this; the second project phase covering 2,355.67 ha; and the third project phase covering the remaining 147.34 ha. The first phase consists of 97 properties distributed across the municipalities of Tenosique, Huimanguillo, Balancán, Candelaria, Carmen, and Palenque, while the second consists of 31 properties across Balancán, Candelaria, Carmen, Escárcega, Tenosique, Salto de Agua, and Palenque. The third phase consists of one property in the municipality of Carmen.

The objective of this document is to describe the project activities implemented during the third monitoring period, starting on October 22, 2020, and ending on October 25, 2022, and to verify 291,590 tCO₂e of net greenhouse gas (GHG) emissions reduction achieved from *T. grandis* plantations. In order to monitor and mitigate the negative impacts of the project, the following activities have been developed during the monitoring period: optimization of planting area selection; improvement of nursery techniques; implementation of a water supply system for irrigation; improvement of protocols for the control of pests and diseases; and the optimization of thinning techniques. Ultimately, the project generated 1085 jobs and supported local communities in attaining basic needs, such as providing formal employment opportunities in regions largely characterized by informality, especially during planting, monitoring activities, and the maintenance of its conservation areas.

¹ According to the ex-ante estimations updated for present verification (see Section 3.2.2.2) before any deductions for buffer credits.

² Until reaching the LTA, before any deductions for buffer credits.

The audit history of the project, including the period of this monitoring report, is presented in Table 1:

Table 1: Audit History of the Project

Audit Type	Period	Program	Validation/Verification Body Name	Number of years
Validation/ Verification	30-June-2013 -- 01-October-2017	Verified Carbon Standard (VCS)	AENOR Internacional, S.A.U	4
Second Verification	16-October-2017-- 21-October-2020	VCS	Aster Global Environnemental Solutions, Inc.	3
Third Verification	22-October-2020 to 25-October-2022	VCS	Ruby Canyon Environmental Inc.	2
Total				9

1.2 Sectoral Scope and Project Type

The project corresponds to VCS sectoral scope 14 'Agriculture, Forestry and Other Land Use' (AFOLU) as an ARR grouped project.

1.3 Project Proponent

Organization name	Agropecuaria Santa Genoveva S.A.P.I. de C.V.
Contact person	Víctor Hugo Fernández
Title	General Director
Address	Carretera Cayal Nohyaxche Km 87, Alfredo V. Bonfil, Campeche, C.P. 24570, México
Telephone	+(52) 981 813 2066
Email	victor.fernandez@genoveva.com.mx

1.4 Other Entities Involved in the Project

Organization name	South Pole Carbon Asset Management Ltd.
Role in the Project	South Pole creates and oversees the development of appropriate project design and monitoring techniques in line with VCS guidelines.
Contact person	Maria Fernanda Buitrago
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1.5 Project Start Date

The project began on June 30, 2013. Seeding activities began on this date at Doña Carmina farm.³

1.6 Project Crediting Period

For the current grouped project, the crediting period is 36 years⁴. This period started on June 30, 2013, and ends on May 31, 2049.

1.7 Project Location

The expansion region of the grouped project covers the Mexican states of Tabasco, Chiapas, and Campeche (see Figure 1).

³ See [Supporting documents \Start date]

⁴ See internal procedure document: Plantation management plan [Supporting Docs\PMA]

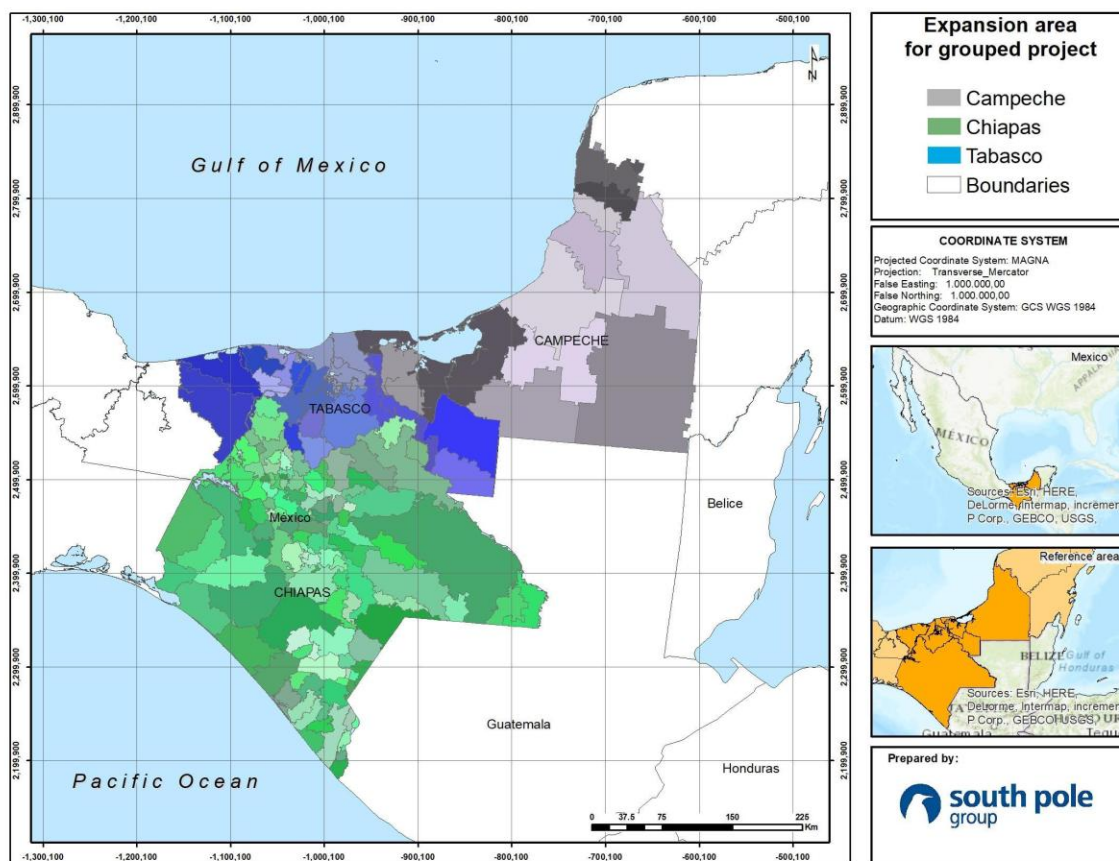


Figure 1: Project Area

1.7.1 Project Area

In the first phase of the grouped project, the eligible project area spans 3,743.06 ha across 97 properties in five municipalities: 16 properties in Balancán (Tabasco); 54 properties in Huimanguillo (Tabasco); 13 properties in Tenosique (Tabasco); two properties in Palenque (Chiapas); and 12 properties in Candelaria (Campeche).⁵

In the second phase, the grouped project area spans 2,355.67 ha across five properties in the municipalities of Balancán (Tabasco), 11 properties in Candelaria (Campeche), three properties in Carmen (Campeche), four properties in Escárcega (Campeche), six properties in Tenosique (Tabasco), one property in Salto de Agua (Chiapas), and one property in Palenque (Chiapas).⁶

In the third phase, the grouped project area spans 147.34 ha across one property in the municipality of Carmen (Campeche).

⁵ Joint Project Description & Monitoring Report, Reforestation with Teak CO₂e TEAKMEX. (2018).

⁶ Monitoring Report, second verification. Reforestation with Teak – CO₂e TEAKMEX. (2021).

The location of the project area in the first, second and third phases of the grouped project are presented in Figure 2.⁷

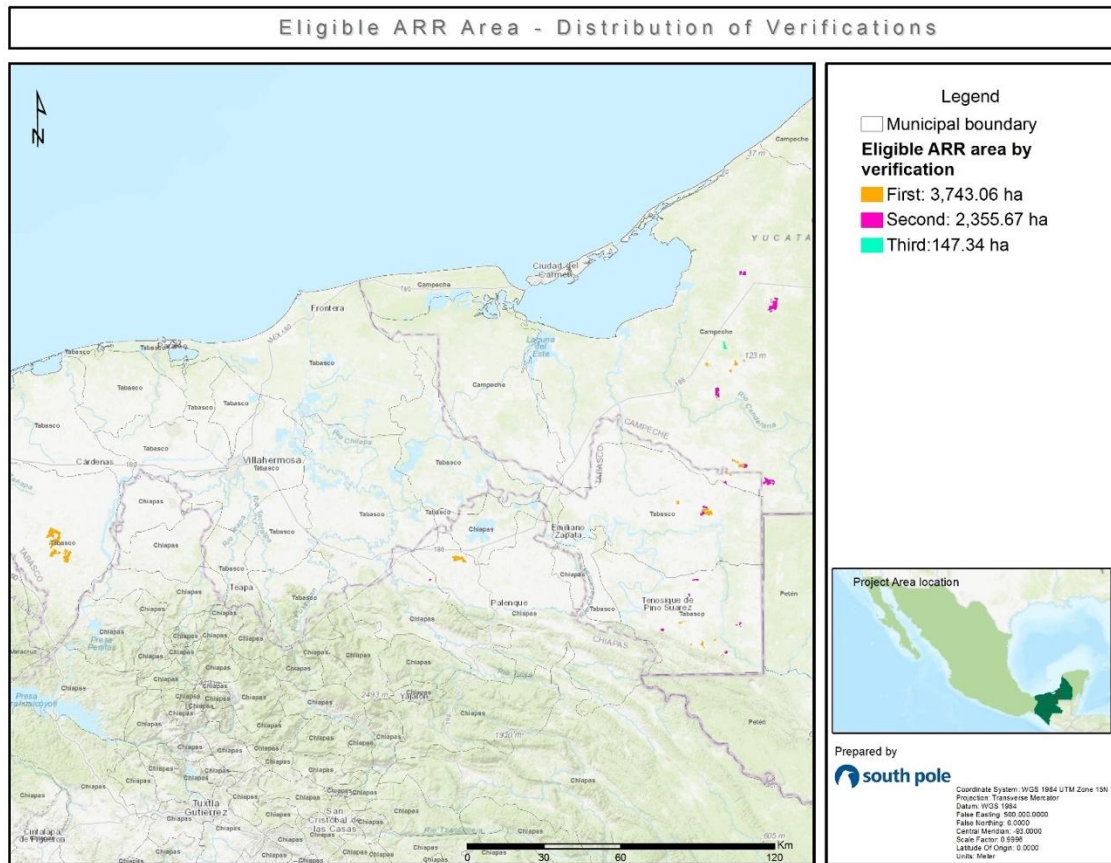


Figure 2: Project Area in the First, Second, and Third Project Phases

1.8 Title and Reference of Methodology

'AR-ACM0003: Afforestation and reforestation of lands except wetlands', v.2.0.⁸

The applied methodological tools are:⁹

- 'Combined tool to identify the baseline scenario and demonstrate additionality in Afforestation/Reforestation (A/R) Clean Development Mechanism (CDM) project activities', v.01.
- 'CDM_AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1.

⁷ See [Supporting documents\GIS\KML]

⁸ This methodology is available online at <https://cdm.unfccc.int/methodologies/ARmethodologies/approved>

⁹ These documents are available online at <https://cdm.unfccc.int/methodologies/ARmethodologies/tools>

- 'CDM_AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2.
- 'CDM_AR-TOOL15: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity', v.02.0.
- 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity', v.04.0.0.

1.9 Participation Under Other GHG Programs

The project has not been registered, nor is it seeking registration under any other GHG program.

1.10 Other Forms of Credit and Supply Chain Emissions

The project has not sought or received any other GHG environmental credits. GHG emission removals are issued only as Verified Carbon Units (VCUs) under VCS certification. No other types of GHG credits or other forms of environmental credit will be traded with other programs or mechanisms.

1.11 Sustainable Development Contributions

According to the information presented by the 'Sustainable Development Report 2022' (Sachs et al., 2022), Mexico is ranked 74 of 163 countries for sustainable development contributions, receiving an SDG Index score of 70.2.¹⁰ This index measures the progress made toward achieving all 17 Sustainable Development Goals (SDGs). Mexico's score places it below other countries in the region, such as the Dominican Republic and Ecuador, and is lower than the average registered for the Latin American and the Caribbean region (77.2). This means that the country must strengthen its efforts to achieve its goals for humanity and the planet in each of the five critical areas that shape the SDGs: People, Prosperity, Planet, Partnership, and Peace.

Of the 17 SDGs, Mexico has two country-level targets rated as being “on track or maintaining SDG achievement”, namely SDGs 5: Gender equality and 12: Responsible consumption and production. However, Mexico has also registered a decline in two of its objectives, SDGs 15: Life on land and 16: Peace, justice, and strong institutions. In general, Mexico has shown a moderate improvement in the SDGs analyzed at country level, as presented in Figure 3.

¹⁰ <https://dashboards.sdgindex.org/profiles/mexico>



Figure 3: Sustainable Development Goal Trends

(Source: Sachs et al., 2022)¹¹

In this context, the present project is aligned with some of Mexico's major challenges related to achieving its SDG targets at country level. Given the expected outcomes, the project contributes to the following SDGs (see Table 2):

¹¹ Sachs, J. D., LaFortune, G., Kroll, C., Fuller, G., & Woelm, F. (2022). *Sustainable Development Report 2022: From Crisis to Sustainable Development: the SDGs as Roadmap to 2030 and Beyond*. Cambridge University Press.

Table 2: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	1.1	1.1.1 Proportion of population below the international poverty line	Implemented activities to decrease	Providing new opportunities for formal employment in the region, contributing to an improved quality of life for the local population.	Currently, AGSA provides 774 permanent jobs ¹² (1,085 for the monitoring period), with a daily income ¹³ from 9.2 USD/day, ¹⁴ thus promoting regional economic growth.
2)	2.1	2.1.2 Prevalence of moderate or severe food insecurity in the population	Implemented activities to decrease	No further changes this monitoring period	Employment opportunities provide the community with greater economic and food security.
3)	5.5	5.1.1 Whether or not legal frameworks are in place to promote, enforce, and monitor equality and	Implemented activities to decrease	26 women hired throughout Campeche, Tabasco, and Chiapas in 2022.	The project provides job opportunities for women.

¹² See [Supporting Docs\NPRT\External risk\Community Engagement\Human resources summary v2022]

¹³ See [Supporting Docs\NPRT\External risk\Community Engagement]

¹⁴ Exchange rate: MXN 1.000 = USD 0.0538 as of February 16, 2023. The World Bank's definition of the global poverty line in September 2022 (see [Fact Sheet: An Adjustment to Global Poverty Lines](#)).

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
		non-discrimination on the basis of sex			
4)	8.3	8.5.2 Unemployment rate, by sex, age, and persons with disabilities	Implemented activities to decrease	From the beginning, the project has involved a diverse group of people in its implementation activities, including planting activities, control and management of the plantations, and monitoring. Most people involved in these activities are represented and integrated by local people, promoting economic growth in the region, while the company has policies designed to prevent psychosocial risk and discrimination. ¹⁵ Santa Genoveva has also developed a beekeeping project through its partner company Lacteos Santa Genoveva. ¹⁶	For the monitoring period, 1,085 people were hired by AGSA, including field workers and administrative staff. Currently, 774 are permanent jobs, 26 of them are women, with all benefits, thus promoting regional economic growth. Staff are granted the following additional benefits to those established in the Federal Labor Law: loans for workers; recreational activities, financial support, ¹⁷ life insurance, and rewards for time spent at the company.

¹⁵ See [Supporting Docs\Five minutes talks\ Psychosocial risk prevention policy & Policy for the prevention of discrimination, workplace harassment, sexual harassment, violence in the workplace]

¹⁶ See [Supporting Docs\NPRT\External risk\Community Engagement\Honey project]

¹⁷ Examples of this support include two days with salary and payment for the birth of legally recognized children, two days with salary enjoyment and civil marriage payment, and two days with salary enjoyment and payment for the death of a first-degree relative.

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
5)	12.2	Achieve the sustainable management and efficient use of natural resources	Implemented activities to increase	The project is concerned with the sustainable development of activities and its contribution to climate change mitigation. The company promotes sustainable development in its procedures and value chain.	AGSA's forest management and custody chain has Forest Stewardship Council (FSC) certification. ¹⁸
6)	13.0	t of GHG emissions avoided or removed	Implemented activities to increase	The project area for the third verification has the potential to reduce 249,972 tCO ₂ e. ¹⁹	Reduce a total of 710,672 tCO ₂ e during the project crediting period. ²⁰
7)	15	15.2.1 Progress toward sustainable forest management	Implemented activities to increase	AGSA promotes sustainable development in its procedures and value chain toward sustainable forest management ²¹ .	The project protects native forest patches and streams, helping to improve the connectivity between forests, and creates so-called 'steppingstones' for the movement of species, mammals, and birds to the Calakmul Biosphere Reserve. ²²

¹⁸ See [Supporting Docs\FSC certification]

¹⁹ Total VCUs after buffer discount until reaching LTA.

²⁰ See [Supporting Docs\ Estimations \ Excel file ex-ante estimations]. Total VCUs after buffer discount until reaching LTA.

²¹ See [Supporting documents/ Conservation studies]

²² <https://en.unesco.org/biosphere/lac/calakmul>

As mentioned in Table 2 the activities developed during this monitoring period contribute to maintaining and potentiating the SDG by providing new opportunities for formal employment for men and women in the region (774 permanent jobs. For the monitoring period, 1,085 people were hired, including field workers and administrative staff), which also promotes economic growth in the region (contributing to SDGs 1, 2, 5,8). The project also promoted sustainable development in its procedures and value chain; activities that include planting activities, control and management of the plantations, and monitoring, are developed under high-quality standards requirements such as FSC certification (contributes to SDGs 12 and 15: Life on land). The 337,023 tCO₂e of removed emissions contributes to the SDG 13 Climate Action.

Related to Mexico, the project helps to achieve national targets, especially on those which are rated as being on “track or maintaining” and those “declining”, such as SDG 5: Gender equality and 12: Responsible consumption and production, and SDG 15: Life on land.

2 SAFEGUARDS

2.1 No Net Harm

According to the analysis developed during the validation process, some negative impacts generated by the project as a result of implementing its activities, during this third verification period, has been monitored and mitigated through a series of additional measures (see Table 3). In addition, employee surveys²³ identified concerns from neighboring families regarding potential impacts on soil and water sources. As part of the project's community engagement plan, AGSA held meetings in 2023²⁴ and 2024²⁵ with the stakeholders listed in Table 7. These meetings helped consolidate a clearer understanding of the neighboring communities' perceptions of both the positive and negative impacts (6,7, 8 and 9) associated with the project.

Table 3: Potential Negative Impacts of Project Activities and Their Mitigation Measures

Activity	Impact	mitigation measures
1. Land preparation, nurseries, thinning, and exploitation	Impact on Flora and Fauna	Relocation of fauna species

²³ See [Supporting documents/ NPRT/External risk/Community Engagement/ CarbonProjectSurveys]

²⁴ See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2023]

²⁵ See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2024]

Activity	Impact	mitigation measures
		This measure does not apply to AGSA because all the forestry plantations that the company has established were on agricultural land, which was devoid of vegetation, classified as pasture and/or fruit crops (see baseline in the project document). For more details see the legal explanation in: [Supporting documents\NPRT\external risk\Community Engagement\Mitigation measures]
2. Nurseries, thinning, and exploitation	Soil compaction	Improved nursery techniques and mechanized thinning and exploitation activities ²⁶
3. Land preparation thinning, and exploitation	Air pollution	Vehicles and equipment are in optimal conditions and their maintenance is adequate ²⁷
4. Nurseries	Excess water expenditure	Strict use of water by micro sprinklers for irrigation ²⁸
5. Plantation, pruning, thinning, fertilization, fires, and exploitation	Health impact on employees	Training in different areas such as work posture, personal protective equipment, use of chemical substances, and fire control ²⁹
6. Plantation, pruning, thinning, fertilization, and exploitation	The use of agrochemicals impoverishes and damages the soil.	The implementation of agrochemicals is developed in line with the requirements of the federal environmental requirements through SEMARNAT and FSC certification. ^{30 31}
7. Plantation, pruning, thinning, fertilization	Employees identify increased water quantity in the spring season, but mention that there is	Agrochemicals are used in accordance with the list of agrochemicals allowed by the environmental authority. In those places where there is a greater possibility of runoff, according to the management plant, the plantations are established 50 meters

²⁶ See [Supporting documents/ NPRT/External risk/Community Engagement/ Mitigation measures/PRF-011 Aclareo 2025 and nursery]

²⁷ See [Supporting documents/ NPRT/External risk/Community Engagement/ Mitigation measures/Programa de mantenimiento de maquinaria y equipo]

²⁸ See [Supporting documents/ NPRT/External risk/Community Engagement/ Mitigation measures/Nursery]

²⁹ See [Supporting documents/ NPRT/External risk/Community Engagement/ Mitigation measures/Trainings]

³⁰ See [Supporting documents\NPRT\Internal risk\Project management\Management plans]

³¹ See [Supporting documents\NPRT\ Natural risk\Pest and Disease]

Activity	Impact	mitigation measures
	contamination of streams	from streams and rivers ³² . In addition, pest control is carried out through biological control, previously authorized by the environmental authority. ³³ .
8. Exploitation and transport	Excessive speeding of AGSA's vehicles	AGSA has road regulations ³⁴ that must be followed by all company personnel who have under their custody any type of motor vehicle (either their own or the company's) and travel within the company's facilities or in neighboring facilities.
9. All project plantations.	There is limited access to areas of cultural significance that are in protected status within the project boundaries.	In some areas located in the state of Tenosique municipality, the presence of archaeological monuments was identified in 2016. This finding was reported to the National Institute of Archaeology and History (INAH), who helped to delimit the protection polygons for archaeological monuments. AGSA must comply with its commitment to protect and maintain these elements in good condition; therefore, personnel access to these areas has been limited. ³⁵ .

During the third monitoring period, the project owner developed the following activities as part of the proposed mitigation measures proposed in Table 3, regarding soil preparation, nursery, use of agrochemicals, thinning, pest and disease control:

2.1.1 Selection of Land for Plantation

Protocols for soil selection that optimize the selection of planting areas by verifying topographic conditions, demonstrating the presence of native vegetation and fauna, and analyzing physical and chemical factors such as permeability degree, susceptibility to ponding/flooding, fertility, and the presence of toxic elements.

³² See [Supporting documents\NPRT\Internal risk\Project management\Management plans]

³³ See [Supporting documents\NPRT\ Natural risk\Pest and Disease/ Pests and biological control]

³⁴ See [Supporting documents/ NPRT/External risk/Community Engagement/ Road regulations 2022 AGSA]

³⁵ See [Supporting documents/ NPRT/External risk/Community Engagement/INAH]

2.1.2 Nursery Techniques

Selection of high-quality plates. AGSA has the capacity to produce around two million plants per year from a 4-ha nursery. Tissue culture, reproduction by cuttings, and nursery work are combined to improve plantation yield (see Figure 4).



Figure 4: Nursery Techniques

2.1.3 Water Supply and Prevention of Water Excesses

Improving production by implementing water supplying irrigation (if necessary), using technology to prevent flooding and water losses, i.e., ensuring wells and pumping equipment are in optimal condition and installing drip irrigation systems, and creating drainage to control water excess if needed to guarantee humidity and water saturation (see **Figure 5**).



Water wells and pumps



Drip irrigation



Drainage to control water excess

Figure 5: Water supply and prevention of excesses

2.1.4 Control of Pests and Diseases

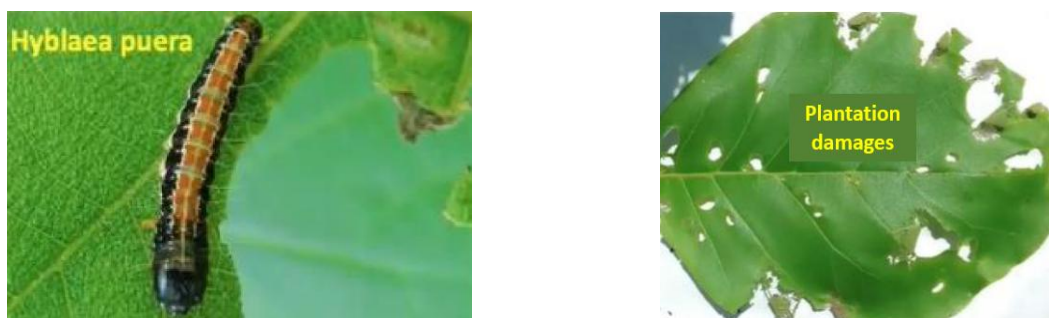
In the control of pests and diseases, priority is given to biological control (see Figure 6). For instance, natural predators such as *Cryptolaemus montrouzieri* or *Anagyrus kamali*, a parasite, are released to control *Maconellicoccus hirsutus*, known in the project area as “cochinilla rosada”.

Where insecticides are used, it is ensured that these exhibit as little aggression and have as few adverse effects on beneficial insects as possible, as in the case of the teak defoliator. The insecticide spinetoram is often used, which is based on a fermented product that has shown high effectiveness in low doses and is not harmful to other insects (see Figure 7).


Damage from *Maconellicoccus hirsutus*

Release of *Cryptolaemus montrouzieri*

Figure 6: Biological Control of *Maconellicoccus hirsutus*



Hyblaea puera (teak defoliator)

Figure 7: Control of Pests and Diseases – *Hyblaea puera*

To reduce damage to the ecosystems, protocols for each lot type are defined to delimit affected or potentially affected areas and criteria for tree sampling and cochineal identification are outlined. In addition, monitoring plans define the specific responsibilities of field staff in the monitoring, reporting, and pest control processes.³⁶ In addition to the control and monitoring protocol for possible pests and diseases, information on the implementation of these activities is presented in the NPRT, Natural risk section³⁷. Different records of pest presences can also be found in this folder, including the management of pests such as *Macconellicoccus hirsutus* and *Anagyrus kamali* controlled with activities performed in conjunction with the National Reference Center for Biological Control and SEMARNAT.

Other agrochemicals commonly used in plantation management during the monitoring period are listed in Table 4 .

Table 4: Agrochemicals Commonly Used in Plantation Management

Product Name	Product Type
UREA 46-00-00	Fertilizer
Korte concentrado	Herbicide
Trompa	Insecticide
Formula 22-16-7 DAP	Fertilizer

³⁶ See [Supporting documents\NPRT\Internal risk\Project management\Management plans]

³⁷ See [Supporting documents\NPRT\ Natural risk\Pest and Disease]

Product Name	Product Type
Formula 24.3 - 20.3 - 12.2	Fertilizer
Fertilizante DAP fosfato diamonico	Fertilizer
Fertilizante MF 32.1-22.9-0	Fertilizer
Fertilizante 30.8-19.4-4.4	Fertilizer
Fertilizante 27.1-19.3-7.7	Fertilizer
Faena*	Herbicide
Herbipol glifosato*	Herbicide
Prado	Herbicide
Durango*	Herbicide

* These herbicides are only occasionally used in young plantations during the rainy season.

The implementation of agrochemicals is developed in line with the requirements of the federal environmental requirements through SEMARNAT and FSC certification. Human Resources (HR) also introduced a section on industrial safety and hygiene in 2008 with the aim of establishing an occupational safety program to reduce accidents and occupational risks by voluntarily adhering to the Occupational Health and Safety Self-Management Program created by the *Secretaría del Trabajo y Previsión Social* [Secretariat of Labour and Social Welfare].³⁸

2.1.5 Community Activities

During the third verification period, the company maintained the preferential hiring of nearby residents. Community activities included supporting with the diesel supply for road maintenance machinery and garbage bins for community use (see the attached communications).³⁹ COVID-19 prevention talks were held with workers and, through the *Instituto Mexicano del Seguro Social* [Mexican Institute of Social Security], campaigns for HIV and hepatitis C detection and COVID and influenza vaccinations developed for workers and their families (see Figure 8 and Figure 9).⁴⁰

³⁸ See [Supporting documents\NPRT\External risk\Community Engagement\AGSA Human resources summary v2021]

³⁹ See [Supporting documents\ Community support request]

⁴⁰ See [Supporting documents\NPRT\External risk\Community Engagement\ Health campaigns]



Figure 8: Vaccination Campaign and COVID-19 Prevention Talk

Vacunación COVID e influenza Trabajadores de AGSA y familiares

La vacuna de Influenza es para todos.

La vacuna de COVID es para:

- Los que no tienen ninguna dosis.
- Para los que les falta la 1ª. Dosis.
- Para los que les falta la 2ª. Dosis.
- Para los que les falta la 3ª. Dosis de refuerzo.
- Incluso para los que quieren una 4ª. o 5ª. Dosis.



Oficinas Campeche HOY 14 de octubre

Haciendo de Santa Genoveva el mejor lugar para trabajar...

Vacunación COVID e influenza Familiares de trabajadores

Por primera vez, los días 5, 6 y 7 de octubre se vacunara a familiares de trabajadores del rancho que quieran vacunarse contra influenza y también de COVID:

La vacuna de COVID es para ADULTOS:

- Los que no tienen ninguna dosis.
- Para los que les falta la 1ª. Dosis.
- Para los que les falta la 2ª. Dosis.
- Para los que les falta la 3ª. Dosis de refuerzo.
- Incluso para los que quieren una 4ª. o 5ª. Dosis.



TAMBIEN VACUNARÁN A LOS NIÑOS QUE LES FALTE ALGUNA VACUNA DEL ESQUEMA DE VACUNACIÓN NORMAL O INFLUENZA.

La Campaña de vacunación para familiares será los días 5, 6 y 7 de octubre en Base 5 a partir de las 9:30 am.
Si tienes duda, acércate al servicio médico.




SALUD

SECRETARÍA DE SALUD

Campaña de detección de hepatitis C y VIH

Dirigido a TODOS LOS TRABAJADORES DEL RANCHO SANTA GENOVEVA
Y OFICINAS CAMPECHE.

Las pruebas son rápidas y los resultados son inmediatos.

PARTICIPA...solo necesitas tu credencial INE

**Este 3 de noviembre en Rancho Campeche
Y 4 de noviembre en Oficinas Campeche**

En AGSA respetamos a nuestros trabajadores, por lo que tu resultado solo lo sabrás tú y el personal de secretaria de salud. El resultado es CONFIDENCIAL.

No olvides tu credencial INE
Haciendo de Santa Genoveva el mejor lugar para trabajar...

Figure 9: Health Campaign Signs for COVID-19 and Influenza Vaccinations and HIV and Hepatitis Detection

2.1.6 Thinning Mechanization

It is crucial that training be conducted for permanent field and technical staff. AGSA has focused on mechanizing thinning and exploitation activities such as dragging and loading, implementing new machinery for this purpose, guaranteeing that the condition of vehicles and equipment is maintained for optimal performance, and putting in place responsible practices for the care of soils and other elements of the plantation environment (see Figure 10).



Figure 10: Thinning Mechanization

2.2 Local Stakeholder Consultation

During the third verification period, no relevant changes were made that could affect the benefits for stakeholders. Telephone contact numbers kept in visible places around the project area served as a communication channel with the community (see Figure 13 below). The company also socialized the carbon project with the workers and developed a survey in 2022 to assess support for the activity.⁴¹

The surveys aimed to assess employees' perceptions of the role of forest plantations in addressing climate change, based on the premise that company workers are residents of the communities closest to the farms where the plantations awaiting certification are located. Surveys were conducted with 34 employees from Balancán, Palenque, and Huimanguillo municipalities.

The results indicate that employees perceive the main positive impacts as improved family income and enhanced living conditions, largely attributed to their ability to invest in meeting basic needs and providing education for their children.

Regarding negative impacts, 23% of respondents reported community concerns about water quality and availability. These concerns were primarily linked to a perceived decrease in water flow over time and contamination. Additionally, 85% of respondents acknowledged that the use of agrochemicals in the plantations causes soil and environmental contamination. According to these respondents, this contamination has the potential to adversely affect soil fertility and water quality. In response to these perceptions of possible impacts on water and soil, compliance with current regulations and FSC certification requirements is established, both for selecting the agrochemicals to be used and for maintaining distances to bodies of water. Compliance with this regulatory framework and the implementation of best practices, as well as the tenure of the project areas, which is referred to by those attending the participation meetings as legal land and private property without conflicts, have avoided affecting neighboring populations in terms

⁴¹ See [Supporting documents/ NPRT/External risk/Community Engagement/ CarbonProjectSurveys]

of access to ecosystem services. This information was utilized to develop the risk assessment table and to establish appropriate mitigation measures (See Table 3). Regarding the relationship with the environment, in these spaces, elements such as the presence of fauna species, the improvement of the landscape and climate were considered positive. As already mentioned, the income received by the workers and the improvement in the living conditions of the families are also perceived positively in the socioeconomic dimensions. In this same aspect, the project is located in a region in which the land and natural resources have historically been used for agricultural production; in other words, the project does not affect or change the productive vocation and use of resources in the region (See 2.3.1.2 Socioeconomic and cultural context).

Regarding the socialization of the project's progress in the third verification, AGSA generated spaces for work teams and each supervisor was generating the information. In addition, a summary of the benefits of the project was presented in spaces visible to all workers. The information shows the type of training generated during the period, the type of certifications held by the company, the tasks and benefits of the health and safety team, and the benefits generated for workers and the community sector.



¿Cuáles son los impactos que usted considera pueden tener las plantaciones de AGSA en la calidad del aire?

Antes impacto positivo, si las áreas sembradas para la siembra estaban sin árboles, o con los estudios ambientales requeridos.

b. ¿Con la presencia de las plantaciones, ha cambiado el olor en el ambiente? ☒ Sí ☐ No, ¿Cómo ha sido este cambio?

Positivo	Neutro	Negativo
☒	☐	☐

c. ¿En el pasado, ha habido un problema con la calidad del aire dentro de sus hogares (por ejemplo, problemas respiratorios o problemas de asma o alergia)? ☒ Sí ☐ No

d. ¿Cómo consideras que el proyecto puede ayudar o agravar los problemas relacionados con la calidad del aire?

Destacando áreas y proporcionando flora para la fauna nativa

usted cree que:

Ayuda	No afecta	Agrava
☒	☐	☐

e. ¿Considera usted que este proyecto hará que los niveles de agua aumenten o disminuyen? ¿por qué?

Aumenta	No afecta	Disminuye
☒	☐	☐

g. ¿Cree usted que el uso de agroquímicos por el proyecto contamina el suelo de la plantación o sus alrededores? ☒ Sí ☐ No, ¿Por qué?

Se tiene conocimiento que las prácticas químicas (camina) si van las que usa la empresa NO.

h. ¿Cuál considera que es el impacto de la plantación en el paisaje? ☒ Sí ☐ No, Señale si es positivo, neutro o negativo.

Positivo	Neutro	Negativo
☒	☐	☐

i. Según su consideración ¿Qué impacto puede tener la plantación de AGSA en la vegetación y animales locales? Justifique su respuesta

Elemento	Positivo	Neutro	Negativo
Vegetación	☒	☐	☐
Animal	☒	☐	☐

A las las, le permiten el habitat de los animales y la vista es impresionante de los árboles

j. Usted cree que las contribuciones del proyecto para proteger o mejorar ríos, bosques, humedales o praderas son:

Positivas	Neutras	Negativas
☒	☐	☐

2. Aspectos laborales

a. ¿Considera que el proyecto implica la creación de puestos de trabajo locales? ☒ Sí ☐ No

SECCIÓN 4, RESULTADO DE LAS ENCUESTAS A TRABAJADORES

¿Considera que el clima ha cambiado?

17% ☒ sí ☐ no

83%

¿Cree que la siembra de árboles ayudan a disminuir la alteración...

10% ☒ sí ☐ no

90%

¿Considera importante que AGSA desarrolle proyectos para mitigación de cambio climático?

12% ☒ sí ☐ no ☐ no sabe

88%

¿Sabe que las plantaciones contribuyen a la emisión de oxígeno...

17% ☒ sí ☐ no

83%

¿Esta usted informado sobre el proyecto de bonos de carbono que la empresa lleva a cabo?

44% ☒ sí ☐ no

56%

SECCIÓN 1

1. La empresa cuenta con trabajadores de campo, administrativos y directivos.

2. Hay puestos de trabajo fijos y temporales.

3. Cerca del 90% son trabajadores de Campeche, Tabasco y Chiapas.

SECCIÓN 2

1. Principales capacitaciones:

2. Certificaciones

SECCIÓN 3

1. ¿QUÉ HACE LA EMPRESA EN SEGURIDAD E HIGIENE?

2. ¿QUÉ HACE LA EMPRESA EN SEGURIDAD E HIGIENE?

Figure 11: Activities with employees

Table 5. Employee surveys conducted in 2022

Date	Localization	Activity	Respondents
14/11/2022	Las Palmas, Balancán	Employee surveys	9

Date	Localization	Activity	Respondents
17/11/2022	El Paraíso, Balancán	Employee surveys	8
21/11/2022	Huimanguillo	Employee surveys	8
05/12/2022	Palenque	Employee surveys	9

To keep employees informed about the progress of the project, during 2023⁴² other spaces for socialization of project results were held, and for 2024⁴³ meetings were held with the ejidos and localities closest to the areas located in the municipalities of Huimanguillo, Balancán, and Tenosique in the state of Tabasco. In the meetings with ejidos and localities close to the project areas, the impacts identified in the surveys of workers in 2022 were validated, thus consolidating the potential risks of the project and proposing mitigation measures.

Table 6. Agenda of meetings held in 2023 and 2024

Date	Localization	Activity	Attendants
13/12/2023	Huimanguillo Properties	Socialization of the results of the AGSA - Carbon Credits project for supervisors, assistants and field personnel.	7
13/12/2023	Rancho las palmas	Socialization of the results of the AGSA - Carbon Credits project for supervisors, assistants and field personnel.	11
14/12/2023	Teca de Oro Offices	Socialization of the results of the AGSA - Carbon Credits project for supervisors, assistants and field personnel.	10
05/12/2024	Virtual Meeting	Socialization of the results of the AGSA - Carbon Credits project for management, administrative personnel, supervisors, assistants and field personnel.	32

⁴² See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2023]

⁴³ See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2024]

Date	Localization	Activity	Attendants
05/12/2024	Health House	Socialization of the results of the AGSA - Carbon Credits project presented to the neighboring ejido population.	20
05/12/2024	School of the village - Ejido El Xotal	Socialization of the results of the AGSA - Carbon Credits project presented to the neighboring ejido population.	12
06/12/2024	Social Center - Ejido El Pichi, Municipality Balancán	Socialization of the results of the AGSA - Carbon Credits project presented to the neighboring ejido population.	19
06/12/2024	Basketball court - Ejido reforma agraria	Socialization of the results of the AGSA - Carbon Credits project presented to the neighboring ejido population.	12
09/12/2024	Santa Genoveva Meeting Room	Socialization of the results of the AGSA - Carbon Credits project for management, administrative personnel, supervisors, assistants and field personnel.	9

**AGROPECUARIA SANTA GENOVEVA, S.A.P.I. DE C.V.
BALANCÁN, TABASCO**

ACTA DE SOCIALIZACIÓN N° 01			
Hora de inicio: 16:00	Hora final:	Fecha	
Lugar: Centro Social del Ejido El Pichi	Año: 2024	Mes: 12	Día: 06

Objetivo: Sociabilizar los resultados del Proyecto: Restauración con Teca- CO2e de la empresa Agropecuaria Santa Genoveva S.A.P.I. de C.V. con la comunidad del Ejido Agricultores, Ejido El Pichi, Ejido López Mateos y Ejido Pancho Villa, Balancán, Tabasco.

AGENDA	
1.	Apertura de la reunión
2.	Presentación de los participantes de la reunión
3.	Contextualización ¿Quiénes somos? - Cambio climático - Proyectos AR - Estándares VCS - Proyecto Restauración con Teca- CO2e - Resultados de la implementación
4.	Espacio de preguntas
5.	Mecanismo PQRS
6.	Validación de usos del suelo e impactos
7.	Cierre de la reunión

DESARROLLO DE LA AGENDA

Nos reunimos en el centro social del Ejido el Pichi, Nos acompañaron dos delegados municipales: Ejido el Pichi y Agricultores 2da Sección. Nos presentamos todos, se les dio el contexto de la reunión, todos participaron con comentarios, estuvieron muy participativos y al final el delegado municipal del Ejido el Pichi terminó la reunión con unas palabras de agradecimiento.

Acuerdos y Compromisos

Con los delegados municipales acordamos reunirnos periódicamente para concientizar a las personas la importancia de cuidar los recursos y coordinarnos para las brigadas de incendios.



**AGROPECUARIA SANTA GENOVEVA,
S.A.P.I. DE C.V.**

Formato de Evaluación

Proyecto Teak Mex	
Fecha: 06 de diciembre de 2024.	Balancán, Tabasco.
¿Cuál es su impresión de la reunión?	
muy efectiva para prevenir el efectos del medio ambiente	
¿Qué aspectos le gustan del proyecto?	
Empleación de empleos y el esfuerzo de la empresa en el cuidado del medio ambiente para generar acción de carbono	
¿Qué aspectos no le gustan del proyecto?	
Todo es favorable la empresa se preocupa por el medio ambiente	
Comentarios adicionales:	
Todo lo que la empresa esta haciendo es muy favorable para el medio ambiente del país	
Firma:	
Rafael García C	

PREGUNTA	IMPACTO REAL (SI/NO) / POTENCIAL	DESCRIPCIÓN	MEDIDAS DE MITIGACIÓN
1. ¿Existen personas o grupos comunitarios que podrían verse afectados por las actividades del proyecto Teak Mex?	SI NO	Porque la teca es un árbol de carbono	
2. ¿Tanto hombres y mujeres podrían beneficiarse de las actividades del proyecto Teak Mex?	SI	Porque genera empleo	
3. ¿Las actividades del proyecto Teak Mex podrían aumentar la carga de trabajo en las mujeres?	NO	Porque son actividades habituales.	
4. ¿De qué manera se beneficiarían los hombres y las mujeres de las actividades del proyecto Teak Mex?	SI	Por que la familia mantiene una economía fija. (segura)	
5. ¿Las actividades del proyecto Teak Mex podrían limitar el acceso de la comunidad a bienes y servicios como el agua, productos del bosque, caza de animales o uso agrícola? ¿Cómo?	NO	Por que la comunidad se beneficia del proyecto.	
6. ¿Las mujeres, niñas y niños de la comunidad podrían verse expuestos a riesgos o peligros a causa de las actividades del proyecto Teak Mex? ¿Cómo?	SI	Por el exceso de Velocidad. topes.	
7. ¿Existen sitios, estructuras u objetos con valores históricos, culturales, artísticos, tradicionales o	NO	No existe ninguna estructura.	

PREGUNTA	IMPACTO REAL (SI/NO) / POTENCIAL	DESCRIPCIÓN	MEDIDAS DE MITIGACIÓN
8. ¿Podrían presentarse conflictos en el proyecto Teak Mex relacionados con el derecho sobre la tierra y su uso?	NO Positivo	Son Propiedad Privada	
9. ¿Cómo el proyecto Teak Mex puede afectar o beneficiar las fuentes de agua importantes para la comunidad?	NO Positivo	No hay desechos Químicos	
10. ¿Qué cultivos o productos de la comunidad podrían verse afectados o beneficiarse de las actividades del proyecto Teak Mex?	SI Negativo	disminución la Agricultura de Autocosecho	
11. ¿Cómo el proyecto Teak Mex podría modificar la cantidad o calidad de productos agrícolas de la zona?	SI Positivo	Facilitación de Fertilizantes	
12. ¿Cómo afectará el proyecto Teak Mex a los hogares encabezados por mujeres?	SI negativo	de Beneficiación de Hogar	
13. ¿El proyecto Teak Mex puede afectar la seguridad alimentaria de la comunidad? (comunidades que obtienen frutos y carne de monte)	NO negativo	NO Afecta.	
14. ¿Las actividades del proyecto podrían disminuir las áreas disponibles para la agricultura o el pastoreo?	NO negativo	Son independientes de Cjido	

AGROPECUARIA SANTA GENOVEVA, S.A.P.I. DE C.V.											
REGISTRO DE ASISTENCIA											
Nombre del evento o actividad: Reunión de Socialización de Resultados, Proyecto: Restauración con Teco- CO2e											
Objetivo: Socializar los resultados del Proyecto: Restauración con Teco- CO2e de la empresa Agropecuaria Santa Genoveva S.A.P.I. de C.V.											
Fecha	Día: 06	Mes: 12	Año: 2024	Lugar: Centro Social del Ejido El Pichil, Tabasco							
Hora de inicio: 16:00	Hora final: 17:50		Responsable(s): Ing. Edmundo Pérez Aragón e Ing. Francisco González Rivera								
Este formato tiene como propósito registrar la participación en la actividad o evento. Registre los datos de los participantes en la columna correspondiente. Con su consentimiento previo, se dará mantenimiento a la información registrada en este formato. La información registrada en este formato es de carácter confidencial y no debe ser utilizada para fines ajenos a los que se destinó. La información registrada en este formato es de carácter confidencial y no debe ser utilizada para fines ajenos a los que se destinó. La información registrada en este formato es de carácter confidencial y no debe ser utilizada para fines ajenos a los que se destinó.											
Nº	Nombre y Apellido	Edad	Sexo	M	P	CUB	INE/CURP	Cargo u ocupación	Teléfono	Autoriza el tratamiento de los datos	Firma
1	Juan Carlos	25	M	✓				Operador	961 537 12 65	SI	J.C.A.
2	Jose de la Cruz	39	M	✓				Operador	961 537 12 65	SI	J.R.M.
3	Jose de la Cruz	39	M	✓				Operador	961 537 12 65	SI	J.R.M.
4	Roberto de la Cruz	44	M	✓				Operador	961 537 12 65	SI	J.R.M.
5	Roberto de la Cruz	44	M	✓				Operador	961 537 12 65	SI	J.R.M.
6	Roberto de la Cruz	44	M	✓				Operador	961 537 12 65	SI	J.R.M.
7	Roberto de la Cruz	44	M	✓				Operador	961 537 12 65	SI	J.R.M.
8	Roberto de la Cruz	44	M	✓				Operador	961 537 12 65	SI	J.R.M.

AGROPECUARIA SANTA GENOVEVA, S.A.P.I. DE C.V.											
REGISTRO DE ASISTENCIA											
Nombre del evento o actividad: Reunión de Socialización de Resultados, Proyecto: Restauración con Teco- CO2e											
Objetivo: Socializar los resultados del Proyecto: Restauración con Teco- CO2e de la empresa Agropecuaria Santa Genoveva S.A.P.I. de C.V.											
Fecha	Día: 06	Mes: 12	Año: 2024	Lugar: Casa de Salud, Huimanguillo, Tabasco							
Hora de inicio: 16:00		Hora final: 17:50		Responsable: Ing. Juan Velázquez Juárez e Ing. Pedro Moreno Hernández							
Este formato tiene como propósito registrar su participación en la actividad o evento registrado en este formato. Con su consentimiento previo, se dará mantenimiento a la información registrada en este formato. La información registrada en este formato es de carácter confidencial y no debe ser utilizada para fines ajenos a los que se destinó. La información registrada en este formato es de carácter confidencial y no debe ser utilizada para fines ajenos a los que se destinó. La información registrada en este formato es de carácter confidencial y no debe ser utilizada para fines ajenos a los que se destinó.											
Nº	Nombre y Apellido	Edad	Sexo	M. P.	CUB	INE/CURP	Provincia/ Municipio	Cargo u ocupación	Teléfono	Autoriza el tratamiento de los datos	Firma
1	Juan Carlos Pérez Balbuena	29	✓				Huimanguillo	Operador	912 12 782	SI	J.C.A.
2	Jose de la Cruz	39	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
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73	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
74	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
75	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
76	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
77	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
78	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
79	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
80	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
81	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
82	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
83	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
84	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
85	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
86	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
87	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
88	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
89	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
90	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
91	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
92	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
93	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
94	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
95	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
96	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
97	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
98	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
99	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.
100	Roberto de la Cruz	44	✓				Huimanguillo	Operador	912 12 782	SI	J.R.M.

Figure 12: Meetings with communities, validation of impacts

AGSA HR's Organizational Development and Management team, the division of the company in charge of the relationship with workers, has created an email address (rhagsa@genoveva.com.mx) in addition to the Grievances and Suggestion Procedure through which workers can report on any topic they wish.⁴⁴ These channels guarantee that the information communicated is totally confidential and reaches the HR representative only. The email is also one of the ways to distribute important information on the policies for social risk prevention⁴⁵ and the prevention of discrimination, workplace harassment, sexual harassment,

⁴⁴ See [Supporting documents/ NPRT/External risk/Community Engagement/ AGSA_GrievancesSuggestionProcedure]

⁴⁵ See [Supporting Docs Psychosocial/Five minutes talks/Psychosocial risk prevention policy]

and workplace violence.⁴⁶ Both policies are still valid, being focused on the prevention of related risk factors and the promotion of a favorable organizational environment. The company has also implemented 'Five-minute talks' to ensure that employees are informed of best security before developing field activities.⁴⁷



Figure 13: Telephone contact number signs

In June 2022, during the third verification period, the community of Suc-Tuc in Campeche requested support with the acquisition of five garbage bins for the use of the community. Later, in August 2022, the community of Crucero San Luis in Campeche requested a diesel supply to be used in road maintenance machinery (see the attached communications).⁴⁸ These requests were fulfilled, with the company providing the requested bins and fuel for the machinery for road improvements.

2.3 AFOLU-Specific Safeguards

2.3.1.1 Stakeholder identification

While identifying stakeholders, AGSA employees were established as direct project beneficiaries. In addition, maps were first analyzed to identify community stakeholders and to locate populated centers within a radius of 5 km, 10 km, and 20 km to the project areas (see Figure 12). It was found that AGSA ranches located in the municipalities of Balancán, Tenosique, and Huimanguillo had populated centers and localities within that range, while in other ranches, the nearest communities were more than 10 km away.

⁴⁶ See [Supporting Docs Psychosocial/Five minutes talks/Prevention of discrimination, workplace harassment, sexual harassment, workplace violence policy]

⁴⁷ See [Supporting documents/Five minutes talks]

⁴⁸ See [Supporting documents/ Community support request]

Analyzing the information on the distances of the population centers, the requirements of labour, goods and services by the project, the areas of intervention and the project activities, it was determined that there will be no significant impacts on the population centers that are beyond the range of 5 kilometers, because there are no significant interactions with these populations, no alteration of the conditions, characteristics or dynamics in the villages between 10 and 20 kilometers. Significant interactions occur with the population living in the 5 kilometer range with whom priority is given, for example, to hiring employees.

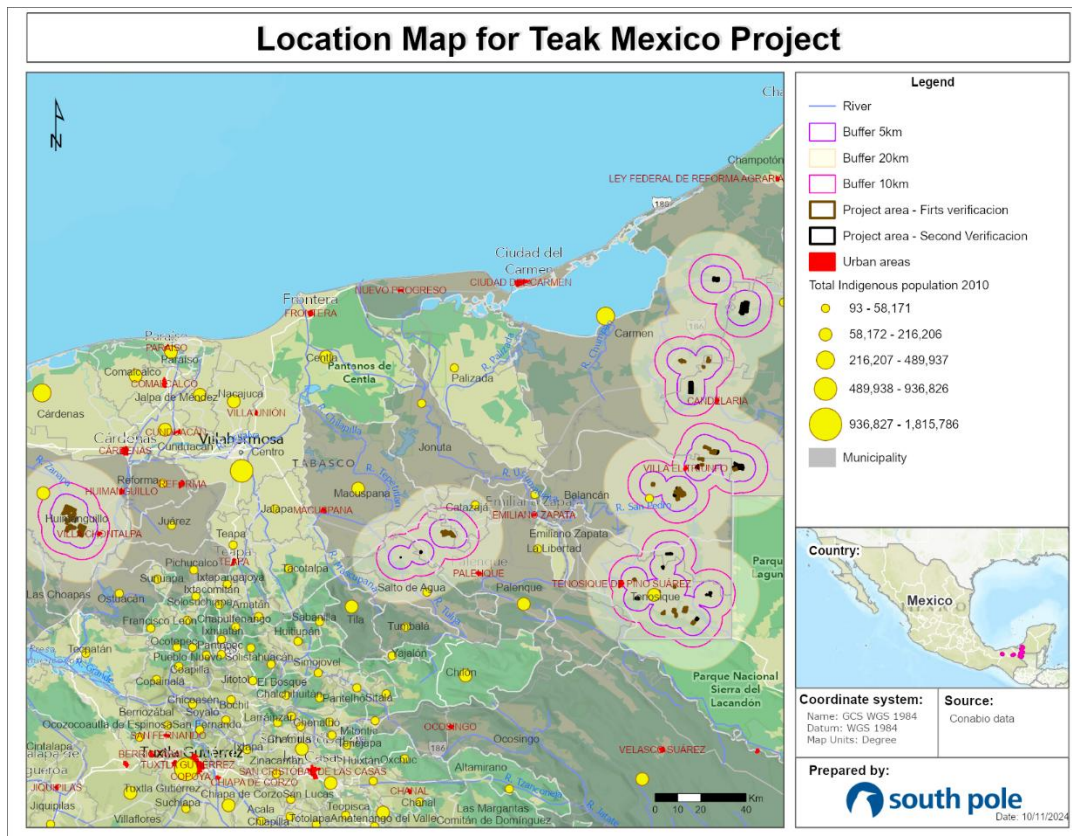


Figure 14. Map of population distribution in relation to project areas

Considering the analysis described above conducting meetings with people familiar with the company's activities in the area and to validate the potential risks and impacts, priority was given to localities located within a 5 km radius. Once the municipalities were identified, the most populated and centrally located ejidos and localities were selected to serve as meeting points with nearby communities. This prioritization was made considering the possibility of having more contact and knowledge of the project's activities due to their geographic proximity to the project areas. Therefore, the meetings to disseminate results and validate impacts were held in: El Pichi (Balancán), El Xotal (Tenosique), La Última Lucha (Tenosique), Reforma Agraria (Tenosique) and Población de la Colonia Mercedes (Huimanguillo), attended by people living in the villages identified in the 5 km range mentioned above. (See Table 37).

Table 7. Stakeholder identification

Stakeholders	Localization	Description
AGSA Employees	States of Campeche, Tabasco and Chiapas	Employees in managerial, administrative, operational, and technical positions of AGSA. Employees from different areas of the company have been involved in the results socialization process.
Ejido El Xotal y Ejido Reforma Agraria	Tenosique municipality, estado de Tabasco	The rural population is mainly engaged in small-scale agriculture and livestock raising. The main cash crops are corn, tomatoes, squash and watermelon. Livestock is raised on a small scale.
Ejido El Pichi y Agricultores segunda sección	Municipio de Balancán, estado de Tabasco	
Colonia Mercedes Population	Municipio de Huimanguillo, estado de Tabasco	

As mentioned in the results of the stakeholder consultations, after analyzing the identification of risks and impacts with both employees and communities, as well as reviewing the management plans and mitigation measures, contrasting the actions of the project with the socio-economic conditions of the region in which it is located, it is concluded that the project has not generated significant changes in the population.

The people most directly involved with the project are the employees, for them and their families the project does not represent a change in their vocation, due to the fact that the region already has a supply of agricultural and forestry activities, during their interaction with the company they have received the necessary training so that, during their work, they do not suffer health problems. Workers and their families perceive positive changes in their income, job stability and access to information in training, as well as education and sensitivity to environmental care and climate change.

In terms of access to ecosystem services, thanks to the ownership of all the intervention areas, it has not been necessary to limit access to ecosystem services. Only the area of archaeological remains has limited interaction, but this is precisely to preserve these ecosystem services related to culture and following the indications and commitments established with the National Institute of Archaeology and History. Environmental elements such as water, soil and air have been protected by complying with established standards, formulating mitigation actions and training employees to comply with measures to ensure that the natural environment does not deteriorate.

2.3.1.2 Socioeconomic and Cultural Context

TENOSIQUE

According to the municipal development plan of Tenosique borders to the north with Balancán, to the east with Balancán and the Republic of Guatemala, to the south with Guatemala and the state of Chiapas, and the west with Chiapas and Emiliano Zapata. Located in the Los Ríos Region, southeast of Villahermosa, Tabasco, it is 211 km from the capital. Its altitude ranges from 0 to 700 meters above sea level and covers an area of 1,882.86 km², representing 7.62% of the state's territory. The municipality has a territorial extension of 1,882.86 km², , ranking sixth in size within the state. Its territorial division includes 1 municipal seat, 31 neighborhoods, 10 subdivisions, 1 suburban estate, 4 agricultural or livestock colonies, 12 towns, 5 villages, and 86 ejidos.

According to INEGI, the State Quarterly Economic Activity Indicator (ITAE) reported that Tabasco registered a 4.4% growth in the third quarter of 2021 compared to the previous quarter, standing out as one of the three entities with the highest increase in its economic activity. Additionally, it showed an annual variation of 14.1%. Economic activities in Tabasco showed differentiated variations in the latest annual report. Primary activities, such as agriculture, livestock, fishing, and forestry, saw a decrease of 3.9%. In contrast, secondary mining, manufacturing, construction, and electricity activities grew by 18.4%.

Meanwhile, tertiary activities, which encompass goods distribution, services related to information, knowledge, recreation, and the government sector, reported an annual increase of 7.2%.

Tenosique municipality consists of 224 localities, of which 71.8% correspond to rural areas, while the remaining 28.2% is composed of urban zones. According to 2020 data from INEGI, the total population was 62,310 inhabitants, representing 2.59% of the state population of Tabasco. Of the total, 50.8% are women and 49.2% are men, with an average age of 29 years or less. The majority of the population is of Maya origin, with Ch'ol being the most spoken indigenous language in the municipality.

During the social mapping exercise⁴⁹ conducted at the meetings on December 5 and 6, 2024, the land uses outlined in the previous section were validated. The findings confirmed that the primary land uses in the consulted ejidos are centered around cattle ranching and small-scale agriculture. Livestock farming is carried out on small plots, ranging from 30 to 50 hectares, and the products derived from this activity are marketed. Subsistence agriculture includes the cultivation of vegetables, corn, watermelon, and squash. Sugarcane production has decreased compared to previous years; now, a small amount of cultivated sugarcane is used for maintaining the local livestock. A key factor driving land use change in this area is implementing the

⁴⁹ See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2024/Documents_Tenosique]

Sembrando Vida program, promoted by the national government, which has encouraged replacing subsistence crops with reforestation using fruit-bearing and timber trees. During this exercise, an area of archaeological importance for the community was identified, located outside the plantation areas. Fishing, practiced sporadically by community members, only occurs during the rainy season. No conflicts were identified between the use of water sources, crop areas, and the areas or activities carried out by AGSA.

BALANCÁN

Based on the municipal development plan Balancán, whose name comes from the Maya terms *Balam* (Jaguar) and *Kan* (Serpent), means "Place of Jaguars and Serpents." This municipality, which was inhabited by the Olmecs and Maya, preserves important archaeological remains in sites such as Moral-Reforma, El Arenal, Santa Elena, Tierra Blanca, Multé, and Tiradero.

Located between latitudes 17°25' and 18°11' north and longitudes 90°59' and 91°43' west, Balancán lies at an altitude ranging from 0 to 200 meters. It borders the state of Campeche to the north; to the east with Campeche and the Republic of Guatemala; to the south with the municipalities of Tenosique and Emiliano Zapata; and to the west with Emiliano Zapata and Campeche.

The municipality extends along the San Pedro and Usumacinta rivers, with several tributaries that house species such as snook, tilapia, pejelagarto, and bobo. Its territory is also home to rich fauna, including deer, rabbits, wild boars, turtles, parrots, parakeets, chachalacas, pijijes, and various species of snakes.

With an area of 3,573.57 km², which represents 14.47% of Tabasco, Balancán ranks second in size within the state.

In the municipality of Balancán, 1.78% of the population speaks indigenous languages, of these, 1.93% do not speak Spanish. The most spoken indigenous languages are Ch'ol (44.55%) and T'seltal (42.4%). Additionally, 1.58% of the population aged 3 years and older is considered Afro-Mexican or of African descent.

Balancán stands out for its agricultural vocation, with productive areas such as the highlands, rice-growing region, Vía, Plan Balancán, and river zones, which contribute a wide variety of products. Among the most important crops are corn, rice, sorghum, beans, and vegetables such as watermelon, which is of export quality.

The municipality is also important in livestock production, particularly of cattle and dairy products. However, in recent years, livestock production has been affected by several adverse factors, such as rising input costs, climate change, prolonged droughts, and excessive rainfall, which has led to an increase in cattle mortality. This has affected livestock reproduction and the marketing chain.

The results of the social mapping⁵⁰ carried out in Balancán showed that livestock farming is carried out on a medium scale, with a primary focus on the breeding of calves for meat processing. This practice has long been a cornerstone of the local economy, providing both sustenance and income to the rural families in the area. However, in recent years, there has been a shift in agricultural practices due to the implementation of the Sembrando Vida program. This government initiative has encouraged the adoption of polyculture, promoting the cultivation of crops like orange, coconut, and various forest species. As a result, traditional crops such as squash, beans, and corn, which were once staples in the region, have been abandoned or reduced in favor of these new, government-supported farming practices.

Balancán is also home to a extensive and ecologically significant lagoon system, which spans over 800 hectares. This network of waterways serves as a crucial resource for the local population, particularly for fishing activities. During the dry season, when the lagoons are more accessible due to lower water levels, families rely on fishing as an important source of food and income.

HUIMANGUILLO

As outlined in the municipal development plan, Huimanguillo is a municipality that houses the most important mountains in Tabasco, including Cerro Mono Pelado, the highest peak in the state, located in the mountainous region at 1,000 meters above sea level (masl). This mountain is not only an important tourist attraction but also a geographical landmark that marks the boundary between the states of Chiapas and Tabasco. Other lower mountains in the region include Cerro La Pava, La Ventana, La Copa, and Las Flores.

The results of the 2015 Intercensal Survey by INEGI regarding the surveyed population determined that Huimanguillo has a total population of 188,792 inhabitants, divided into 92,293 men, constituting 48.9%, and 96,499 women, corresponding to 51.1% of the population. It is natural to see that the population of the municipality tends to increase, as the growth of the municipal seat and its localities has led to urban expansion to accommodate outsiders or for residents to retain their heritage in Huimanguillo and opt to work within their homeland.

According to the 2015 Intercensal Survey by INEGI, no indigenous groups or speakers of indigenous languages were recorded in Huimanguillo. However, 14% of the total population considers themselves Afrodescendants. While there is an indigenous population, it constitutes a very small percentage in the municipality, and its origin is not specified. Additionally, a key indicator for identifying the indigenous population is if they have spoken their regional dialect for five or more years.

⁵⁰ See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2024/Dcoments_Balancán]

The agricultural activity in Huimanguillo focuses on the production of citrus fruits and staple grains. The municipality is the leading producer of pineapples in the state, as well as a significant producer of lemons. Orange cultivation accounts for 93.1% of the state's production. Huimanguillo also has advantages in the production of Hevea rubber and papaya, with shares of 70.5% and 52.8%, respectively. Although agro-industry is expected to boost the quality of life and promote the local economy, this potential is still not fully exploited.

Huimanguillo is one of the main livestock regions of Tabasco, ranking second in the production of both beef and dairy cattle. It also leads the state's production of poultry. Livestock is essential to the local economy, contributing significantly with products such as poultry (51.7%), cattle (15.8%), sheep (11.4%), and pigs (10.9%). Cattle farming is the most significant in terms of volume and monetary value. Additionally, the municipality has high potential in honey production, which accounts for 14.5% of the state's total, as well as beeswax, which makes up 9.6%.

In business terms, Huimanguillo stands out for its productivity and economic performance, ranking fifth in manufacturing production and excelling in fixed assets per occupied person. The oil industry has a significant influence, particularly due to the presence of PEMEX's gas and basic petrochemical areas. Contributing factors to this performance include the gross capital formation of value-added and the payment of premiums for movable and immovable property insurance, which represent a significant percentage of expenditure on the consumption of goods and services.

In the case of Huimanguillo, the social cartography⁵¹ showed that subsistence farming is less prevalent compared to other nearby municipalities such as Balancán and Tenosique. However, agricultural activity in this area is mainly focused on the cultivation of pineapples and lemons, two products that have gained importance in both regional and national markets. The demand for these products has driven their cultivation in extensive areas, which can cover up to 16,000 hectares, making Huimanguillo a key player in the production of these fruits.

On the other hand, livestock farming in Huimanguillo primarily takes place on small ranches, where animals are raised for local consumption and commercialization in nearby markets. Although livestock farming does not have the same level of importance as in other areas, it remains a significant source of income for rural families in the municipality.

As for fishing, this activity is carried out occasionally and is mainly intended for subsistence, reflecting a traditional practice of survival. Fishing in Huimanguillo does not have the same economic relevance as in other neighboring areas, but it remains an important resource during the seasons when local fishermen have access to the available bodies of water in the region.

⁵¹ See [Supporting documents/ NPRT/External risk/Community Engagement/ Meetings 2024/Documents_Huimanguillo]

In the context of the Agropecuaria Santa Genoveva S.A.P.I. de C.V. (AGSA) project, legal ownership of all farms involved has been confirmed through the corresponding property registry⁵² and plantation registry. AGSA holds legal title to all properties that are part of the project⁵³, and there are no third-party occupants in the project area. Historically, there have been no conflicts related to the tenure of these lands.

During the social mapping exercise carried out in the area, participants did not report significant conflicts related to land use. This suggests that, despite transitions in agricultural practices and the presence of forest plantations, there has been a relatively harmonious coexistence of different land uses, ranging from livestock to reforestation and fishing. This situation reflects the community's adaptability to new agricultural paradigms, while maintaining traditional practices that have sustained the local population for generations.

Additionally, the existence of a land tenure deed supporting the owner's use of the land and the absence of historical tenure disputes reinforces that the FPIC process is not applicable in this case. Since no conflicts over land use were identified and no third-party claims have been registered, and considering that the property is legally supported, there is no need for a free, prior, and informed consent process.

2.3.1.3 Communication mechanisms

In addition to the previously socialized Grievances and Suggestion procedure for employees⁵⁴, AGSA HR's team created an email address available to address any suggestions or doubts from employees.

In the case of other stakeholders, persons, neighbors, representatives of a population, or representatives of an association, the following have been established as possible channels of communication in the complaints or disputes document⁵⁵:

1. Direct verbal communication with an AGSA employee
2. Sending an e-mail (rhagsa@genoveva.com.mx)
3. Telephone 981 81 320 66 ext. 1000.

After receiving the communication, the established protocol indicates that:

⁵² See [Supporting documents/ Land Tenure/Properties register

⁵³ See [Supporting documents/ Land Tenure/Plantation register

⁵⁴ See [Supporting documents/ NPRT/External risk/Community Engagement/ PQCS Mechanism

⁵⁵ See [Supporting documents/ NPRT/External risk/Community Engagement/ PQCS Mechanism

1. Verbal communications are directed to the generation of a written communication containing, date, name of the person or entity requesting and reason for the communication. All AGSA employees are able to give these suggestions.
2. All communications received are directed at the human resources department.
3. In the case of complaints or disputes, the applicant will be asked to attach evidence of the situation that is the subject of the complaint or dispute.
4. Complaints or controversies will be analyzed by a committee made up of managers and directors.
5. The committee has a maximum of 2 weeks to convene with the applicant and engage in a dialogue or negotiation.
6. The meetings, dialogues and negotiations will be documented by AGSA.
7. The first phase of the procedure for handling complaints and disputes is intended to be resolved through respectful dialogue and reaching agreements between the parties. These meetings should be documented, with the authorization of the parties, by means of the complaint log, written documents and photographs. If the case is closed in this phase, a written communication is sent to the applicant.
8. The second phase is carried out when it has not been possible to resolve the complaint or controversy, in which case the parties go to a neutral third party, the Ministry of Labor and Social Welfare, CONAGUA, Semarnat, the Ejido Commissioner's Office or the City Council.
9. The agreements and decisions reached in this instance must be recorded and communicated in writing, as well as filed by AGSA.
10. In cases in which the dispute cannot be resolved, the third instance consists of going to court and following the procedures and decisions established there. The resulting decision and documentation will be filed by AGSA.

In addition, the procedure establishes that, in each of the phases, the parties involved must refrain from commenting on the case outside the formal spaces for dialogue. The procedure has been made known to all company personnel, installed in the surveillance bases, and handed out to the local commissioners.

During the verification period, no Grievances or Suggestions were received, and no disputes were raised from any stakeholder. In contrast, the requests received at the main ranch, located in Campeche state, were associated with requests for support with inputs for road maintenance and waste management these requests were satisfactorily attended to. These requests were received in writing, were satisfactorily dealt with and formalized in writing. Furthermore, it is reported that there was no conflict of any kind between the project and the stakeholders.

San Francisco Suc Tuc Hopelchen Campeche a 10 de Junio 22

C. Ing. Eduardo Torres
Responsable del Área de
Protección Ambiental del
Rancho Santa Genoveva.
Presente:

Por medio de la presente y de la manera
mas atenta me dirijo a ud. para solicitarle su valioso
apoyo, para que nos proporcione 5 tambores vacios para
la recolección de basura en la comunidad de San Francisco
suc Tuc. si esta en sus posibilidades poder apoyarnos
para mantener limpia nuestra comunidad.
Agradeciendo de antemano su atención me
despido de ud. enviándole un cordial saludo

ATTE
Jose Alfredo Poot Aguayo
Comisario Municipal de San Francisco
SUC TUC.

Jic. Hector Louroche Cruz
Ing. Hugo Fernandez Carrillo
Empresa Sta Genoveva
Presente:

Asunto: Solicitud

Por esta medio la localidad de Chucero San Luis Municipio
de Hopelchen, a través de su Autoridad Estatal me dirijo a
ustedes con la finalidad de informarle que actualmente se
está realizando el Raspeado del Camino de Terracería que
conduce de Chucero San Luis - al Camapucuto Yemomita
Nueva Esperanza, ubicado a intersección la entrada a la
empresa Sta Genoveva, en la que transita personal que
labora en dicha empresa
Motivo por el cual me dirijo a ustedes para solicitarles su
colaboración para continuar con el mantenimiento de dicho
camino, la solicitud consiste en 200 litros de Combustible Diesel
y letreros informativos que se instalarán en el trayecto
del camino para prevenir accidentes
esperando que esta solicitud sea atendida en forma
favorable, para el beneficio de todas las que en este
trayecto van y que me despido de ustedes, más
antes enviándole un cordial saludo
Chucero San Luis Hopelchen Campeche a 10 agosto/22



Testado en la
Linda Luis Ochoa
Comisario Estatal

CARTA DE AGRADECIMIENTO

Ing. Víctor Hugo Fernández Carrillo
Lic. Héctor González Cruz
Directores de Rancho Santa Genoveva

Por este medio le presento mi gran agradecimiento por habernos apoyado con la
solicitud realizada semanas antes respecto a donación de 5 tambores para basura del
poblado de San Francisco Suc Tuc.

Estos tambores que nos fueron entregados por el personal de la empresa
Agropecuaria Santa Genoveva SAPI. de C.V. servirán para mantener limpia nuestra
comunidad.

Gracias por apoyarnos.

Atte.
JOSÉ ALFREDO POOT AGUAYO
Comisario Municipal de San Francisco Suc Tuc

RECIBO DE DONATIVO

Recibí de la empresa AGROPECUARIA SANTA GENOVEVA SAPI DE
CV, la cantidad de 200 litros de diesel por concepto de donación para la
maquinaria que está dando mantenimiento al camino de terracería de
Crucero San Luis a Rancho Santa Genoveva.

Fecha: 19-8-22

Maquinaria a la que se le entregó el diesel:

Motocombinadora Motor GRADER 736598 Serie F CAT

Nombre de comisario: Jorge Luis Chan Huchin

Firma:

Sello:

Testigos: Secretario: Jorge Luis Chan Huchin

Tesorerero: Miguel Ángel González Carrillo

Jorge Israel May Herrera / Abogado: Roberto Toranzo

Jose Guadalupe Lech Kua / Pedro Ferra / Ismael Enríquez Cueto

Figure 15. Evidence of requests for assistance

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

During this monitoring period, activities related to the first phase and outlined in the first verification period were maintained. The most significant change was the establishment of 147.34 ha of new planted areas in 2021. Activities related to protocols for soil selection, nursery improvements, water supply, water excess prevention, control of pests and diseases, the mechanization of thinning, training of workers, and benefits for the communities were mentioned in Section 2.1.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation is proposed.

3.2.2 Project Description Deviations

The following sections present the updates on the project description (PD) for the third monitoring period. These changes do not deviation impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

3.2.2.1 Forestry Management Measures

Thinning:

For teak, as indicated in Section 1.8 of the PD and the monitoring report of the second verification period, thinning practices can vary depending on the genetic material and the environmental conditions in the area. Despite the initial thinning schedule, intended to be carried out in years 4, 6, and 11, the calendar and intensity of thinning was adjusted according to the project proponent's experience with the current management unit and the data registered in the project plantations. Table 8 presents the thinning rate for the two management profiles considered.

Table 8: Thinning rate for each management profile

Management profile	Years since the beginning of the plantation	Thinning (%)
Management 1	8	35
	10	28
	13	29

Management profile	Years since the beginning of the plantation	Thinning (%)
Management 2	7	53
	10	28
	13	29

Replanting:

Every stand of the plantation will be subsequently replanted after the final harvest in year 18. This will guarantee that the permanence of their carbon stock against which VCUs are issued is maintained and not lost during a final cut with no subsequent replanting or regeneration.

3.2.2.2 Estimated Net GHG Emission Reductions and Removals

Stratification:

As stated in the PD, the stratification of the project was based on establishment year and plot quality qualification according to the growth model for *T. grandis* developed by Tamarit (2013)⁵⁶ in the project region. Due to the fluctuating yield across the plantation cycle, the initially proposed approach may result in varying quality qualifications for lots during measurement events. To address this issue, a new stratification scheme based on the planting year and localization (municipality) is proposed in this Monitoring Report (see Table 9).

Table 9: Stratification of Ex-ante actual net GHG removals

Strata	Year	Municipality	Management profile ⁵⁷	Area (ha)
1.1	2013	Candelaria/ Carmen	Management 1	377.7
1.2	2013	Palenque	Management 1	424.1
2.1	2014	Balancán/ Candelaria	Management 1	151.9
2.2	2014	Huimanguillo	Management 2	1,052.1
3.1	2015	Huimanguillo	Management 2	1,145.8
4.1	2016	Balancán	Management 1	418.0
4.2	2016	Tenosique	Management 1	173.3
5.1	2017	Balancán	Management 1	132.8
5.2	2017	Candelaria	Management 1	222.9
5.3	2017	Salto de Agua/ Tenosique	Management 1	60.2

⁵⁶ See [Supporting documents/Estimations/ Growth model explanation]

⁵⁷ Management profile for Thinning (see Section 3.2.1)

Strata	Year	Municipality	Management profile ⁵⁷	Area (ha)
6.1	2018	Balancán	Management 1	184.9
6.2	2018	Candelaria	Management 1	461.8
6.3	2018	Carmen	Management 1	377.1
7.1	2019	Escárcega	Management 1	710.1
7.2	2019	Palenque/ Tenosique	Management 1	205.9
8.1	2021	Carmen	Management 1	147.3

Root-to-shoot ratio (R) parameter:

This parameter was updated according to the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2, which states that, unless transparent and verifiable information can be provided to justify a different value, this value can be estimated using the following equation:

$$R = \frac{e^{(-1,085+0,9256*\ln(AGB))}}{AGB}$$

Where:

AGB above-ground tree biomass per ha; t d.m.ha⁻¹

This equation was used in the present monitoring period. The value used in the first verification period was a generic one provided by literature which can be applied across a very broad and unspecific scope. The formula currently in use involves the real biomass estimated for the project, which provides a more accurate value for the R parameter.

Estimation of carbon stocks in trees:

The estimation of carbon stocks in trees was made based on the tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2, of the AR-ACM0003 methodology, as follows:

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

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

$$b_{TREE} = V_{tree} * D * BEF * (1 + R_{TREE})$$

$$R_{TREE} = \frac{\exp(-1.085 + 0.9256 * \ln(AGB_{TREE}))}{AGB_{TREE}}$$

Where:

C_{TREE}	Carbon stock in tree biomass; t CO ₂ e.
CF_{TREE}	Carbon fraction of tree biomass; tC t d.m. ⁻¹
B_{TREE}	Tree biomass; t d.m.
A	Sum of areas of the strata; ha.
b_{TREE}	Tree biomass strata per hectare; t d.m. ha ⁻¹
V_{tree}	Tree volume per hectare; m ³ ha ⁻¹
D	Basic wood density (over-bark); t d.m. m ³
BEF	Biomass expansion factor; dimensionless
R_{TREE}	Root-to-shoot ratio for trees; dimensionless
AGB_{TREE}	Above ground biomass per hectare; t d.m. ha ⁻¹

The refinement of ex-ante estimates to reflect the current project yield involved assessing tree volume through the application of the mean annual increment (MAI). This assessment utilized data from forest inventories conducted in 2022 for this monitoring report. Specifically, calculations for MAI focused exclusively on the older lots (aged 8 and 9 years), where no thinning had occurred⁵⁸. This approach was adopted due to the ongoing cutting cycle of 18 years, with a consideration for the remaining years. Additionally, the thinning volume was discounted in the ex-ante estimates in accordance with the established management profiles (see Section 3.2.1).

Table 10: Parameters used for the estimation of carbon stocks in trees

Parameter	Symbol	Value	Source
Basic wood density; t d.m. m ⁻³	D	0.59	Rodríguez-Anda, R., Fuentes, T., & Silva-Guzmán, J. A. (2012) ⁵⁹
Biomass expansion factor; dimensionless	BEF	1.50	Intergovernmental Panel on Climate Change (IPCC) (2003) ⁶⁰

⁵⁸ [Supporting documents\Estimations\Ex-Post 3V Teak Mex]

⁵⁹ See supporting folder [Supporting documents\Estimations\Wood density]. The wood density used is the average value found in the AGSA plantations (Rodríguez-Anda et al., 2012).

⁶⁰ IPCC. (2003). *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. The BEF values used for a 'tropical' climatic zone and 'broadleaf' forest type were taken from Table 3A.1.10, Annex 3A.1.

Parameter	Symbol	Value	Source
Carbon fraction of tree biomass; tC t d.m. ⁻¹	CF _{TREE}	0.47	IPCC, 2006 ⁶¹
Mean annual increment of volume; m ³ ha ⁻¹ y ⁻¹	MAI	16.82	Ex-post estimates ⁶² .

Estimation of carbon stocks in dead wood and litter

Carbon stocks in dead wood and litter were calculated according to 'A/R Tool 12 Estimation of carbon stocks and change in carbon stocks in dead Wood and litter in A/R CDM projects activities' of the AR-ACM0003 methodology, which accepts the use of a conservative default value that relates the carbon content in deadwood and litter as a percentage of the total carbon in the tree biomass.

Estimation of carbon stocks in dead wood

$$C_{DW} = C_{TREE} \times DF_{DW}$$

Where:

- C_{DW} : Carbon stock in dead wood; t CO₂e
- C_{TREE} : Carbon stock in tree biomass; t CO₂e
- DF_{DW} : Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; per cent

Estimation of carbon stocks in litter

$$C_{LI} = C_{TREE} \times DF_{LI}$$

Where:

- C_{LI} Carbon stock in litter; t CO₂e
- C_{TREE} Carbon stock in tree biomass; t CO₂e

⁶¹ IPCC. (2006). Table 4.3., Chapter 4: Forest Land. In IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4: Agriculture, Forestry and Other Land Use.

⁶² [Supporting documents\Estimations\Ex-Post 3V Teak Mex]

DF_{LI} Conservative default factor expressing carbon stock in litter as a percentage of carbon stock in tree biomass; per cent

Table 11 shows the default values to estimate carbon stocks in dead wood and litter:

Table 11: Conservative default factor expressing carbon stock in dead wood and litter

Parameter	Symbol	Value (%)	Comments
Conservative default factor expressing carbon stock in DW as a percentage of carbon stock in tree biomass	DF_{DW}	1	Biome: tropical Elevation: <2,000 m Precipitation: 1,000–1,600 mm/year ⁶³
		6	Biome: tropical Elevation: <2,000 m Precipitation: >1,600 mm/year ⁶⁴
Conservative default factor expressing carbon stock in litter as a percentage of carbon stock in tree biomass	DF_{LI}	1	Biome: tropical Elevation: <2,000 m Precipitation: >1000 mm/year

Baseline emissions

Baseline emissions estimation was carried out using the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2.

In order to estimate the baseline emissions, it is essential to mention the three types of vegetation present in the project area before the start of project activities, these being:

- grassland matrix;
- scattered trees and shrubs in a grassland matrix; and
- citrus shrubs.

⁶³ A value of 1% was applied to areas located in Campeche (Stratum 3) as precipitation there is less than 1,600 mm. See [Supporting documents\Climate_project_area]

⁶⁴ A value of 6% was applied to areas located in Chiapas and Tabasco (Strata 1 and 2) as precipitation there is greater than 1,600 mm. See [Supporting documents\Climate_project_area]

Grassland baseline

According to Section 3 of the PD, ex-ante estimations of carbon stock and the change in carbon stock in the project scenario for the grassland baseline would be estimated as zero.

Shrubs and citrus crop baseline

According to Section 10 of the methodological tool 'AR-TOOL 14', v.04.2, the annual change in carbon stock in shrubs must be estimated as follows:

$$\Delta C_{SHRUB,t} = \frac{C_{SHRUB,t_2} - C_{SHRUB,t_1}}{T} * 1 \text{ year}$$

Where:

$\Delta C_{SHRUB,t}$	Change in carbon stock in shrubs within the project boundary between times t_1 and t_2 ; t CO ₂ e year ⁻¹
C_{SHRUB,t_1}	Carbon stock in shrubs within the project boundary at time t_1 ; tCO ₂ e
C_{SHRUB,t_2}	Carbon stock in shrubs within the project boundary at time t_2 ; tCO ₂ e
T	Time elapsed between two successive estimations ($T=t_2-t_1$); year

A value of 57.57 t CO₂e ha⁻¹ was adopted for the carbon stock in shrubs, according to Mexico's forest reference emission level (FREL).⁶⁵ For citrus crops, a value of 105.97 t CO₂e ha⁻¹ was adopted according to information presented in Yepes et al. (2011).

Net GHG Emissions and Removals

Change in carbon stock for the project was calculated according to the methodology 'AR-ACM0003', v.2.0:

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t}$$

Where:

$\Delta C_{P,t}$	Change in project carbon stock occurring in the selected carbon pools in year t ; t CO ₂ e
$\Delta C_{TREE_PROJ,t}$	Change in carbon stock in tree biomass in the project area in year t , as estimated in the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2; tCO ₂ e

⁶⁵ SEMARNAT. (n.d.). *National forest reference emission level proposal México*. See "Secondary Deciduous Tropical Forest" in Table 4. https://redd.unfccc.int/files/frel_mexico_english_version_jan15f.pdf

ΔC_{SHRUB_PROJ}	Change in carbon stock in shrub biomass in the project area in year t , as estimated in the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2; tCO ₂ e
$\Delta C_{DW_PROJ,t}$	Change in carbon stock in DW in the project area in year t , as estimated in the methodological tool 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1; tCO ₂ e
$\Delta C_{LI_PROJ,t}$	Change in CLI in the project area in year t , as estimated in the methodological tool 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1; tCO ₂ e

Net anthropogenic GHG removals by sinks were calculated as follows:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$

Where:

$\Delta C_{AR-CDM,t}$	Net anthropogenic GHG removals by sinks in year t ; t CO ₂ e
$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks in year t ; t CO ₂ e
$\Delta C_{BSL,t}$	Baseline net GHG removals by sinks in year t ; t CO ₂ e
LK_t	GHG emissions due to leakage in year t ; t CO ₂ e

LK_t can be considered as zero according to Sections 5.3, 5.4, and 5.5 of the methodology 'AR-ACM0003':

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

Calculation of Verified Emissions Reductions (VERs):

According to VCS Standard v4.5, for those projects where harvesting practices are contemplated on project activities, the loss of carbon due to harvesting shall be included in the quantification of the project emissions. The maximum number of GHG credits available to projects shall not exceed the long-term average (LTA) which is calculated as follows:

$$LTA = \frac{\sum_{t=0}^n (PE_t - BE_t)}{n}$$

Where:

LTA	The long-term average GHG benefit
PE_t	The total to-date GHG emission reductions and removals generated in the project scenario (tCO ₂ e). Project scenario emission reductions and removals shall also consider project emissions of CO ₂ , N ₂ O, CH ₄ and leakage
BE_t	The total to-date GHG emission reductions and removals projected for the baseline scenario (tCO ₂ e)
t	year
n	Total number of years in the established time-period

As previously indicated, Teak Mex is defined as a grouped project characterized by the phased expansion of its project area through the sequential establishment of new stands during various years. To ensure an equitable distribution of benefits across the project area, LTA estimates have been individually computed for each stratum, encompassing the entire crediting period and aligning with complete harvesting cycles. Finally, the overall LTA for the project was estimated by adding the values calculated for each stratum.

The LTA GHG benefit of the third phase was calculated as 710,672 tCO₂e after the buffer discount (see 'Supporting documents/Estimations/Ex-Ante 3V Teak Mex').

3.3 Grouped Projects

3.3.1 Eligibility Criteria for Third Phase Areas

An eligibility analysis has been developed that considers all the eligibility criteria proposed by the VCS to define the third phase project area. In order for any new eligible areas to be included as instances willing to participate with the proposed grouped project, they must meet the following criteria:

- Be within one of the designated geographic areas specified in the project description (PD).
- Comply with the following eligibility criteria:
 - 1) All areas to be incorporated in the grouped project must meet the applicability conditions set out in the methodology applied to the project:

- 1.1) No evidence of forest in the project area at the beginning of reforestation activities.⁶⁶ This criterion will be proven by ground truthing, satellite images, aerial photographs, official maps, or land use records (as presented in the subsection below).
- 1.2) The land cannot be categorized as wetlands.
- 2) Use the technologies or measures specified in the project description⁶⁷.
- 3) Apply the technologies or measures in the same manner as specified in the project description⁶⁸.
- 4) All areas are subject to the baseline scenario determined in the PD for the specified project activity and geographic area⁶⁹.
- 5) The new instances shall have characteristics with respect to additionality⁷⁰ consistent with the initial phase of the specified project activity and geographic area, such as:
 - 4.1) inclusion in the monitoring report with sufficient information (e.g., technical and geographic) in compliance with the eligibility criteria;
 - 4.2) validation at the time of verification against the eligibility criteria described above;
 - 4.3) evidence of project ownership over each instance of project activity, held by the project proponent from the respective activity start date⁷¹;
 - 4.4) a start date (2021 for the third instance area Teca de Oro) is later than the grouped project start date⁷²; and
 - 4.5) crediting eligibility from the start date of the project activity through to the end of the project crediting period only. Note that, where a new instance of project activity has begun in a previous verification period, no credit may be claimed for

⁶⁶ The CDM defines Mexico's forest as a minimum continuous area of 1 ha with a crown cover greater than 30% and a minimum potential in situ height of 4 m. <https://cdm.unfccc.int/DNA/index.html>

⁶⁷ Technologies and measures used in the new instances are the same as those described in the PDD section "1.8 Description of the Project Activity" and in this MR in section 4.3 Monitoring Plan

⁶⁸ Technologies and measures in the new instances are applied in the same manner as those described in the PDD section "1.8 Description of the Project Activity" and in this MR in section 4.3 Monitoring Plan

⁶⁹ The new areas are also subject to the same baseline scenario determined in the PDD section 2.4, which is mainly livestock farming. This is also consistent with the results presented in this MR in section 3.3.2.2 Results, where the areas to include as new eligible areas correspond to grassland and scrubland.

⁷⁰ The new areas are under the same additionality characteristics described in the section of the PDD, which was based on a barriers analysis, and which are preserved for the present as they are in the same territory as the previous areas and under the same socioeconomic dynamics.

⁷¹ See [Supporting Docs\NPRT\External risk\Land Tenure\Plantation register \Campeche\TECA DE ORO plan

⁷² Teca de Oro plantation is established in 2021. Eligibility will be maintained for the crediting period of the project.

any GHG emission reductions or removals generated. New instances are eligible for crediting from the start of the next verification period.

- 4.6) Same barriers as those identified in the initial analysis (PDD section 2.4)
- 6) The project activity should be under the control of the project participants⁷³.

3.3.2 Analysis of Forest/Non-Forest

3.3.2.1 Methodology

The eligibility process for the new area was developed for one plantation property established in 2021 in the municipality of Carmen, Campeche state, and was later used as the reference for areas evaluated in the third phase.

For an area to be considered eligible and, thus, included in the project area, it must not meet the CDM definition of forest for a minimum period of 10 years prior to the project start.⁷⁴ To verify this requirement, a historical forest cover search and analysis was carried out using Advanced Land Observing Satellite Advanced Visible and Near Infrared Radiometer type 2 (AVNIR-2)⁷⁵ and Planet⁷⁶ medium-resolution multispectral imagery. Figure 16 shows the five main steps that make up the methodological flow for the identification of eligible areas for A/R projects: data acquisition from official sources and satellite images (free access); data standardization; forest and non-forest classification by visual inspection of the extreme years of the baseline; identification of the areas that meet the eligibility criteria; and, finally, verification of the absence of wetlands and forests (intermediate years) in the eligible areas.

⁷³ New instances have the same owner (Agropecuaria Santa Genoveva). ⁷³ See Supporting [Docs\NPRT\External risk\Land Tenure\Plantation register \Campeche\TECA DE ORO]

⁷⁴ The CDM defines Mexico's forest as a minimum continuous area of 1 ha with a crown cover greater than 30% and a minimum potential in situ height of 4 m. <https://cdm.unfccc.int/DNA/index.html>

⁷⁵ <https://search.asf.alaska.edu/#/>

⁷⁶ <https://account.planet.com/signin>

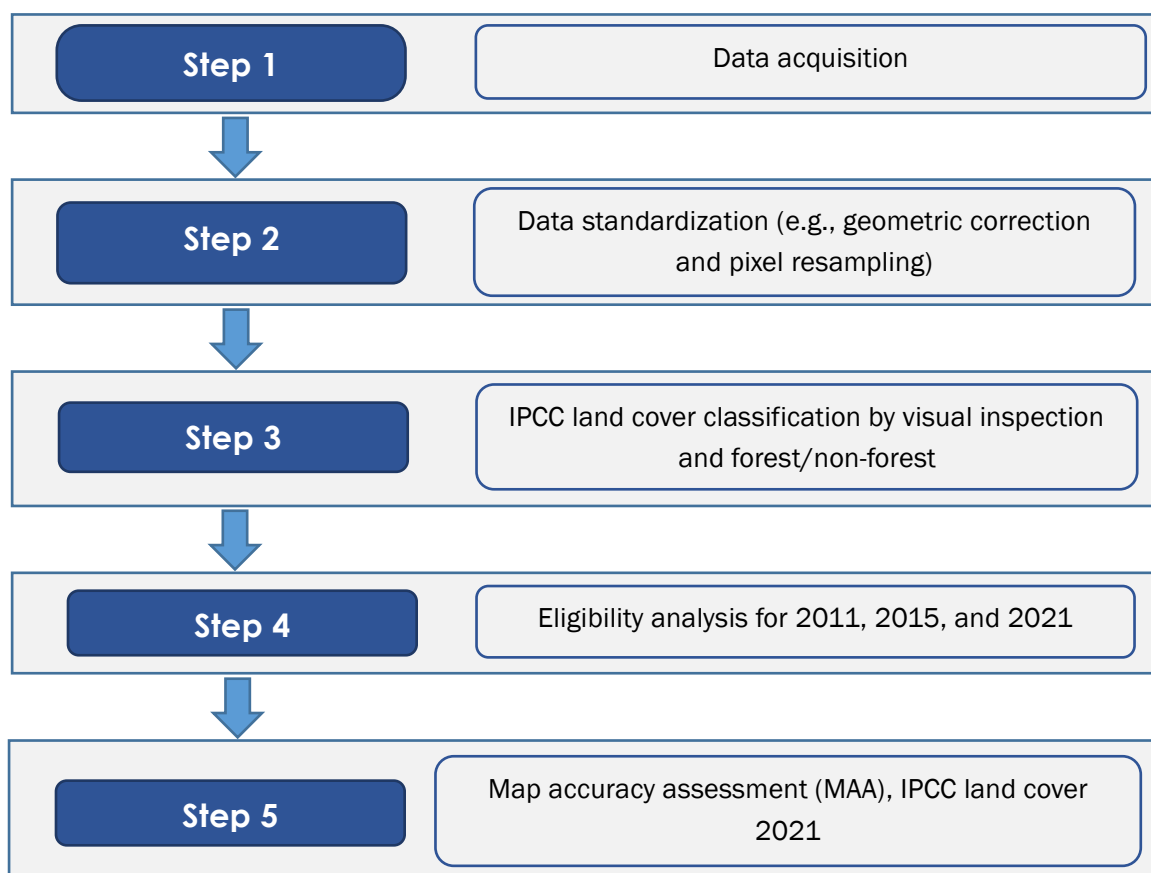


Figure 16: Methodology Developed for the Eligibility Analysis

- Step 1: Data acquisition**

South Pole works with AVNIR-2 and Planet multispectral images with level two processing, which guarantees products with atmospheric correction at surface level, geometric correction pixel by pixel without displacement, and quality bands to process pure pixels. Table 12 shows the optical images downloaded by date and location for the entire project area.

Table 12: Pixel Value Associated with Various Covers

Sensor	Processing level	Date of acquisition
AVNIR-2	L2	01/06/2011
AVNIR-2	L2	02/21/2011
Planet	L2	12/2015
Planet	L2	02/2021

Sensor	Processing level	Date of acquisition
Planet	L2	12/2021

- Step 2: Data standardization**

Taking into account spatial resolutions of 10 m and 4 m for the AVNIR-2 and Planet satellites, respectively, the satellite images were standardized using the wall-to-wall geometric correction methodology, whereby the orthorectified images from AVNIR-2 were taken as a base and the images from Planet were corrected by 15 control points and a root mean square of less than 1.

- Step 3: IPCC land cover classification**

The process for class definition and the methodological process for land cover classification is described as follows:

Class definitions

Definitions for the land cover classifications used in this project are based on the 2006 IPCC methodology, which establishes the criteria and categories of land use and land cover.⁷⁷ Table 13 shows the categories used and those identified in the project area.

Table 13: IPCC Land Cover Classifications

IPCC land cover category	Classification	Forest/non-forest
Forest land	Forest	Forest
	Forest planting	Non-forest
Cropland	Cropland	Non-forest
Grassland	Grassland	Non-forest
	Scrubland	Non-forest
Wetland	Wetland	Non-forest ⁷⁸
Settlement	Settlement	Non-forest ⁷⁹
Other land	Other land	Non-forest

⁷⁷ <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

⁷⁸ Areas representing wetlands are non-eligible.

⁷⁹ Areas representing settlements are non-eligible.

Image digitization

The project area concentrates on land used as forest plantations and pastures. Thorough and detailed classifications are therefore chosen by digitizing, at a scale of 1:25,000, satellite images of forest stands (greater than or equal to 0.5 ha), forest cover, forest planting, grassland, scrubland, and land cover present in the three years used as baseline, i.e., 2011, 2015, and 2021. This process is guided by an expert in remote sensing (RS) and geographic information systems (GIS).

- **Step 4: Eligibility analysis for the years evaluated**

Using the forest and non-forest layers for the period, a cartographic overlay of the years 2011, 2015, and 2021 is generated to determine the layer of change between coverage and eligibility across pairs of years. Table 14 shows the eligibility criteria used, assuming that an area is eligible when it shows instability during the 10 years of the analysis (i.e., the gross deforestation approach) and that any remaining areas are ineligible. In the case of eligibility for regrowth, areas that were planted throughout the baseline are considered eligible. Finally, areas with no information are not reported.

Table 14: Eligibility Criteria

Year (2011)	Year (2015)	Year (2021)	Eligibility
Forest	Forest	Forest	Ineligible
Forest	Forest	Non-forest	Ineligible
Forest	Non-forest	Non-forest	Ineligible
Forest planting	Forest planting	Forest planting	Ineligible
Forest planting	Forest planting	Non-forest	Ineligible
Forest planting	Non-forest	Non-forest	Ineligible
Non-forest	Non-forest	Non-forest	Eligible

- **Step 5: MAA**

MAA is a set of measurement calculations indicating whether the generated cartographic information has been well classified in terms of the probability that each class matches reality (i.e., the control points represent the terrain), that the map has a low error of omission and commission, and that the results are replicable and comparable.

The accuracy assessment for the 2021 land cover map was validated using a confusion matrix with commission errors, i.e., pixels mistakenly classified as a land cover class to which they do

not belong, and omission errors, i.e., pixels corresponding to a land cover class they were not classified as belonging to. This results in a percentage of the overall accuracy of the classification, where the classification obtained was compared to a random distribution of control points. The total number of points was calculated from the total number of polygons in each layer, considering the finite population calculation methodology proposed by Morillas (2007). If a point at a visual scale of 1:5,000 belonged to the forest or non-forest class, the geospatial solutions expert would undertake a point-by-point evaluation of this information. This was done using the multispectral image repositories of Google Earth, Microsoft Bing Maps, and Esri Basemaps. The ArcMap 10.8 Confusion Matrix tool was used to make the comparisons and deliver the general accuracy of the classification.

3.3.2.2 Results

Land cover classification.

The IPPC land cover classification of the Teak Mexico project conducted via visual inspection and digitization using AVNIR-2 and Planet images for the years 2011, 2015, and 2021 found the presence of forest, plantings, grassland, and shrublands (see Figure 17, Figure 18, and Figure 19). In the case of the Teca de Oro 1 lot (see Table 15), the presence of plantings in 2011 and 2015 and forest in 2011 were considered non-eligible areas, leaving only regions of pasture and shrublands in the eligible areas throughout the baseline.

Table 15: Land Cover Classification of Teca de Oro 1

Land cover	Baseline		
	2011	2015	2021
Forest (ha)	4.88	0.00	0.00
Forest planting (ha)	264.20	224.97	0.00
Grassland (ha)	147.34	39.24	358.88
Scrubland (ha)	0.00	152.23	57.55

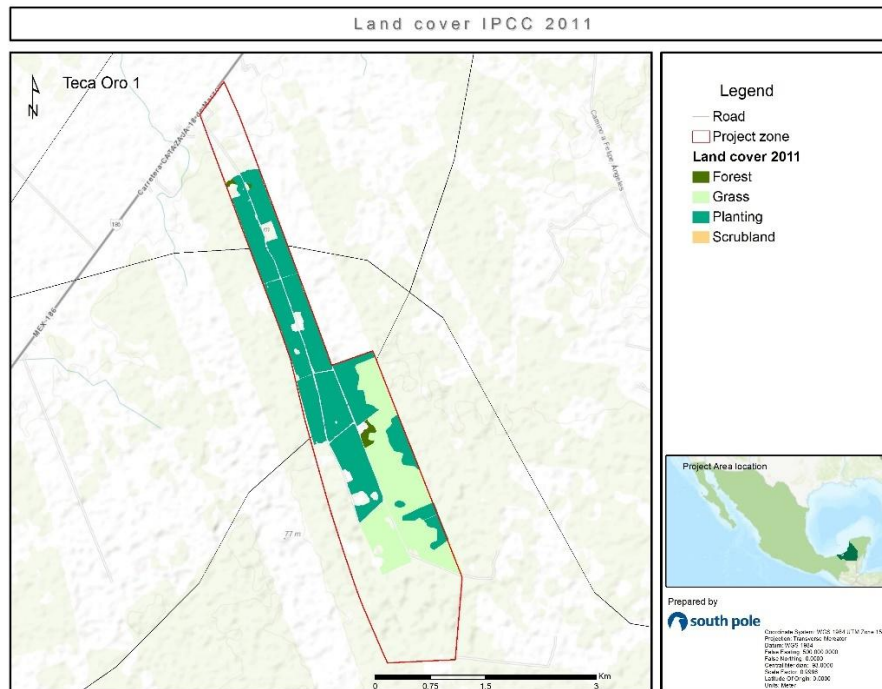


Figure 17: Land Cover in 2011

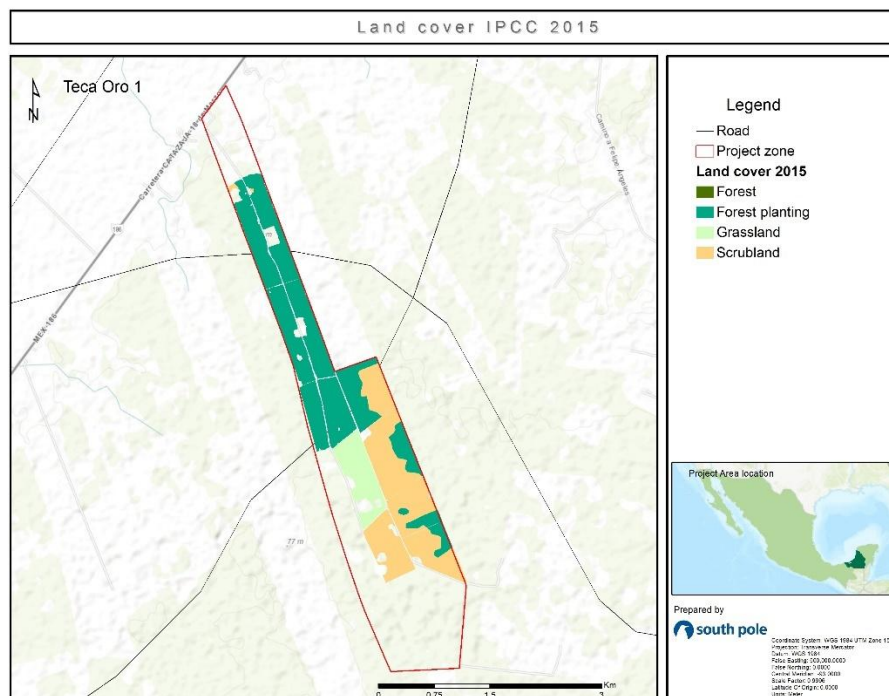


Figure 18: Land Cover in 2015

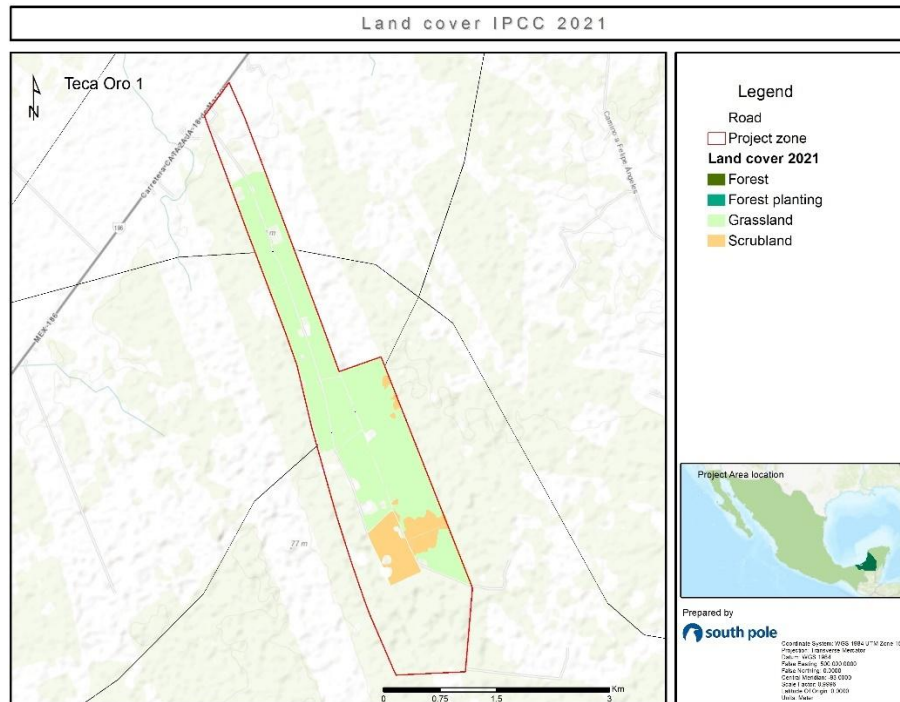


Figure 19: Land Cover in 2021

ARR eligibility

The forest/non-forest cover for the years 2011, 2015, and 2021 is used for the project area, where the areas that remained as stable non-forest in all three years of the cartographic overlay are delimited and classified as eligible areas. Conversely, areas with stable forest or those that have lost their forest cover in any year are classified as non-eligible areas.

Figure 20 shows the distribution of the eligible areas in the project area within a total property area of 416.43 ha. The eligible area of the Teca de Oro 1 lot represents 147.34 ha or 35% of the lot surface (see Table 16). Details of areas included for third instance are presented in Table 17

Table 16: Eligibility in 2021

ARR eligibility	Teca de Oro 1 (ha) 2011
Eligible	147.34
Ineligible	269.09
Total	416.43

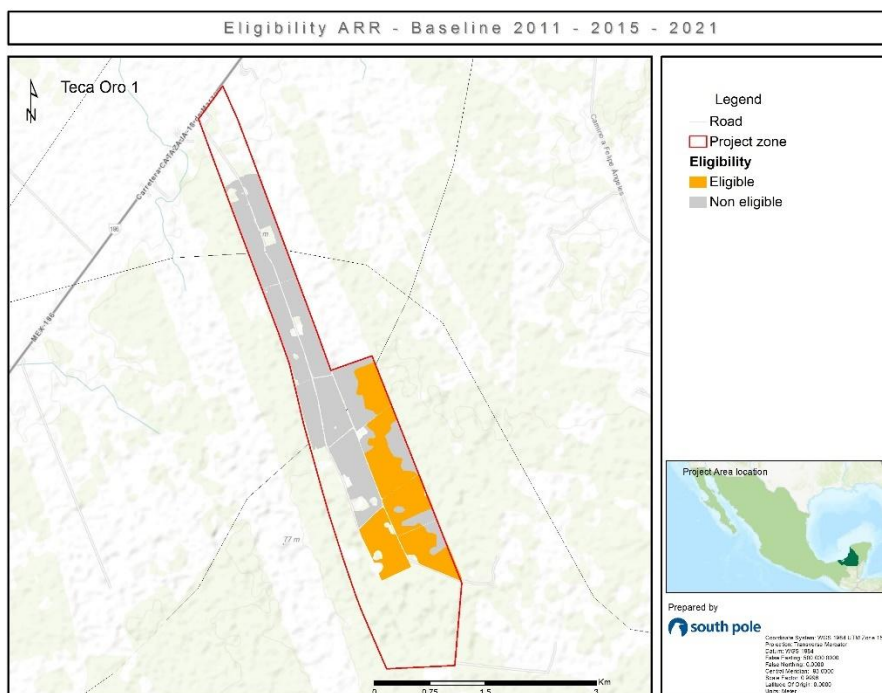


Figure 20: Eligibility Map in 2011, 2015, and 2021

Table 17: Areas included for third instance.

LMF	Plantation date	Eligible area (ha)
7-133	01/07/2021	20.82
7-135	01/08/2021	38.32
7-136	01/09/2021	31.93
7-137	01/08/2021	28.50
7-138	01/08/2021	27.77
Total		147.34

Calculation of classification accuracy

The land cover of the Teak Mexico project in 2021 was validated with 2021 satellite images, using a set of statistics that indicate whether the generated cartographic information is well classified according to: 1) the probability of land cover detection with respect to reality; 2) the acquisition of control points representing the terrain; 3) the land cover as a whole, maintaining a low occurrence of omission and commission errors; and 4) if results can be replicated and compared.

The data acquired, sampling design, and results obtained by the confusion matrix from the accuracy evaluation are shown below.

Data acquisition

To assess the accuracy of land cover in the project area in 2021, South Pole worked with WorldView-2 and WorldView-3 multispectral images, mosaics with spatial resolutions of less than 1 m and an average cloudiness of less than 1% in the project zone, and images provided by the Esri licensing that South Pole has for commercial use. Table 18 shows the use of optical images of the entire project area by date and location.

Table 18: Statistical Values for the Sample Forest and Non-Forest in the Year 2021

Lot name	Sensor	Date of acquisition
Teca de Oro 1	WorldView-2	2021/02/06

Figure 21 shows a composite image of WorldView image mosaics of the project zone in the year 2021 in RGB 3, 2, 1 composition.

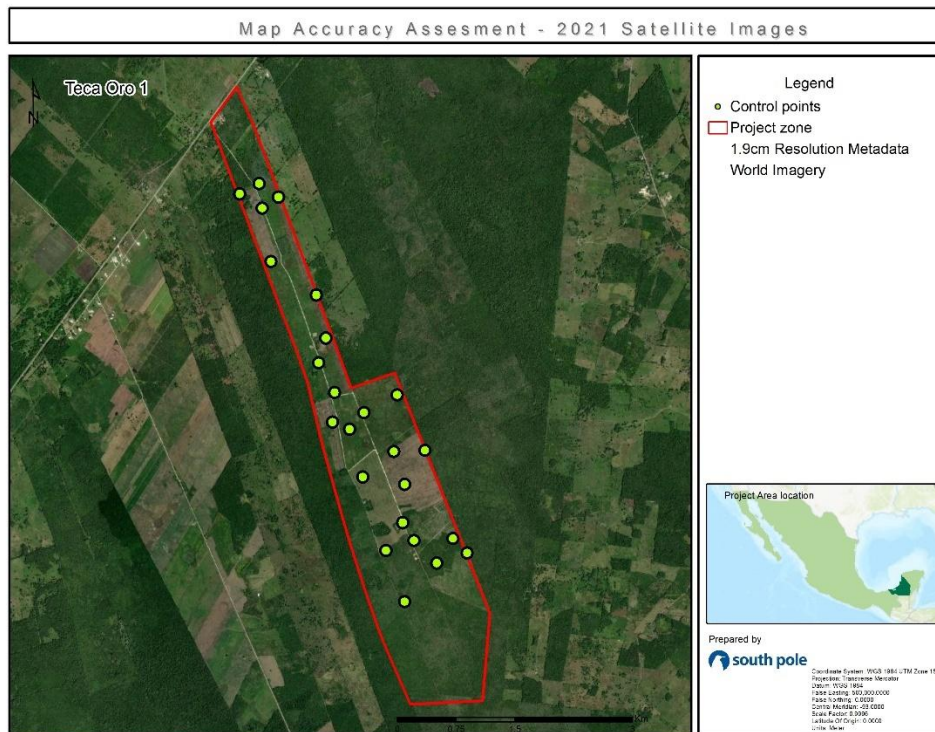


Figure 21: WorldView-2 and WorldView-3 Image Mosaic for the Year 2021 in RGB 3, 2, 1

Sample design.

In order to validate the land cover types (i.e., forest, planting, scrubland, and grassland) in 2021 using the WorldView-2 and WorldView-3 sensor image mosaics, a method of enlisting a GIS and RS expert to perform a visual inspection of a random sample of points within the project area was adopted. For a population of 113 segments of land cover with a maximum expected margin of error of 5%, the sample size for a 95% confidence level is 88 points.

The ArcMap 10.8 Compute Confusion Matrix tool was used to perform the following calculations (Esri, 2021):

- Table 19 shows the results of the MAA for land cover classification in the year 2021, with an overall accuracy of 93.18% with respect to the control points with classes correctly assigned (i.e., forest, plantation, scrub, and grass), classification errors by omission of less than 20%, and errors by visual assignment commission into the non-forest classes of 10%, with a hit rate of more than 80%.

Table 19: Confusion Matrix – Land Cover, 2021

Validation points (units)							
Land cover 2021	Forest (Value 1)	Planting (Value 2)	Scrub (Value 3)	Grass (Value 4)	Total	User accuracy	Overall accuracy
Forest	3	1	0	0	4	75%	-
Planting	2	54	2	0	58	93.10%	-
Scrub	1	0	5	0	6	83.33%	-
Grass	0	0	7	0	20	100%	-
Total	6	55	39	20	88	-	-
%	50%	98.18%	71.42%	100%	-	-	-
Overall accuracy							93.18%

3.3.3 Inclusion of New Project Activity Instances

The new project activity instances for the third verification period comply with the following:

- 1) Occur within one of the designated geographic areas specified in the project description (see Figure 2).
- 2) Conform with the eligibility criteria for the inclusion of new project activity instances as described in section 3.3.1 Eligibility Criteria for Third Phase Areas.
- 3) Are included in the current monitoring report with sufficient technical, financial, geographic, and other relevant information in conformance with the applicable set of eligibility criteria and enable evidence gathering by the verification body.
- 4) Complies with the baseline, eligibility criteria and additionality described in the project description.
- 5) Evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (See Supporting Docs\NPRT\External risk\Land Tenure\Plantation register \Campeche\TECA DE ORO).
- 6) The new project activity instances have a start date (2021) that is the same as or later than the grouped project start date⁸⁰.
- 7) Is eligible for crediting from the start date of the project activity instance through to the end of the project crediting period.
- 8) Only eligible for crediting from the start of the verification period in which they were added to the grouped project.
- 9) The new project activity instances are not and have not been enrolled in another VCS project.
- 10) The new instances correspond to the same project and no capacity limit applies.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data/parameter	Volume model
Data unit	m ³
Description	Model to estimate volume of trees on the function of their DBH and height

⁸⁰ Teca de Oro plantation is established in 2021. Eligibility will be maintained for the crediting period of the project.

Source of data	Tamarit, 2013 ⁸¹
Value applied	$V = 0.000059 * DBH^{1.86} * H^{0.93}$
Justification of choice of data or description of measurement methods and procedures applied	Aboveground tree biomass is calculated using the BEF and wood density in connection with volume data. The model was adjusted with AGSA plantation data from the same site as the project area. For the ex-post estimates, DBH and height data measured between 2013 and 2017 was used.
Purpose of data	Estimation of GHG emission reductions and removals
Comments	N/A

Data/parameter	Wood density
Data unit	t d.m. m ⁻³
Description	Basic density of specific gravity used to estimate stem biomass.
Source of data	Rodríguez-Anda, R., Fuentes, T., & Silva-Guzmán, J. A. (2011) ⁸²
Value applied	0.59
Justification of choice of data or description of measurement methods and procedures applied	Aboveground tree biomass is calculated using the BEF and wood density in connection to the volume data.
Purpose of data	Estimation of GHG emission reductions and removals
Comments	N/A

Data/parameter	BEF
Data unit	Dimensionless
Description	Ratio of aboveground oven-dry biomass to the oven-dry biomass of stem
Source of data	IPCC (2003)
Value applied	1.5
Justification of choice of data or description of measurement methods and procedures applied	Aboveground tree biomass is calculated using the BEF and wood density in connection with the volume data. The BEF values for 'tropical climatic zone' and 'broadleaf forest type' were used.

⁸¹ Tamarit, J. (2013). *Volume calculation, growth and timber yield and operative inventory for Tectona grandis in southeastern Mexico* [Doctoral thesis]. Montecillo. [Supporting Docs\Estimations\Docs]

⁸² Rodríguez-Anda, R., Fuentes, T., & Silva-Guzmán, J. A. (2011). *Technological study for the evaluation and use of Tectona grandis wood from thinning of commercial forest plantations in the state of Campeche, as a support for technological and market innovation*.

Purpose of data	Estimation of GHG emission reductions and removals
Comments	N/A

Data/parameter	R
Data unit	Dimensionless
Description	Ratio of the weight of roots to the weight of the top of the tree. Used for belowground tree biomass estimation.
Source of data	IPCC (2006) ⁸³
Value applied	$R = \exp(-1,085 + 0,9256 \cdot \ln B) / B$
Justification of choice of data or description of measurement methods and procedures applied	Belowground biomass is usually estimated with this factor, as belowground sampling is ecologically destructive and expensive.
Purpose of data	Estimation of GHG emission reductions and removals
Comments	N/A

Data/parameter	Carbon Fraction
Data unit	tC t d.m. ⁻¹
Description	Biomass proportion corresponding to carbon. CF is used to convert biomass to carbon.
Source of data	Table 4.3, Chapter 4: Forest Land of IPCC (2006), <i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	The default value from the IPCC.
Purpose of data	Estimation of GHG emission reductions and removals
Comments	N/A

Data/parameter	DF _{DW}
Data unit	%

⁸³ IPCC. (2006). *2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4: Agriculture, Forestry and Other Land Use*.

Description	Conservative default factor expressing carbon stock in DW as a percentage of carbon stock in tree biomass.
Source of data	Section 8, 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1
Value applied	Elevation <2,000 m and precipitation >1,600 mm·yr ⁻¹ = 6 Elevation <2,000 m and precipitation 1,000–1,600 mm·yr ⁻¹ = 1
Justification of choice of data or description of measurement methods and procedures applied	The default value for the tropical biome.
Purpose of data	Estimation of GHG emission reductions and removals.
Comments	N/A

Data/parameter	DF _{LI}
Data unit	%
Description	Default factor for the relationship between CLI and carbon stock in living trees.
Source of data	Section 8, 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1
Value applied	1%
Justification of choice of data or description of measurement methods and procedures applied	Default value for a tropical biome with an elevation of <2,000 m and precipitation up to 1,000 mm·yr ⁻¹ .
Purpose of data	Estimation of GHG emission reductions and removals.
Comments	N/A

4.2 Data and Parameters Monitored

Data/parameter	A
Data unit	ha
Description	Project area (planted area)
Source of data	Survey databases of each polygon that is part of the project
Description of measurement methods and procedures to be applied	Field measurement: the area shall be delineated either on the ground using Global Positioning System (GPS) coordinates or from geo-referenced RS data.

Frequency of monitoring/recording	At the beginning of site preparation or at the final establishment of the project
Value monitored	Ex-post
Monitoring equipment	GPS equipment (precision 1–5 m) and RS data
Quality assurance/quality control (QA/QC) procedures to be applied	Internal auditing and QA/QC procedures from the PD
Purpose of data	Calculation of project emissions
Calculation method	Measurement
Comments	N/A

Data/parameter	A_i
Data unit	ha
Description	Area of stratum i
Source of data	Monitoring of stratum and stand boundaries by employing a GIS that allows for the integration of data from different sources, including GPS coordinates and RS data.
Description of measurement methods and procedures to be applied	Field measurement: the area shall be delineated either on the ground using GPS or from geo-referenced RS data.
Frequency of monitoring/recording	At the beginning of site preparation
Value monitored	Ex-post
Monitoring equipment	GPS equipment (precision 1–5 m) and RS data
QA/QC procedures to be applied	Internal auditing and QA/QC procedures from the PD
Purpose of data	Calculation of project emissions
Calculation method	Measurement
Comments	The stratification for ex-post estimations is based on the actual implementation of the project planting/management plan. It may even be necessary to evaluate the possibility of re-stratifying the project boundary according to the development of the stand models, as it would enable the merging of several strata to optimize costs and improve forest inventory outcomes.

Data/parameter	N
Data unit	Dimensionless
Description	Number of plots to be established in the project area
Source of data	Estimation
Description of measurement methods and procedures to be applied	This value will be estimated based on pre-sampling developed in the project area before monitoring.
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	N/A
QA/QC procedures to be applied	Before the monitoring report, an error estimation will be carried out with the last measurements to determine whether additional plots need to be established.
Purpose of data	Estimate the number of plots needed to comply with a sampling error of less than 10%
Calculation method	See Section 4.3.3.1
Comments	N/A

Data/parameter	n_i
Data unit	Dimensionless
Description	Number of plots to be established in each stratum
Source of data	Estimation
Description of measurement methods and procedures to be applied	This value will be estimated using the total number of plots and the area of each stratum.
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	N/A
QA/QC procedures to be applied	In each forest management lot, there should be at least one permanent monitoring plot (PMP) per 25 ha. In cases where the forest management lot has a discontinuous surface, with different soil or growth conditions, another PPM will be added. However, not all cases of surface discontinuity will require a PPM in each discontinuous part.

	As the plantation progresses, the variance of the MPPs of each forest management lot will be analyzed and the appropriate number of PPMs adjusted for that lot.
Purpose of data	Estimation of the number of plots needed for each stratum for complying with a sampling error of less than 10%
Calculation method	See Section 4.3.3
Comments	N/A

Data/parameter	Plot location
Data unit	Latitude/longitude
Description	Localization of each sampling plot
Source of data	Data field sampling
Description of measurement methods and procedures to be applied	Measured with GPS
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	N/A
Monitoring equipment	GPS
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	The sample plot location is registered with a GPS and marked on the project map

Data/parameter	DBH
Data unit	cm
Description	DBH of the trees
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Typically measured 1.3 m above ground. Measure all the trees above a minimum DBH in the permanent sample plots that result from the project activity
Frequency of monitoring/recording	Each time a verification is conducted

Value monitored	Ex-post
Monitoring equipment	Tape measure
QA/QC procedures to be applied	Workers involved in field measurement work should be fully trained in field data collection. Field measurements shall be checked by a qualified person to correct any technical errors. Additionally, there is a forest auditor charged with giving an independent opinion on the quality of information presented to investors in the company. This is done by randomly selecting 10% of the plots and using 10 trees from each of these plots. From this, a comparative report is issued to compare the information found by the auditor and that found by AGSA. If there are inconsistencies in the diameter data found in the MiraSilv software, ⁸⁴ these are referred to the forest supervisor so that they can carry out a corresponding review in the field.
Purpose of data	Calculation of project emissions
Calculation method	See Section 4.3.3
Comments	N/A

Data/parameter	H
Data unit	m
Description	Total height of trees
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Measure the heights of all trees in the permanent sample plots resulting from the project activity
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	Clinometer and measuring tape
QA/QC procedures to be applied	Workers involved in field measurement work should be fully trained in field data collection. Field measurements shall be checked by a qualified person to correct any technical errors. In the software used by the company (i.e., MiraSilv), there is a model for reviewing successive measurements to verify the consistency of the recorded increments in terms of diameter and height. This is the first review done in the

⁸⁴ MiraSilv is an application dedicated to the management of arboreal information. The system facilitates, through a standardized methodology, the establishment of temporary or permanent plots of growth of any shape and size and for any forest species. It enables the creation of an individual database that facilitates the monitoring and comparison of tree growth. It also facilitates classification by site quality in reforestation programs and compares increases in volume, height, and diameter found in different plantation systems.

	process. Once again, the forest auditor is charged with giving an independent opinion on the quality of information presented to investors of the company. This is done by randomly selecting 10% of the plots and, from each of these plots, using 10 trees to create a comparative report juxtaposing the information found by the auditor with that found by AGSA. If there are inconsistencies in the height data found by MiraSilv, these are referred to the forest supervisor so that they can conduct a corresponding review in the field
Purpose of data	Calculation of project emissions
Calculation method	See Section 4.3.3
Comments	N/A

Data/parameter	T
Data unit	Year
Description	Period elapsed between two successive estimations of carbon stock in trees and shrubs
Source of data	Verification records
Description of measurement methods and procedures to be applied	See monitoring plan
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	$T=t_2-t_1$
Comments	If the two successive estimations of carbon stock in trees are carried out at different points of time in years t_2 and t_1 , e.g., in the month of April in year t_1 and in the month of September in year t_2 , then a fractional value is assigned to T.

4.3 Monitoring Plan

4.3.1 Verification of Changes in Carbon Stocks in the Pools Selected

This monitoring plan provides guidance on monitoring and standard operational procedures for the ARR project activity. It fulfills the requirement that the project activity should have credible

and accurate monitoring procedures in place to enable the evaluation of project performance and the verification of net anthropogenic GHG emission removals.

Only the aboveground biomass (AGB) of established trees will be measured. Hence, only the individual growth of trees will be monitored in permanent plots.

The carbon content below ground (i.e., in DW and litter) attributable to project activities will not be monitored. These will instead be estimated by using default values and methods suggested in the methodological tools 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1 and 'Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities'. The R will be used to estimate belowground biomass based on the aboveground measures.

4.3.2 Stratification

As stated in the PD, the stratification of the project was based on establishment year and plot quality qualification according to the growth model for *T. grandis* developed by Tamarit (2013)⁸⁵ in the project region.

Due to the fluctuating yield across the plantation cycle, the initially proposed approach may result in varying quality qualifications for lots during measurement events. To address this issue, a new stratification scheme based on the planting year and localization (municipality) is proposed in this monitoring report (see Table 20).

Table 20: Stratification

Strata	Year	Municipality	Management profile ⁸⁶	Area (ha)
1.1	2013	Candelaria/ Carmen	Profile 1	377.7
1.2	2013	Palenque	Profile 1	424.1
2.1	2014	Balancán/ Candelaria	Profile 1	151.9
2.2	2014	Huimanguillo	Profile 2	1,052.1
3.1	2015	Huimanguillo	Profile 2	1,145.8
4.1	2016	Balancán	Profile 1	418.0
4.2	2016	Tenosique	Profile 1	173.3
5.1	2017	Balancán	Profile 1	132.8
5.2	2017	Candelaria	Profile 1	222.9
5.3	2017	Salto de Agua/ Tenosique	Profile 1	60.2
6.1	2018	Balancán	Profile 1	184.9

⁸⁵ See [Supporting documents/Estimations/ Growth model explanation]

⁸⁶ Management profile for Thinning (see Section 3.2.1)

Strata	Year	Municipality	Management profile ⁸⁶	Area (ha)
6.2	2018	Candelaria	Profile 1	461.8
6.3	2018	Carmen	Profile 1	377.1
7.1	2019	Escárcega	Profile 1	710.1
7.2	2019	Palenque/ Tenosique	Profile 1	205.9
8.1	2021	Carmen	Profile 1	147.3

4.3.3 Establishment of Permanent Plots⁸⁷

The activities related to the establishment and measurement of PMPs are defined to evaluate the development of the plantation.⁸⁸

Responsibility

It is the responsibility of the Production Manager, the Forest Manager, the Chief of Quality, and the Chief of Forestry Maintenance to ensure that all the guidelines established in this procedure are properly complied with by the plot measurement teams.

Location on the topographic map

Each delimited forest management lot, including its total area, is recorded in the general AGSA plan. Furthermore, each forest management plot or *Manejo de Información sobre Recursos Arbóreos* (MIRA)⁸⁹ lot has a record that includes the location, total area, species planted, and date of planting.

Location of permanent plots at the project level

The number of PMPs to be established is determined depending on the total area of the forest management plot. The criteria for determining how many PMPs are established in each forest management lot are as follows:

⁸⁷ More detailed information about the establishment of monitoring plots can be found as a supporting document in [Supporting documents/Estimations/Plot_establishment]

⁸⁸ Activities for the establishment of PMPs took into account the guidance provided by the *Centro Agronómico Tropical de Investigación y Enseñanza* [Tropical Agricultural Research and Higher Education Center] (CATIE). Arias, L. A. U. (2003). *Guide for the Establishment and Measurement of Plots for the Monitoring and Evaluation of Tree Growth in Research and Reforestation Programs with the MIRA System Methodology*. CATIE.

⁸⁹ Forest management plots (i.e., MIRA plots) are the minimum units of forest management that correspond to sections of a production order. In some cases, this will be equal to a production order, with the same species, approximately the same age, and the same rate of growth.

- ## Size and shape of plots

Establishment of plots in the field

To identify the PMP within each site, each forest management plot is assigned a consecutive number. Following this, consecutive numbering of PPMs is used within each forest management plot.

		NORTE									
Oeste										Este	
1	2	3	4	5	6	7	8	9	10		
20	19	18	17	16	15	14	13	12	11		
21	22	23	24	25	26	27	28	29	30		
40	39	38	37	36	35	34	33	32	31		
41	42	43	44	45	46	47	48	49	50		
60	59	58	57	56	55	54	53	52	51		
61	62	63	64	65	66	67	68	69	70		
80	79	78	77	76	75	74	73	72	71		
81	82	83	84	85	86	87	88	89	90		
10 0	99	98	97	96	95	94	93	92	91		
Oeste										Este	
SUR											

Figure 22: Numbering of Trees Within the PMP**Measuring the trees**

The height and diameter of all trees in the plot are measured. With this information, the number of trees in the plot during development of the plantation is determined. It is then possible to determine the site quality based on growth curves as a function of age.

The diameter and height data taken in the field should be recorded and generated using the MiraSilv software. The forest catcher oversees the input of measurements to MiraSilv.

Measuring diameter

This is measured at 1.30 m high (i.e., chest height) from the base of the tree. Here, the diameter of the tree is measured with a diameter tape.

When using the standard tape measure graduated in cm and mm, the measurement given is the perimeter. The diameter is calculated by dividing the measured value by π (pi). Steel- or nylon-reinforced plastic tape will be used to avoid damage to the tape that may cause errors in obtaining data (Figure 23). The measurement of diameters is performed according to the process shown in Figure 24.



Figure 23: Measuring Tree Diameter With a Measuring Tape

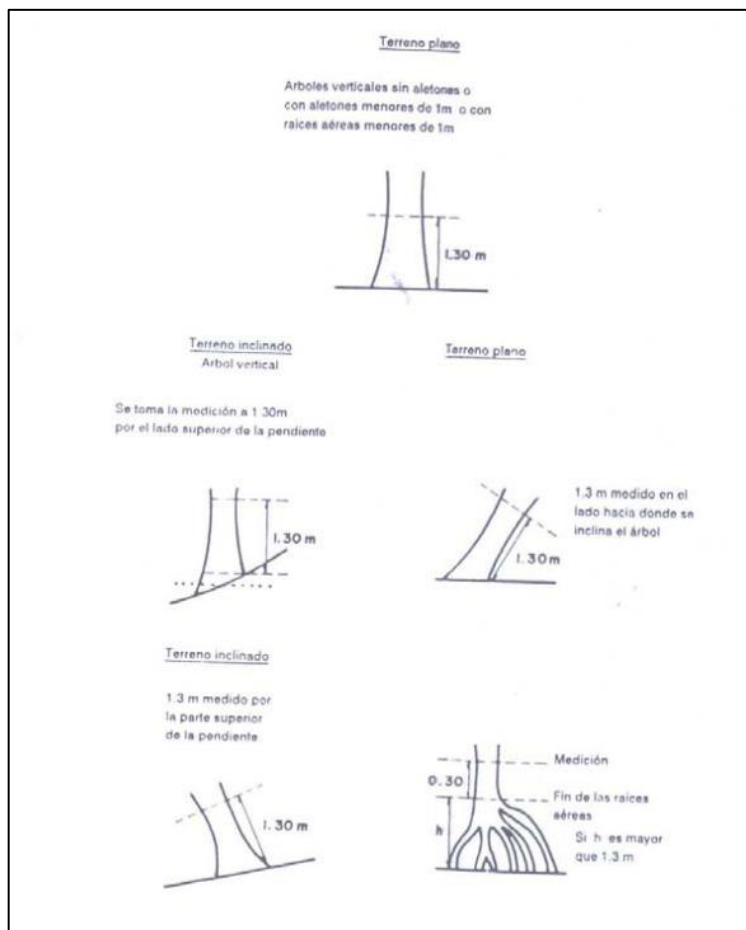


Figure 24: Measuring the Diameter According to the Inclination of the Shaft With Respect to the Surface

Measuring height

In commercial cases, two readings of tree height are taken. The first one is taken from the top, where the tree trunk reaches a minimum of 10 cm in diameter, while the bottom reading is taken at the base of the tree. Height measurements can be taken in two ways depending on the measuring equipment used:

- 1) **Measuring with a 15-m-high bar:** the person responsible for measuring stands in front of the tree to be measured. They place the bar next to the tree and extend it until the hook reaches the top of the tree. When reading the stamped bar, it is important to remember that the numbering starts at the top of the bar going down to the bottom. This instrument measures in m, decimeters (dm), and cm. In the case of small trees that are less than 4 m in height, an aluminum tool of 4 or 5 m can be used (Figure 25).



Figure 25: Measuring With a Stamped Bar

- 2) **Measuring with an electronic clinometer:** for a single reading of the clinometer, the person responsible for the measurement must calibrate it according to their distance from the tree to be measured. This depends on the height of the tree, as the distance should always be greater than the height. Taking the readings from the treetop and the base of the tree, the clinometer reveals the height of the tree (Figure 26).



Figure 26: Measuring With a Clinometer

Frequency and use of the data taken in PMPs

The plots are measured annually during the month of October. In addition to estimating the carbon sequestration of plantations, the information generated is used to document the effectiveness of the technology package, incorporate appropriate adjustments to the management plan, decide on the type of soils to be planted in the future, anticipate thinning logistical needs and final harvests, and develop an updated financial projection of project productivity.

4.3.3.1 Number of Plots

The number of plots required for measuring the variation within the project boundary and strata shall be estimated by using the CDM A/R methodological tool 'Calculation of the number of sample plots for measurements within A/R CDM project activities', v.02.1.0.⁹⁰

The number of plots to be established and measured will be estimated as follows:

$$n = \frac{N * t^2 * (\sum_{i=1}^l w_i s_i)^2}{N * E^2 + t^2 * \sum_{i=1}^l w_i s_i^2}$$

Where:

n	Number of sample plots required for the estimation of biomass stocks within the project boundary; dimensionless
l	Total number of strata within the project boundary
i	1, 2, 3, ... biomass stock estimation strata within the project boundary
N	Total number of possible sample plots within the project boundary (i.e., the sampling space or the population)
t	Two-sided student's t-value, at infinite degrees of freedom, for the required confidence level; dimensionless
w _i	Relative weight of the area of stratum <i>i</i> (i.e., the area of stratum <i>i</i> divided by the project area); dimensionless
s _i	Estimated standard deviation of biomass stock in stratum <i>i</i> ; t d.m. ha ⁻¹
E	Acceptable margin of error in estimations of biomass stock within the project boundary; t d.m. ha ⁻¹

4.3.3.2 Analysis of the Monitored Data and Parameter

The data recorded in the forest inventory for both DBH and height will be the input to the volume model that will define the total biomass accumulated for the project at the time of monitoring.⁹¹

For ex-post estimates, the default parameters, and equations (see Sections 4.1 and 4.2) will be the same ones used for ex-ante estimations unless better values exist at the time of verification. These will always follow the A/R tool for carbon stock estimation. See Section 5.1 for ex-ante net GHG emission reductions and removals.

⁹⁰ CDM. (2010). *A/R Methodological Tool: Calculation of the number of sample plots for measurements within A/R CDM project activities*. <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-03-v2.1.0.pdf>

⁹¹ All data proposed can be updated.

4.3.3.3 Procedures for Internal Auditing and QA/QC

AGSA will be responsible for the centralized documentation of all project planning and implementation. QA/QC procedures will be implemented and monitored to ensure that net anthropogenic GHG removals by sinks are measured precisely and are credible, verifiable, and transparent.

- Training will be held for all relevant personnel on all data collection and analysis procedures.
- Steps will be taken to control mistakes in sampling and data analysis to develop a credible plan for measuring and monitoring carbon stock change in the project. The same procedures shall be used throughout the project lifetime to ensure continuity.

In the software used by the company (i.e., MiraSilv), there is a model that can review successive measurements of diameter and height to check their consistency. This is the first review carried out in the process.

Furthermore, the forest auditor will issue a comparative report on the height of trees to provide investors with an independent opinion on the quality of the information. This will be based on measurements taken from 10 trees randomly selected from 10% of the land plots. If there are inconsistencies between this data and that from MiraSilv, a supervisor shall undertake field-site revision of the data.

Field data collection

The staff involved in the measurement of carbon pools will be fully trained in field data collection and analysis. To verify that plots have been installed and measurements taken correctly, a minimum of 10% of randomly selected plots will be remeasured by a supervisor with a team not involved in the initial measurement sampling.

The remeasurement data will be compared with the original measurement data. Any errors found will be corrected and recorded. The level of errors recorded will be calculated and reported using the following equation:

$$Error\ (\%) = \frac{|Estimate_1 - Estimate_2|}{Estimate_2}$$

The proper entry of data into the data analysis spreadsheets is required to produce reliable carbon estimates. Communication between all staff involved in measuring and analyzing data will be used to resolve any apparent anomalies before a final analysis of the monitoring data is completed. If there are any problems with the monitoring plot data that cannot be resolved, the plot will not be used in the analysis. Expert judgment and comparison with independent data will be used to try to ensure that data results are in line with expectations. Additionally, field data will be reviewed by the crew leader of the monitoring team (e.g., within the operational and management structure), further ensuring that the data and analysis are accurate.

Due to the long length of the project (i.e., 36 years) and the speed at which technology is advancing, data archiving will be an essential component. Data will be archived in several forms. The stored data will include data analysis and models, the final estimate of the amount of carbon sequestered, any GIS products, and the measuring and monitoring reports. Electronic copies of all data and reports will be updated periodically and converted to any new format required by future software or hardware. A project participant involved in the field measurements will be assigned to implement this. The data collected shall be archived for at least two years after the end of the last crediting period of the project activity. The main activities to be developed for the QA/QC process are described in Table 21.

Table 21: Verification and Checklist Considered to Guarantee the Quality of the Information Gathered and its Management

QC activity	Procedures
Check that assumptions and criteria for the selection of emission factors and other estimation parameters are documented	Cross-check descriptions of project activities, emission factors, and other estimation parameters with information on source and sink categories and ensure that these are properly recorded and archived.
Check for transcription errors in data input and reference	• Confirm that bibliographical data references are properly cited in internal documentation. • Cross-check a sample of input data (either measurements or parameters used in calculations) for transcription errors.
Check that removals are calculated correctly	• Reproduce a representative sample of removal calculations. • Selectively mimic complex model calculations with abbreviated calculations to judge relative accuracy.
Check that parameters and units are correctly recorded and that appropriate conversion factors are used	• Check that units are properly labeled in calculation sheets. • Check that units are correctly carried through calculations from beginning to end. • Check that conversion factors are correct. • Check that temporal and spatial adjustment factors are used correctly.
Check the integrity of database files	• Confirm that the appropriate data processing steps are correctly represented in the database. • Confirm that data relationships are correctly represented in the database. • Ensure that data fields are properly labeled and have the correct design specifications. • Ensure that adequate documentation of database and model structures and operations are archived.
Check that the movement of inventory data among processing steps is correct	• Check that removal data is correctly reported when preparing summaries.

QC activity	Procedures
	Check that removal data is correctly transcribed between different intermediate products.
Check that uncertainties in removals are estimated or calculated correctly	- Check that qualifications, assumptions, and expert judgments are recorded. - Check that calculated uncertainties are complete and calculated correctly following the methodology requirements.
Undertake a review of internal documentation	- Check that there is detailed internal documentation to support estimates and to enable the reproduction of emission and removal estimates. - Check that inventory data, supporting data, and inventory records are archived and stored to facilitate detailed reviews. - Check the integrity of the data archiving arrangements of any outside organizations involved in inventory preparation.
Check time series consistency	- Check for temporal consistency in time series input data for biomass estimation. - Check for consistency in the algorithm/method used for calculations throughout the time series.
Undertake completeness checks	- Confirm that estimates are reported for all years. - Check that known data gaps that may result in incomplete emissions estimates are documented and treated conservatively.
Compare estimates to previous estimates	Current inventory estimates should be compared to previous estimates if available. If there are significant changes or departures from expected trends, recheck estimates and explain the differences.

Uncertainty assessment

The project follows the modalities and procedures for A/R project activities to estimate baseline net GHG removal by sinks, leakage, actual net GHG removal by sinks, and net anthropogenic removal by sinks.

Equation 15 of the methodological tool 'AR-TOOL14', v.04.2 was used to calculate the uncertainty in tree volume. The uncertainty value is 3.5%, which implies no discount for GHG removals in the current monitoring period.⁹²

Other elements of the monitoring plan

The baseline is to be the continuation of economic activities that were taking place before the project start date and which are unlikely to change due to the historical use of the soil. However, if the accreditation period is renewed during the course of the project, the baseline must be reviewed to determine whether the baseline approach used is still valid or if the conditions have

⁹² See [Supporting documents/Estimations/ Ex_post_2ndVer , Uncertainty tap]

changed due to changes in regulations and sectoral policies or technical, environmental, or market factors.

Verification of project emissions

The project will quantify and monitor the non-CO₂ GHG emissions resulting from any fire occurrences (e.g., forest fires) within the project boundary. These events will be monitored and the affected area recorded.

Emissions of non-CO₂ GHGs resulting from the loss of aboveground tree biomass due to fire will be calculated in each verification period by using the AGB in trees of the relevant strata calculated in the previous verification, the default values for the combustion factor, the emission factors, and the global warming potential.

4.3.3.4 Operational and Management Structure

The operational structure and responsibilities for the project are presented as a supporting document.⁹³

⁹³See [Supporting document/ Organization chart 2022]

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

A baseline emissions estimation was carried out using the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2.

To estimate baseline emissions, it is essential to identify the three types of vegetation present in the project area before the start of project activities:

- scattered trees and shrubs in a grassland matrix;
- trees in conservation areas around the grassland matrix; and
- citrus shrubs in the locality of Huimanguillo.⁹⁴

Trees

According to the methodological tool 'AR-TOOL14', v.04.2, carbon stock in trees in the baseline can be considered zero if all of the following conditions are met:

- 1) pre-project trees are neither harvested, nor cleared, nor removed throughout the crediting period of the project activity;
- 2) pre-project trees do not suffer mortality due to competition from trees planted by the project or damage due to the implementation of the project activity at any time during the crediting period of the project activity; and
- 3) pre-project trees are not inventoried along with the project trees in the monitoring of carbon stocks, but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the project activity.

The trees present in the project area are mainly located in conservation areas and are not included in the carbon estimations.⁹⁵ In the case of isolated trees, these are maintained during the project lifetime and are not counted in the plot monitoring as only teak trees are quantified

⁹⁴ Located in Tabasco Site 8.

⁹⁵ Due to its importance to the ecology of the territory and even for the well-being of the plantations, AGSA ensures the continued existence of pre-project trees in conservation areas, taking care that they are not disturbed by any other activity. AGSA has developed studies involving the study of existing biodiversity, the presence of special fauna, such as the white-tailed deer, thunderous deer, and ocellated turkey, and the identification of high conservation value forests. As proof, studies developed can be found in [Supporting documents/ Conservation studies]

(Figure 28). Therefore, changes in baseline emissions due to differences in the carbon stocks of trees was considered to be zero.



Figure 27: Areas of Conservation and Plantation Within the Site (Center of the Image)



Figure 28: Trees Remaining in the Middle of the Plantation

Shrubs

Grassland baseline

According to Point 12 of the conditions under which carbon stock and changes in carbon stock may be estimated as zero, the tool 'AR-TOOL14', v.04., establishes that trees and shrubs in the baseline may be accounted as zero in the event that the land is subjected to periodic cycles, e.g., slash-and-burn or clearing-regrowing cycles, which is the case for the livestock farming baseline in the project area. Slash-and-burn farming is a common practice in the baseline.

According to Point 13, for the purpose of making ex-ante estimations of carbon stock and changes in carbon stock in the project scenario, change in the carbon stock of shrubs would be estimated as zero for the grassland baseline.

Shrubs area and citrus crop baseline

According to Equation 25, Section 10 of the methodological tool 'AR-TOOL14', v.04.2, the annual change in carbon stock in shrubs must be estimated as follows:

$$\Delta C_{SHRUB,t} = \frac{C_{SHRUB,t_2} - C_{SHRUB,t_1}}{T} * 1 \text{ year}$$

Where:

$\Delta C_{SHRUB,t}$	Change in carbon stock in shrubs within the project boundary in year t between times t_1 and t_2 ; tCO ₂ e
C_{SHRUB,t_2}	Carbon stock in shrubs within the project boundary at time t_2 ; tCO ₂ e
C_{SHRUB,t_1}	Carbon stock in shrubs within the project boundary at time t_1 ; tCO ₂ e
T	Time elapsed between two successive estimations ($T=t_2-t_1$); yr

Before the establishment of the plantations in 2014 and 2015, certain areas totaling 1,204.09 ha in Huimanguillo were previously utilized for Citrus crops. The application of a carbon stock value of 105.97 tCO₂e/ha, sourced from Yepes et al. (2011), led to an overarching baseline discount of 232,914 tCO₂e. In the first verification, a baseline discount of 105,793 tCO₂e was applied (see Table 27).

During the second phase of the project between 2017 and 2019, Shrub areas spanning a total of 685,30 ha were identified across Balancán, Candelaria, Escárcega, Palenque and Tenosique municipalities. Using a carbon stock value of 57.57 tCO₂e/ha, as specified in Mexico's FREL⁹⁶, baseline emissions for the second instance were estimated at 39,450 tCO₂e. These emissions were entirely discounted during the second verification process (see Table 27).

For new instances of the project, corresponding to newly established plantations in 2021 in Carmen municipality, Shrubs areas totaling 50,6 ha were identified. This corresponds to a Baseline emission of 2,913 tCO₂e⁹⁷, which are discounted in this third verification of the project (see Table 27).

5.2 Project Emissions

The actual net GHG removals by sinks shall be calculated as follows:

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

Where:

$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks in year t ; tCO ₂ e
$\Delta C_{P,t}$	Change in the carbon stocks in the project occurring in the selected carbon pools in year t ; tCO ₂ e
$GHG_{E,t}$	Increase in non-CO ₂ GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity in year t , as estimated in the tool 'Estimation of non-CO ₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity'; tCO ₂ e

5.2.1 Change in Project Carbon Stocks Occurring in the Selected Carbon Pools

Planted areas during the first verification period (2013–2016)

The eligible planted area per property is presented in Table 22.

⁹⁶ SEMARNAT. (n.d.). *National forest reference emission level proposal México*. See "Secondary Deciduous Tropical Forest" in Table 4. https://redd.unfccc.int/files/frel_mexico_english_version_jan15f.pdf

⁹⁷ SEMARNAT. (n.d.). *National forest reference emission level proposal México*. See "Secondary Deciduous Tropical Forest" in Table 4. https://redd.unfccc.int/files/frel_mexico_english_version_jan15f.pdf

Table 22: Eligible Planted Areas During the First Verification Period (2013–2016)

State	Municipality	Property name	Year	Eligible planted area (ha)
Campeche	Candelaria	FRACCI II PREDIO TRES HERMANOS	2014	26.92
		LA ESCONDIDA	2013	20.35
		LA FRANELA	2013	140.90
		LA FRANELA II	2013	8.17
		SAN CARLOS	2013	37.54
		TRES HERMANOS FRACCION I	2013	19.26
	Carmen	EL CHUBASCO	2013	1.75
		FRACCI I PREDIO PASO NUEVO	2013	0.73
		LA ILUSION	2013	42.28
Tabasco	Balancán	EL PARAISO	2016	79.58
		LA CAOBA LOTE 90	2016	90.58
		LOTE 85	2016	71.15
		LOTE NUMERO 84 MACULIS	2016	70.13
		MACHICHE LOTE 79	2016	36.38
		PREDIO 78	2014	60.15
		PREDIO 86	2014	64.86
		PREDIO EL REGALO	2016	4.02
		PREDIO RUSTICO A. CASTILLO	2016	39.07
		PREDIO RUSTICO RUPERTO MONTOYA	2016	19.02
		PREDIO RUSTICO SOCRATES SACARIAS	2016	7.04
		RANCHO LA LUZ	2016	1.00
		EL CONQUISTADOR	2016	106.74
	Huimanguillo	EL POMELO	2015	66.37
		LA TRINIDAD	2015	112.58
		LOTE 1	2014	19.90
		LOTE 10	2015	28.31
		LOTE 10 A	2015	31.12
		LOTE 10 GREGORIO M	2014	22.71
		LOTE 11	2014	22.07
		LOTE 11 PINO SUAREZ	2015	85.41
		LOTE 13	2014	42.54

State	Municipality	Property name	Year	Eligible planted area (ha)
		LOTE 14	2014	42.26
		LOTE 16	2014	26.96
		LOTE 17	2014	29.85
		LOTE 18	2014	32.83
		LOTE 1ª	2015	40.98
		LOTE 1ª GREGORIO MENDEZ	2014	17.86
		LOTE 1B	2015	51.17
		LOTE 2	2014	42.35
		LOTE 2 MERCEDES GAMAS	2015	71.54
		LOTE 20	2014	31.55
		LOTE 20 PINO SUAREZ	2015	77.70
		LOTE 21	2014	20.52
		LOTE 21 PINO SUAREZ	2015	38.50
		LOTE 21-A	2015	24.87
		LOTE 22	2014	38.73
		LOTE 22-A	2014	36.04
		LOTE 24	2014	38.74
		LOTE 27 Y 28	2014	58.83
		LOTE 3 y 5	2014	39.84
		LOTE 30	2014	39.04
		LOTE 31	2014	41.77
		LOTE 31 PINO SUAREZ	2015	62.12
		LOTE 32	2014	17.74
		LOTE 32 PINO SUAREZ	2015	41.97
		LOTE 32-A	2015	30.98
		LOTE 33	2015	36.01
		LOTE 34	2014	51.74
		LOTE 37	2014	38.44
		LOTE 37 MERCEDEZ GAMA	2014	35.20
		LOTE 38	2014	42.17
		LOTE 39	2014	44.17
		LOTE 41	2014	23.14
		LOTE 42	2014	22.71
		LOTE 42 PINO SUAREZ	2015	70.15

State	Municipality	Property name	Year	Eligible planted area (ha)
		LOTE 48	2014	20.33
		LOTE 49	2014	19.71
		LOTE 6	2015	40.97
		LOTE 64	2014	38.02
		LOTE 7	2015	34.13
		LOTE 8	2014	21.79
		LOTE 9	2014	32.61
		LOTE 9 PINO SUAREZ	2015	38.59
		LOTE 9-A	2015	32.68
		PREDIO SANTA MONICA	2015	64.90
		PREDIO SANTA PATRICIA	2015	64.79
	Tenosique	EL PENSAMIENTO	2016	7.47
	EL SACRIFICIO	2016	9.31	
	LOTE 1	2016	0.83	
	LOTE 11 Y 15	2016	8.12	
	LOTE 15	2016	6.79	
	LOTE 17	2016	88.26	
	LOTE 2	2016	9.03	
	LOTE 20	2016	3.22	
	LOTE 44	2016	13.41	
	SAN OCTAVIO	2016	26.84	
Chiapas	Palenque	DONA CARMINA	2013	292.33
		HIDALGO	2013	131.80
Total				3,743.06

Planted areas during the second verification period (2017–2019)

The eligible planted area per property is presented in Table 23.

Table 23: Eligible Planted Areas During the Second Verification Period (2017–2019)

State	Municipality	Property name	Year	Eligible planted area (ha)
Campeche	Candelaria	PREDIO ROMA	2017	101.00
Campeche	Candelaria	LA ILUSION	2018	86.70
Campeche	Candelaria	5 DE MAYO	2017	121.87

State	Municipality	Property name	Year	Eligible planted area (ha)
Campeche	Candelaria	SAN ROQUE	2018	17.42
Campeche	Candelaria	SAN JUANITO	2018	26.12
Campeche	Candelaria	SAN FRANCISCO	2019	15.63
Campeche	Candelaria	LA MARTINICA	2018	21.96
Campeche	Candelaria	LA ESPERANZA	2018	8.43
Campeche	Candelaria	EL RECUERDO	2018	13.22
Campeche	Candelaria	EL LEON	2019	261.87
Campeche	Candelaria	DOS HERMANAS	2018	10.47
Campeche	Carmen	PROVIDENCIA	2018	199.26
Campeche	Carmen	LA VOLUNTAD DE DIOS	2018	113.83
Campeche	Carmen	EL TEXANO	2018	64.06
Campeche	Escárcega	DOCE DE MAYO	2019	21.70
Campeche	Escárcega	LOS MANANTIALES	2019	345.73
Campeche	Escárcega	RANCHO NUEVO	2019	328.77
Campeche	Escárcega	SANTA FLORA	2019	13.86
Tabasco	Balancán	LOTE NUMERO 96	2017	62.68
Tabasco	Balancán	LOTE NUMERO 74 SETENTA YCUATRO	2017	70.07
Tabasco	Balancán	LOTE NUMERO 97	2018	44.54
Tabasco	Balancán	LA ALONDRA	2018	68.10
Tabasco	Tenosique	SAN FERNANDO	2019	37.21
Tabasco	Tenosique	EL PALMAR	2019	45.02
Tabasco	Tenosique	EL PALMAR 2	2019	1.77
Tabasco	Tenosique	CASTILLA	2019	11.07
Tabasco	Tenosique	LOTE NUMERO 03	2017	58.92
Tabasco	Tenosique	MURCIA	2019	82.10
Tabasco	Balancán	PARDILLOS	2018	72.34
Chiapas	Palenque	FINISTERRA	2019	28.78
Chiapas	Salto de agua	EL PARRAL	2017	1.25
Total				2,355.67

Newly planted area during the third verification period (2020–2022)

The eligible planted area per property is presented in Table 24.

Table 24: Eligible Planted Area During the Third Verification Period (2020–2022)

State	Municipality	Property name	Year	Eligible planted area (ha)
Campeche	Carmen	TECA DE ORO	2021	147.34
Total				147.34

Total eligible planted area 2013–2022	6,246.07
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Stratification

As stated in the PD, the stratification of the project was based on establishment year and plot quality qualification according to the growth model for *T. grandis* developed by Tamarit (2013)⁹⁸ in the project region.

Due to the fluctuating yield across the plantation cycle, the initially proposed approach may result in varying quality qualifications for lots during measurement events. To address this issue, a new stratification scheme based on the planting year and localization (municipality) is proposed in this monitoring report (see Table 25).

Table 25: Stratification of the Actual Net GHG Removals

Strata	Year	Municipality	Management profile ⁹⁹	Area (ha)
1.1	2013	Candelaria/ Carmen	Profile 1	377.7
1.2	2013	Palenque	Profile 1	424.1
2.1	2014	Balancán/ Candelaria	Profile 1	151.9
2.2	2014	Huimanguillo	Profile 2	1,052.1
3.1	2015	Huimanguillo	Profile 2	1,145.8
4.1	2016	Balancán	Profile 1	418.0
4.2	2016	Tenosique	Profile 1	173.3
5.1	2017	Balancán	Profile 1	132.8
5.2	2017	Candelaria	Profile 1	222.9
5.3	2017	Salto de Agua/ Tenosique	Profile 1	60.2
6.1	2018	Balancán	Profile 1	184.9
6.2	2018	Candelaria	Profile 1	461.8

⁹⁸ See [Supporting documents/Estimations/ Growth model explanation]

⁹⁹ Management profile for Thinning (see Section 3.2.1)

Strata	Year	Municipality	Management profile ⁹⁹	Area (ha)
6.3	2018	Carmen	Profile 1	377.1
7.1	2019	Escárcega	Profile 1	710.1
7.2	2019	Palenque/ Tenosique	Profile 1	205.9
8.1	2021	Carmen	Profile 1	147.3

Estimation of carbon stocks in trees

To estimate the carbon stock in tree biomass at a point in time, the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2 was used, specifically method "a) Estimation by measurement of sample plots".

Plot biomass values were estimated from direct measurements conducted on trees in the sampling plots.¹⁰⁰ The establishment of the sampling plots was carried out according to the process outlined in Section 4.3.3.

Step 1: Volume estimation¹⁰¹

Volume estimation depending on diameter and height

The volume estimation per tree depending on diameter and height is found using the Tamarit equation (Tamarit, 2013):¹⁰²

$$V = 0.000059 * DBH^{1.866203} H^{0.932461}$$

Where:

V Tree volume; m³

DBH DBH; cm

H Total height; m

According to Point 1.7 of the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2, for ex-post estimations, the volume equation used must be demonstrated to be appropriate for the purpose

¹⁰⁰ 345 plots were established in total. The location of the sampling plots can be found in [Supporting documents\SIG\Shape\plots]

¹⁰¹ See Column AA of the 'PlotsMeasurment2020' sheet, found in [Supporting documents\Estimations\Ex_post_estimations]

¹⁰² See [Supporting documents\Estimations\Literature\REPORT OF VALIDATION_ecuacion volume] and [Supporting documents\Estimations\Literature\Tamarit_2013]

of estimating tree biomass by applying the tool 'Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in A/R CDM project activities', v.01.0.1.¹⁰³ The equation used complies with the criteria presented in Section 5(c) of the tool, with the equation being derived from a data set of at least 30 sample trees¹⁰⁴ and the value of the coefficient of determination (R^2) being no less than 0.85.¹⁰⁵

Step 2: Biomass estimation¹⁰⁶

The estimation of tree biomass was calculated according to Equation 5, Appendix 1 of the methodological tool 'AR-TOOL14', v.04.2:¹⁰⁷

$$b_{TREE} = (V_{TREE} \times D \times BEF) \times (1 + R)$$

Where:

b_{TREE}	Mean tree biomass per ha in the tree biomass estimation strata; t d.m./ha ⁻¹
V_{tree}	Mean tree volume per ha in the tree biomass estimation strata; m ³ /ha ⁻¹
D	Basic wood density; t/m ⁻³
BEF	BEF; dimensionless
R	R ; dimensionless

Step 3: Carbon stocks estimation

The estimation of carbon stocks in the tree biomass estimation strata was calculated according to Equation 13 of the methodological tool 'AR-TOOL14', v.04.2:

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

Where:

B_{TREE}	Tree biomass in the tree biomass estimation strata; t/DM
A	Sum of areas in the tree biomass estimation strata; ha
b_{TREE}	Tree biomass per ha in the tree biomass estimation strata; t d.m. ha ⁻¹

¹⁰³ <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-18-v1.0.1.pdf>

¹⁰⁴ See Section 2.4, p. 25 of the supporting document [Supporting documents/Estimations/Literature/Tamarit_2013]

¹⁰⁵ See Section 2.4, p. 31 of the supporting document [Supporting documents/Estimations/Literature /Tamarit_2013]

¹⁰⁶ See 'Sheet ΔC' in [Supporting documents\Estimations\Ex-Post 3V Teak Mex V1]

¹⁰⁷ The average height and diameter within each plot was used to calculate the average volume. This average was then used to estimate the biomass in each strata.

and:

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

Where:

b_{TREE}	Tree biomass per ha in the tree biomass estimation strata; t d.m. ha ⁻¹
w_i	Ratio of the area of stratum i to the sum of areas in the tree biomass estimation strata; dimensionless
$b_{i,i}$	Mean tree biomass per ha in stratum i ; t d.m. ha ⁻¹

Estimation of the uncertainty was calculated according to Equation 15 of the methodological tool 'AR-TOOL14', v.04.2:¹⁰⁸

$$u_c = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^M w_i^2 \times \frac{S_i^2}{n_i}}}{b_{tree}}$$

Where:

u_c	Uncertainty
t_{VAL}	Two-sided student's t-value for a confidence level of 90% and degrees of freedom equal to $n - M$, where n is the total number of sample plots within the tree biomass estimation strata and M is the total number of tree biomass estimation strata
w_i	Ratio of the area of stratum i to the sum of areas in the tree biomass estimation strata; dimensionless
S_i^2	Variance of tree biomass per ha across all sample plots in stratum i ; t d.m. ha ⁻¹
b_{TREE}	Mean tree biomass per ha in the tree biomass estimation strata; t d.m. ha ⁻¹
n_i	Number of sample plots in stratum i

The estimation of the mean carbon stock in trees within the tree biomass estimation strata was calculated according to Equation 12 of the methodological tool 'AR-TOOL14', v.04.2:

¹⁰⁸ See 'Sheet Uncertainty' in [Supporting documents\Estimations\SamplingError&Uncertainty]. Equation 15 of the methodological tool 'AR-TOOL14', v.04.2 was used to calculate the uncertainty in tree volume. The uncertainty value is 7.48%, implying a discount of 0% applied to GHG removals in the current monitoring period.

$$C_{TREE} = \frac{44}{12} \times C_{tree}$$

Where:

C_{TREE} Carbon stock in trees in the tree biomass estimation strata; tCO₂e

CF_{TREE} CF of tree biomass; tC t d.m.⁻¹

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

Table 26: Parameters used for the estimation of tree biomass and mean carbon stock

Parameter	Symbol	Value	Source
Basic wood density (t/m ³)	D	0.59	Rodríguez-Anda, R., Fuentes, T., & Silva-Guzmán, J. A. (2012) ¹⁰⁹
BEF; dimensionless	BEF	1.50	IPCC (2003) ¹¹⁰
CF of tree biomass; tC t d.m. ⁻¹	CF_{TREE}	0.47	IPCC (2006) ¹¹¹

Step 4: Carbon stocks in dead wood

Conservative default factor values of 6% and 1% were applied according to the level of precipitation.¹¹²

Step 5: Carbon stocks in litter

A conservative default factor value of 1% was applied.

Step 6: Carbon stocks in project

¹⁰⁹ See supporting folder [Supporting documents\Estimations\Literature\Wood density]. The wood density used is the average value found in the AGSA plantations (Rodríguez-Anda et al., 2012).

¹¹⁰ IPCC. (2003). *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. The BEF values used for a 'tropical' climatic zone and 'broadleaf' forest type were taken from Table 3A.1.10, Annex 3A.1.

¹¹¹ IPCC. (2006). Table 4.3., Chapter 4: Forest Land. In IPCC, *2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4: Agriculture, Forestry and Other Land Use*. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf

¹¹² See Columns L–M of 'Sheet ΔC' in [Supporting documents\Estimations\Ex_post_estimations]

Changes in the carbon stock of selected carbon pools in year t were calculated according to the methodology 'AR-ACM0003', v.2.0:¹¹³

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t}$$

Where:

$\Delta C_{P,t}$	Change in project carbon stocks occurring in selected carbon pools in year t ; tCO ₂ e
$\Delta C_{TREE_PROJ,t}$	Change in carbon stock in tree biomass in the project in year t , as estimated in the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2; tCO ₂ e
$\Delta C_{SHRUB_PROJ,t}$	Change in carbon stock in shrub biomass in the project in year t , as estimated in the methodological tool 'AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', v.04.2; tCO ₂ e
$\Delta C_{DW_PROJ,t}$	Change in carbon stock in DW in the project in year t , as estimated in the methodological tool 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1; tCO ₂ e
$\Delta C_{LI_PROJ,t}$	Change in CLI in the project in year t , as estimated in the methodological tool 'AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities', v.03.1; tCO ₂ e

5.2.2 Increase in Non-CO₂ GHG Emissions Within the Project Boundary

Increase in non-CO₂ GHG emissions (GHG_{E,t}) within the project boundary as a result of the implementation of the A/R VCS project activity in year t , as estimated in Annex 31 of the methodological tool 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity', v.04.0.0; tCO₂e. Equation 1 of this tool is as follows:

$$GHG_{E,t} = GHG_{SPF,t} + GHG_{FMF,t} + GHG_{FF,t}$$

Where:

$GHG_{E,t}$	Emission of non-CO ₂ GHGs resulting from the burning of biomass and forest fires within the project boundary in year t ; tCO ₂ e
$GHG_{SPF,t}$	Emission of non-CO ₂ GHGs resulting from use of fire in site preparation in year t ; tCO ₂ e

¹¹³ See 'Sheet ΔC (O)' in [Supporting documents\Estimations\Ex_post_estimations]

$GHG_{FMF,t}$	Emission of non-CO ₂ GHGs resulting from use of fire to clear the land of harvest residue prior to replanting of the land or other forest management in year t ; tCO ₂ e
$GHG_{FF,t}$	Emission of non-CO ₂ GHGs resulting from fire in year t ; tCO ₂ e
t	1, 2, 3 ... years elapsed from the start of the project activity

According to the methodological tool 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity', v.04.0.0, the emission of non-CO₂ GHGs resulting from the burning of biomass and forest fires within the project boundary in year t is an estimate based on three sources: 1) the burning of biomass and forest fires within the project boundary; 2) the use of fire in site preparation; and 3) the use of fire to clear the land of harvest residue prior to replanting of the land or other forest management. Sources 1, 2, and 3 were considered to be zero as there were no emissions resulting from burning in the project area during the third verification period and the project activities do not include the use of fires to prepare land. Taking this into account, non-CO₂ GHG emissions ($GHG_{E,t}$) are therefore considered to be zero.

5.3 Leakage

According to the methodological tool 'AR-TOOL15: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity', v.2.0 and the description in Section 3.4 of the 'Joint Project Description & Monitoring Report',¹¹⁴ leakage encompasses all those emissions that occur when the displacement of pre-project agricultural activities leads to an increase in GHG emissions relative to the GHG emissions attributable to the activity as it exists within the project boundary. According to Equation 1 of the methodological tool 'AR-TOOL15', v.2.0 and the behavior of agricultural activities in the project scenario, leakage emissions resulting from the displacement of activities are estimated as follows:

$$LK_{AGRIC,t} = \frac{44}{12} * (\Delta C_{BIOMASS,t} + \Delta SOC_{LUC,t}) = 0$$

$$\Delta C_{BIOMASS,t} = [1.1 \times b_{tree} \times (1 + R_{tree}) + b_{SHRUB} \times (1 + R_s)] \times CF \times A_{DISP,t}$$

$$\Delta SOC_{LUC,t} = SOC_{REF} \times (f_{LUP} \times f_{MGP} \times f_{INP} - f_{LUD} \times f_{MGD} \times f_{IND}) \times A_{DISP,t}$$

Where:

$LK_{AGRIC,t}$	Leakage emissions resulting from the displacement of agricultural activities in year t ; tCO ₂ e
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¹¹⁴ Joint Project Description & Monitoring Report, Reforestation with Teak CO₂e TEAKMEX. (2018).

$\Delta C_{BIOMASS}$	Decrease in carbon stock in the carbon pools of the land receiving the activity displaced in year t ; t d.m.
CF	CF of woody biomass; dimensionless
$A_{DISP,t}$	Area of land from which agricultural activity is being displaced in year t ; ha
b_{tree}	Mean aboveground tree biomass in land receiving the displaced activity; t d.m. ha ⁻¹
R_{tree}	R for trees in the land receiving the displaced activity; dimensionless
b_{SHRUB}	Mean aboveground shrub biomass in the land receiving the displaced activity; t d.m. ha ⁻¹
R_s	R for shrubs in the land receiving the displaced activity; dimensionless
$\Delta SOC_{LUC,t}$	Change in soil organic carbon (SOC) stock due to land use change in the land receiving the displaced activity in year t ; tC ha ⁻¹
SOC_{REF}	SOC stock corresponding to the reference condition in native lands by climate region and soil type applicable to the land receiving the displaced activity; tC ha ⁻¹
f_{LUP}, f_{MGP}	Relative SOC stock change factors for land use, management practices, and inputs, respectively, applicable to the receiving land before the displaced activity is received; dimensionless
f_{LUD}, f_{MGD}	Relative SOC stock change factors for land use, management practices, and inputs, respectively, applicable to the receiving land after the displaced activity has been received; dimensionless
T	1, 2, 3, ...years elapsed since the start of the A/R CDM project activity

Owners of the acquired livestock lands are adults who sold their lands with the intention of moving away from field-based activities to some cities in particular¹¹⁵ and/or migrating to already-degraded areas, therefore presenting no displacement of emissions.

The south of Mexico, where the expansion area of the project is found, has been impacted for decades by policies that incentivize agricultural production. The best example of this is the *Programa Nacional de Desmontes* [National Tree Clearing Program], through which the government allocated land to peasants and the National Commission of Desmontes provided loans to farmers to encourage them to remove vegetation from their lands. The National Farming Program also incentivized changing land use from forest to pasture or agriculture. Following the

¹¹⁵ http://cuentame.inegi.org.mx/poblacion/rur_urb.aspx?tema=P

introduction of these policies, the farming sector showed considerable growth in the 1970s–1985 and the area of land devoted to livestock cultivation and foraging increased by more than 100%.^{116,117} This resulted in a very high incidence of degraded lands across the country, reducing the risk of remnant forest lands being degraded in order to increase the agricultural lands.

As mentioned in Section 3.3.1.2 of the 'Joint Project Description & Monitoring Report',¹¹⁸ in the event that the previous owner of the land purchased by AGSA continues with farming activities, these would be transferred to the already-degraded areas, where the number of livestock would not exceed the load capacity of the system for the following reasons:

- **Availability of the area with farming as current land use:**

The incentives mentioned above led to the current situation in the states that make up the expansion area of the project, i.e., the predominant land use type in these three areas being agricultural. Of the five municipalities located in the project area, four are characterized by having large tracts of land dedicated to farming. In addition to this, the migration phenomenon mentioned previously has meant that rural land is available at lower prices than in other regions of the country. Finally, the change of land use from areas of natural vegetation to pastures is not a viable scenario due to the high cost of soil preparation and the current legislation that "promotes the conservation of forest ecosystems, encouraging their delimitation and sustainable management, avoiding that the change of land use for agricultural purposes or of any other nature affects their permanence and potential".¹¹⁹

- **Type of farming practiced in the region:**

Where alternative land uses are described in Section 2.5.1 of the 'Joint Project Description & Monitoring Report',¹²⁰ it was reported that the type of farming practiced in the area is extensive grazing with an average density of one head of cattle per ha. To increase the load capacity, it would be necessary to increase the number of livestock in the pre-project scenario. Such an increase is not expected as the sale of the farms to AGSA was made as the previous owners no longer had the capacity to maintain livestock due to the migration of young people to the cities.

¹¹⁶ Gilardi, C. H., & Salicrup, D. R. P. (2007). *La legislación forestal y su efecto en la restauración en México*. Instituto Nacional de Ecología y Cambio Climático.

¹¹⁷ Unda, M., & Amaranta, A. (2011). *Efectos ambientales del Programa Nacional de Desmontes, 1972-1982*.

¹¹⁸ *Joint Project Description & Monitoring Report, Reforestation with Teak CO₂e TEAKMEX*. (2018).

¹¹⁹ SEMARNAT. Article 3, *General Law for Sustainable Forest Development*. (Last reform published April 13, 2020). Specific objectives: "VII. Recover and develop forests on degraded forest lands and preferably forest lands, so that they fulfill the function of conserving soil and water, in addition to boosting rural development"; and "X. Promote the conservation of forest ecosystems, encouraging their delimitation and sustainable management, avoiding that the change of land use for agricultural purposes or of any other nature affects their permanence and potential".

¹²⁰ *Joint Project Description & Monitoring Report, Reforestation with Teak CO₂e TEAKMEX*. (2018).

Thus, if animals in the pre-project scenario were displaced to existing grazing lands, the total number of animals in the receiving lands would not exceed the carrying capacity of the land.

Given that the explanation above is still valid for this verification period, the actual project scenario does not consider the displacement of livestock or agricultural activities outside the project boundary toward other forested lands to be likely.

Leakage emissions are accounted as zero, given that non-decreasing carbon stocks (e.g., biomass and SOC) are expected from lands outside the project boundary associated with those activities.

5.4 Net GHG Emission Reductions and Removals

According to Equation 5 of the methodology 'AR-ACM0003', v.2.0, net anthropogenic GHG removals by sinks shall be calculated as follows:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$

Where:

$\Delta C_{AR-CDM,t}$ Net anthropogenic GHG removals by sinks in year t ; tCO₂e

$\Delta C_{ACTUAL,t}$ Actual net GHG removals by sinks in year t ; tCO₂e

$\Delta C_{BSL,t}$ Baseline net GHG removals by sinks in year t ; tCO₂e

LK_t GHG emissions due to leakage in year t ; tCO₂e

LK_t can be considered zero according to Sections 5.3, 5.4, and 5.5 of the methodology 'AR-ACM0003', v.2.0, where $\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t}$.

The total GHG benefit calculated as the sum of stock changes throughout the monitoring period (October 22, 2020–October 251, 2022) is 291,590 tCO₂e (see Table 27 and Excel file 'Ex-Post 3V Teak Mex'). However, it is expected that 249,972 tCO₂e will be issued due to the Long Term Average limit, which corresponds to 710,672 tCO₂e.

Table 27: Net GHG Emission Reductions and Removals

Year	Project emissions or removals (tCO ₂ e)	Baseline emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)	Buffer pool allocation (tCO ₂ e)	VCUs issued in the first verification (tCO ₂ e)	VCUs issued in the second verification (tCO ₂ e)	VCUs eligible for issuance in the third verification (tCO ₂ e)
2013	18,128	-	-	18,128	2,538	15,589	-	-
2014	48,120	111,492	-	-	-	-	-	-
2015	57,673	121,421	-	-	-	-	-	-
2016	58,743	-	-	58,743	8,224	50,519	-	-
2017	58,743	-	-	58,743	8,224	50,519	-	-
2018	150,095	7,858	-	142,237	24,180	-	118,057	-
2019	151,950	26,239	-	125,711	21,371	-	104,340	-
2020	151,950	5,354	-	146,596	24,921	-	121,675	-
2021	212,637	-	-	212,637	65,917	-	-	146,719
2022	212,872	2,913	-	209,959	65,087	-	-	144,871
Total	1,120,912	275,277	-	972,755	220,463	116,628	344,072	291,590¹²¹

¹²¹ This value represents the removals to be verified for this monitoring period. However, it is expected that 249,972 tCO₂e will be issued due to the Long Term Average limit, which corresponds to 710,672 tCO₂e.

As depicted in Table 28, carbon credits available for issuance in the third verification amount to 291,590 tCO₂e. When combined with the credits issued in the two previous verifications, the total reaches 752,290 tCO₂e. However, the Long Term Average of the ex-ante estimates stands at 710,672 tCO₂e, indicating a limit that cannot be surpassed by the issuance of credits. Consequently, during the third verification, only 249,972 tCO₂e can be emitted, leaving 41,618 tCO₂e unissued.

Table 28: VCUs for issuance in the 3rd verification until LTA

VCUs issued in the first verification (tCO ₂ e)	VCUs issued in the second verification (tCO ₂ e)	VCUs eligible for issuance in the third verification (tCO ₂ e)	VCUs total eligible for issuance (tCO ₂ e)	Ex-ante estimates Long Term Average (LTA) (tCO ₂ e)	Difference between VCUs total and LTA (tCO ₂ e)	VCUs for issuance in the 3rd verification until LTA (tCO ₂ e)
116,628	344,072	291,590	752,290	710,672	-41,618	249,972

Table 29 shows the estimated ex-ante GHG emission removals and the achieved emission removals for this monitoring period before the buffer discount is applied.

Table 29: Ex-Ante Emission Removals and Achieved Emission Removals in the Monitoring Period 2021–2022

Ex-ante emission removals	<u>Achieved emission removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
207,094	422,596	104%	According to the measurements carried out, the actual yield of the plantation in these two years is greater than that calculated in the ex-ante estimations. During the monitoring period, planting efficiency was higher than projected.