

TEMPLATE

KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

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VERSION **v.1.5**

RELATED SUPPORT

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KEY PROJECT INFORMATION

GS ID of Project	23254
Title of Project	Brújula Verde
Time of First Submission Date	04/07/2025
Date of Design Certification	19/12/2025
Version number of the PDD	5.0
Completion date of version	19/12/2025
Project Developer	Inverbosques S.A.
Project Representative	Inverbosques S.A.
Project Participants and any communities involved	FG Proyecto Brujula FG Proyecto Brujula 2 ¹
Host Country (ies)	Colombia
Activity Requirements applied	☐ Community Service Activity ☐ Renewable Energy ☒ Land-Use and Forests Activity Requirements/Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☐ Small Scale ☒ Large Scale
Other Requirements applied	N/A
Methodology (ies) applied and version number	Methodology for Afforestation/Reforestation (A/R) GHGs emission reduction & sequestration V2.1 ²
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ Retroactive

¹ Although FG Proyecto Brujula and FG Proyecto Brujula 2 are Representatives, Inverbosques S.A. acts as the official focal point and direct contact for all communications with Gold Standard regarding the Brújula Verde project.

² Available at: <https://globalgoals.goldstandard.org/403-luf-ar-methodology-ghgs-emission-reduction-and-sequestration-methodology/>

Land-use & Forest Key Project Information³

Scope:	☒ Forestry ☐ Agriculture
Silvicultural system:	☒ Conservation (no use of timber) ☐ Selective Harvesting ☐ Rotation Forestry
Project Area (ha):	10,260.0 ha (for validation) with a goal to expand this in the future to at least 30,000 ha (Further information is provided in section A.1 Purpose and general description of project)
Eligible Area (ha):	10,260.0 ha (for validation)
10% Set Aside Conservation area (ha) ⁴ :	The project follows a conservation-oriented silvicultural design, in which the entire Project Area contributes to soil ecosystem restoration and sustainable forest management. Within this framework, $\geq$ 10% of the area has been specifically delineated as conservation set-aside corresponding to riparian buffers and protection zones, ensuring the maintenance of key ecological functions and compliance with both national regulations and Gold Standard requirements. A total of 2,309.2 ha has been delineated as conservation set-aside for this validation, corresponding to riparian and protection

³ Please refer to Appendix 3 for detailed information on LUF projects

⁴ The detailed description and supporting analysis of the conservation area delineation can be found in the document "T-PreReview_AR_10% Conservation Set-Aside_Annex." See the Excel .docx file in the supporting documentation folders: [Supports\PDD\A.1\Set aside]

	zones distributed across the Project Prioritized Area.
Evidence that Project Area Boundary is clearly distinguishable in the field:	The Project Area Boundary is clearly distinguishable in the field with the aid of: • Signs with the name of each property • Roads and fire breaks • Maps from each property and lot planted
Planting Area	10,260.0 ha
How many Modelling Units (MUs) are included in the eligible area:	7 MUs (See Table 39) The MUs are selected based on the plantation years and planting scheme (<i>Eucalyptus Pellita</i> with enrichment or native species).
Summary of New Areas added (copy and insert as needed):	
Size (ha):	Not applicable
Date Added	Not applicable

Table 1 – Estimated Sustainable Development Contributions

SUSTAINABLE DEVELOPMENT GOALS TARGETED	SDG IMPACT (DEFINED IN B.6)	ESTIMATED ANNUAL AVERAGE	UNITS OR PRODUCTS
13 Climate Action (mandatory)	Emission removals	310,058.7 ⁵	tCO ₂ e/year

⁵ Value calculated using the Project Area at validation

SUSTAINABLE DEVELOPMENT GOALS TARGETED	SDG IMPACT (DEFINED IN B.6)	ESTIMATED ANNUAL AVERAGE	UNITS OR PRODUCTS
5 Gender Equality	Women empowerment and gender equality	1	Ratio of the average wage paid during the reporting period to female employees for a specified position, compared to the average wage paid to male employees of the organization for the same position.
8 Decent Work and Economic Growth	Enhanced opportunities for income generation	100	% of employees earning above minimum wage
15 Life on Land	Enhanced biodiversity	42	Number of protected threatened species in the project area & conservation status of species: % increase/decrease in the number of individuals of endangered specie "x" spotted in the project area
	Enhanced biodiversity	167.9	Total area of trees planted: Total area (ha) of trees planted with Native Species/year

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

Brújula Verde, developed by Inverbosques, is a reforestation project that promotes Sustainable Forest Management in Vichada, Colombia with the objective of conserving biodiversity and reforesting degraded savannas.

The project is aligned with IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts) and 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. The project focuses on the activities of planting, conserving and maintaining forest plantations of *Eucalyptus pellita* and native species such as Aceite (*Copaifera pubiflora/officinalis*), Congrio (*Acosmium*

nitens), Macano (*Terminalia amazonia*), Simaruba (*Simarouba amara*), Yopo (*Anadenanthera peregrina*), Nauno (*Albizia guachapele*), Cedro (*Cedrela odorata*), Casia (*Cassia moschata*), Jacarandá (*Jacaranda copaia*), Saladillo Blanco (*Vochysia lehmannii*), and Carbonero (*Calliandra pittieri*), among others. *E. pellita* serves as a restorative species of degraded soils and the long-term objective is to promote and enrich growth, as well as natural regeneration and planting of native species facilitating the process of creating forests in succession. It is expected that the gradual reforestation will transform the land into a thriving ecosystem, where newly established tree corridors enable both flora and fauna to naturally proliferate. As these restored forests develop, they foster greater biodiversity by enriching both the variety of species and the genetic pool within the area.

In the future is idea is to potentially designate the area as a Civil Society Natural Reserve, under Colombia's National System of Protected Areas (SINAP). This voluntary designation should landowners choose to pursue it would reinforce long-term legal and ecological protection, supporting continued forest stewardship beyond the crediting period. Independently of this designation, landholders have signed usufruct agreements that include binding commitments to safeguard the restored forest, both during and after the crediting period. In parallel, the project will explore additional income streams, including the generation of new environmental credits (e.g., biodiversity or water-related credits) and the sustainable use of non-timber forest products (NTFPs) in alignment with conservation goals. The strategy is currently under development and will be formally socialized with all relevant stakeholders during upcoming verification periods to ensure transparency, alignment, and long-term commitment from all parties involved. This integrated approach aims to reinforce the financial sustainability and ecological permanence of the restored ecosystems.

The project boundaries, shown in Figure 1 and detailed in Table 2, are:

- i) the Expansion Region, which is Vichada department,
- ii) the Project Area, currently defined as the eligible planted area at validation (10,260.0 ha) and
- iii) the Prioritized Area, consisting in a set of 59 properties within Vichada in which Inverbosques has a strong relationship with the owners and there is an interest to use them in the project, this was the area used in the Eligibility Assessment (more details below in section A.1).

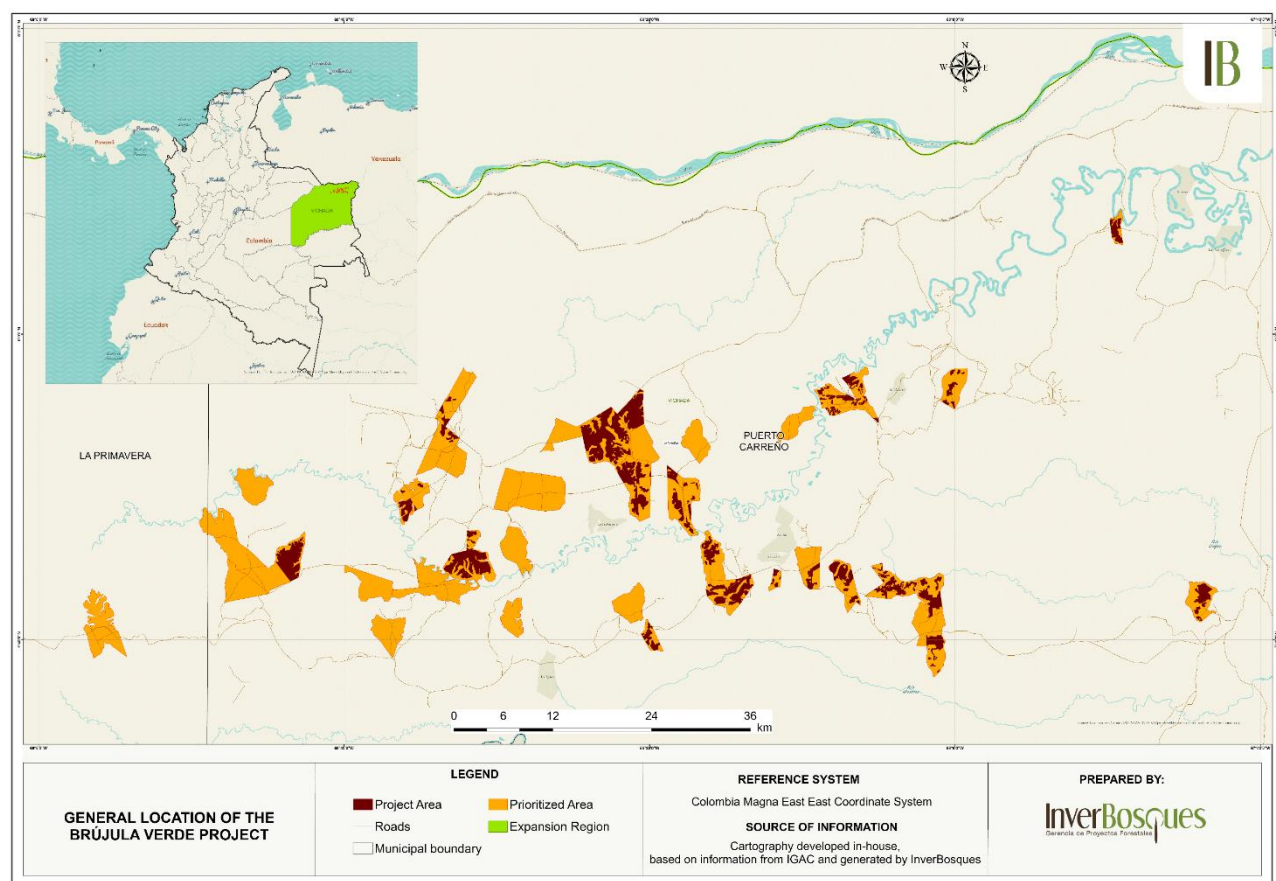


Figure 1 – General location of Brújula Verde Project

(Source: Prepared by Inverbosques (2025))

Table 2 – Project’s boundaries⁶ definition

Boundary	Value (ha)	Definition and purpose
Region of Expansion ⁷	1,615,175.0	Context polygon within the current Design Certification (future expansion): This polygon is included in the current Design Certification scope and which are planning/contextual only. It represents a wider assessment extent covering the project’s broader area of influence in the Vichada region. This region provides spatial context for long-term project expansion potential and landscape-level impacts but is not part of the current eligible or validated project scope.
Prioritized Area (properties boundaries) ⁸	55,619.7	Accounting polygon within the current Design Certification: This polygon forms part of the current Design Certification scope and is the total evaluation area corresponding to the 59 properties assessed during project design. This area was used as the reference extent for eligibility analysis and project planning, ensuring that all candidate lands were properly assessed.
Portion of the Prioritized Area that complies with the methodological requirements ⁹	39,118.7	Total land area meeting the LUF eligibility requirements in the 59 properties of the prioritized area, after exclusion of non-eligible covers, protected zones, and buffers. This represents the area that could be developed under the project within the prioritized area, subject to phased implementation and future planting designs. This Polygon is for accounting context within the current Design Certification (future expansion). This polygon is not included in the current carbon

⁶ The Geodatabase, shapefiles and metadata documenting all boundary figures, including Project Area, Eligible Area, Prioritized Area, Region of Expansion are available in the project’s information management folder on the following path: [Supports\PDD\A.1\Eligibility\GIS]

⁷ See the supporting files, in the project’s information management folder for verifier review, available on the following path: [Supports\PDD\A.1\Eligibility\GIS\SHAPES\BASE_CARTOGRAPHY]. Shapefile titled “AREA_INFLUENCE.shp”

⁸ See the supporting files, in the project’s information management folder for verifier review, available on the following path: [Supports\PDD\A.1\Eligibility\GIS\SHAPES\ THEMATIC_CARTOGRAPHY]. Shapefile titled “T20251112_Eligibility_ARR_10_22_BrujulaVerde.shp”

⁹ See the supporting files, in the project’s information management folder for verifier review, available on the following path: [Supports\PDD\A.1\Eligibility\GIS\SHAPES\ THEMATIC_CARTOGRAPHY]. To select that area please review the shapefile titled “T20251112_Eligibility_ARR_10_22_BrujulaVerde.shp” and filter via the attribute “ARR_Eli”

Boundary	Value (ha)	Definition and purpose
		accounting and does not generate removals at this stage. Any future inclusion will be subject to effective planting, monitoring, and verification in accordance with Gold Standard requirements.
Planting design (intended Project Area expansion)	30,000.0	Planting design (intended Project Area expansion):¹⁰ Refers to the portion of the Eligible Area that the Project Developer plans to effectively establish under plantation as part of the project's phased implementation strategy. While this area falls under the same Gold Standard category of Eligible Area, it represents a subset of the current eligible land that is intended for actual planting, based on technical, operational, and financial planning considerations. Not all of the current Eligible Area is expected to be planted. The planting design defines the area that the Project Developer intends to progressively convert into planted project area over time, subject to implementation capacity and verification. Only the areas that are effectively planted and subsequently verified will be incorporated into the Project Area and included in carbon accounting in future monitoring and verification periods. The 10,260.0 ha validated correspond to Phase 1 and the initial part of Phase 2 (Modelling Units 1-3). By 2027, the project is expected to reach approximately 20,010.0 ha through the planting of Modelling Units 4-7 (Phase 2), following the established plantation model. Beyond this, a potential Phase 3 has been identified, consisting of up to 10,000.0 ha of mixed-species plantations after 2027. It is important to note that only MUs 1, 2 and 3 are included in the present ex-ante estimations, the ex-ante projections for the remaining MUs will be reported in future verification

¹⁰ The full project polygon for Planting design has not yet been defined, as the project is designed for phased expansion. It is expected that the Project Area will progressively expand in future verification cycles to cover up to the planned 30,000.0 ha, within the boundaries of the Region of Expansion and the Eligible Area. Any such expansion will be subject to verification and inclusion in subsequent monitoring and verification periods.

Boundary	Value (ha)	Definition and purpose
		cycles, if applicable, through subsequent Monitoring Reports. The current expansion target of 30,000.0 ha represents the project's planned phased implementation under the validated planting model. Nevertheless, the project retains the capacity to expand beyond this target within the broader Region of Expansion (1,615,175 ha), subject to land availability, stakeholder agreements, and methodological compliance. Any such expansion will be documented in future Monitoring Reports and assessed under Gold Standard requirements. Accordingly, the 30,000.0-ha target should be understood as the present expansion reference, which may evolve in subsequent verification cycles as new restoration opportunities emerge. This area is for accounting context within the current Design Certification (future expansion): It forms part of the current Design Certification framework but is included for contextual and planning purposes only. It represents land within the Eligible Area that may support future Project Area expansion in subsequent verification cycles. This polygon is not included in the current carbon accounting and does not generate removals at this stage. Any future inclusion will be subject to effective planting, monitoring, and verification in accordance with Gold Standard requirements.
Project Area (Eligible planted area at validation) ¹¹	10,260.0	Accounting polygon within the current Design Certification (current removals): This polygon forms part of the current Design Certification scope. It represents the area currently under validation and it

¹¹ At the time of validation, the shapefile titled "Project_Area.shp" represents only the Project Area at validation (10,260.0 ha), corresponding to the planted areas included in the current Design Certification scope. It is expected that the Project Area will progressively expand in future verification cycles. See the supporting files, in the project's information management folder for verifier review, available on the following path: [Supports\PDD\A.1\Eligibility\GIS\SHAPES\ THEMATIC_CARTOGRAPHY]. Shapefile titled "Project_Area.shp"

Boundary	Value (ha)	Definition and purpose
		is Eligible Area already planted within Modelling Units 1 (Phase 1), 2 (Phase 1), and 3 (Phase 1-2). This represents the project's initial scope of active afforestation/reforestation interventions formally included in the validation. It is included in the current carbon accounting and is used for the estimation and reporting of GHG removals under the present monitoring and verification period.

(Source: Prepared by South Pole (2025), based on information from the initiative holder, and the Gold Standard requirements)

For administrative reasons the project is divided in phases, the first phase of the project consists in the planting of 10,010.0 ha (divided in 31 properties all of them located in Puerto Carreño, Vichada). This phase includes the Modelling Units 1 and 2, planted with *E. pellita* (together cover 9,974.1 ha) and a portion of Modelling Unit 3, planted exclusively with native species (35.8 ha). Planting activities for Phase 1 were carried out between 2023 and 2024, and these areas were established with a planting density of 1,200 trees/ha. In MU1 and MU2, native species were introduced as enrichment following the initial mortality of Eucalyptus seedlings, maintaining the overall planting density, and currently, around 90% of the individuals correspond to Eucalyptus, and the remaining 10% (1,200,000 trees) to native species dispersed across the planted area with a transition plan to native forests.

The second phase which is underway in 2025, will also cover around 10,000.0 ha, in this case the project is planting 5,000.0 ha with *E. pellita* and 5,000.0 ha with native species. This phase started with the planting of 250.0 ha of native species (MU3)¹² in one property, more areas will be planted between 2025 and 2027 to reach the goal of around 20,010.0 ha planted in the project¹³. To achieve this goal Inverbosques has

¹² It is important to note that Modelling Unit 3 (MU3) spans both project phases. The portion corresponding to Phase 1 comprises 35.8 ha established with native species between 2023 and 2024, while an additional 250 ha corresponding to Phase 2 were established in 2024, also with native species. This shared configuration reflects the progressive implementation schedule of the project, where planting activities for native species extend across consecutive phases while maintaining distinct accounting boundaries for each period.

¹³ Clarification notes on Project Area phasing and planting model: The 10,260.0 ha included in the current validation correspond to the areas that are already planted in Modelling Unit 1 (Phase 1), Modelling Unit 2 (Phase 1), and Modelling Unit 3 (Phase 1 and 2). By the end of 2027, the project aims to reach approximately 20,010.0 ha of total planted area

developed a nursery (for both Eucalyptus and native species) with the capacity to produce around 19,000,000 seedlings per year.

The silvicultural management plan includes scheduled girdling ("anillamiento") operations. By the 5-year mark, a 20 percent one is conducted: densely clustered or suppressed saplings are cut in place to reduce competition, and all cut material (small stems, branches, leaves) remains on-site as deadwood. This is strictly a silvicultural improvement, not harvesting, no timber ever leaves the site or enters commerce, fully compliant with "conservation forest" requirements (LUF Activity Requirements v1.2.1). Following girdling, gaps are replanted with native species as part of the enrichment strategy. Subsequent periodic girdlings occur at Year 9 (10 percent), Year 14 (10 percent), and at age 19 a final 10 percent, each girdling event is performed under the same conditions, used to replace suppressed invidious, and capture long-term pressures, including disease, structural instability, and other ecological impacts that can accumulate in maturing stands. Whereby in terms of land use, by the end of the crediting period, Eucalyptus will occupy 44.1% of the project area by year 23, while native species will cover the remaining 55.9%, underscoring the project's gradual shift toward native forest restoration as soils are restored and native species can then prosper. This transition will continue post the crediting period.

The selected baseline scenario of the project is the continuation of pre-project land use, which is an entrenched pattern of land conversion, characterized by cyclical burning, extensive grazing systems, and the transformation of natural ecosystems into degraded grasslands.

A.1.1. Eligibility of the project under Gold Standard

through the establishment of additional areas under Modelling Units 4 to 7, as part of Phase 2, which are planned based on the established forest plantation model and form the remainder of Phase 2. These areas are scheduled for planting between 2025 and 2027 and are considered part of the project's confirmed expansion plan.

Considering that the total eligible area within the Prioritized Area, at the time of the submission, is 39,118.7 ha, the project envisages further expansion over this area, of mixed-species plantations beyond Phase 2. Specifically, the project plans to establish an additional 10,000.0 ha over the next five years (beyond 2027), which would correspond to a potential Phase 3. However, since these areas represent a future and currently undefined planting phase, this phase remains contingent and will be designed according to evolving restoration needs and opportunities and will not be included in the current ex-ante estimations.

The design and composition of the planting model for this potential Phase 3 will be defined in future verification cycles, as applicable, through the Monitoring Report. As such, the additional 10,000.0 ha shall be considered a potential planting area and once the planting design is finalized and the sites are confirmed, the area will be formally integrated into the project's scope and associated projections. This approach ensures transparency, consistency with Gold Standard requirements and methodologies, and alignment with the project's phased implementation strategy.

Table 3 below lists the eligibility requirements as per section 3.1.1 of GS4GG Principles & Requirements v2.1¹⁴ and a justification of the compliance for the project.

Table 3 – Principles & Requirements v2.1

Eligibility Requirement	Project's compliance justification
Types of Project	The project type is eligible considering that the methodology applied is a GS Impact Quantification Methodology, as specified in sections B.1 and B.2.
Location of Project	The project is located in Colombia
Project area, project boundary and scale	The Project Boundaries are defined as: Project Area: The Project Area at validation is defined as the eligible planted areas of the first phase. Project Expansion Region: Vichada Department Scale: Large Scale Finally, it is important to highlight that the project is not registered with any other voluntary or compliance schemes, therefore, there is no risk of double counting.
Host country requirements	The project complies with all the applicable legal, environmental, ecological and social regulations of Colombia. Colombia, as a Party to the Paris Agreement, has submitted its Nationally Determined Contribution (NDC)¹⁵ which includes strategies to reduce emissions from deforestation and forest degradation through large-scale reforestation and sustainable forest management. The Brújula Verde Project contributes to these national climate goals by restoring lands and enhancing long-term carbon sequestration in the Department of Vichada. However, the emission removals achieved by the project will not be accounted for under Colombia's Nationally Determined Contribution (NDC), as the project operates independently from government-managed mitigation programs and is developed under the Gold Standard framework, thereby ensuring the absence of any double counting. In line with national policies, Colombia established the National Emission Reduction Registry (RENARE, Resolution 1447 of 2018), which ensures transparency in emission reduction

¹⁴ Available at: <https://globalgoals.goldstandard.org/101-par-principles-requirements/>

¹⁵ Available at: <https://unfccc.int/sites/default/files/2025-09/NDC%203.0%20Declarativa%20Colombia%20Transformaciones%20para%20la%20Vida%20V.25.09.2025%20Gob.%20Nacional.pdf>

Eligibility Requirement	Project's compliance justification
	accounting. The project aligns with this system's principles, currently registered under the feasibility stage. It also maintains independent traceability through the Gold Standard registry. In August 2025 the Ministry of Environment was consulted to understand if there were any procedural requirements for the project to comply with Art 6.2 of Paris Agreement and the government said that there were none at this stage. <u>National regulatory compliance</u> The project complies with all relevant Colombian laws and regulations, as summarized below: • Environmental and forestry framework: Operations are consistent with Law 99 of 1993¹⁶ (creation of the National Environmental System, SINA) and Decree 1076 of 2015¹⁷, which consolidates environmental sector regulations. Reforestation and forest management activities comply with Law 1021 of 2006¹⁸ (General forestry law) and associated technical standards. Coordination with the regional environmental authority (Corporinoquia) ensures compliance with environmental licensing and monitoring obligations. • Land tenure and legal ownership: All project areas are established on properties with verified legal ownership or usufruct rights. The transfer and ownership of emission removals are clearly defined under legally binding usufruct contracts and fiduciary instruments, as described in Section A.1.2 • Social and labor compliance: The project complies with Colombian labor law (Decree 2663 of 1950 "Código Sustantivo del Trabajo")¹⁹ and occupational health and safety standards (Decree 1072 of 2015)²⁰. All workers are legally contracted, affiliated with social security, and receive compensation above the national minimum wage. The project promotes equitable hiring, gender

¹⁶ Available at: https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=297

¹⁷ Available at: https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=78153

¹⁸ Available at: https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=20126

¹⁹ Available at: https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=199983

²⁰ Available at: https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=72173

Eligibility Requirement	Project's compliance justification
	equality, and decent work conditions in line with the Sustainable Development Goals (SDGs 5 and 8). • Environmental and social safeguards: The project ensures compliance with national environmental regulations and Gold Standard safeguard principles through the implementation of an Environmental and Social Assessment framework. Local communities are engaged through participatory processes aligned with Free, Prior, and Informed Consent (FPIC) principles, and continuous stakeholder engagement mechanisms are maintained to address inputs, feedback, and grievances throughout the project's implementation. • Corporate standing: Inverbosques S.A., the project developer, is a legally registered company that complies with all tax, environmental, and operational obligations²¹.
Contact details ²²	Inverbosques S.A Álvaro Trujillo alvaro.trujillo@inverbosques.com NIT: 900151686-4 FG Proyecto Brujula and FG Proyecto Brujula 2 Silvia Ruth Palomino Jerez spalomino@credicorcapital.com NIT: 900531292-7
Legal ownership	The project participants have full and uncontested legal ownership of any carbon credits that are generated, as described in section A.1.2 below
Other rights	Not applicable, there are no other rights transferred to the project.

²¹ Supporting documentation, including registration certificates, fiduciary instruments, and environmental authorizations, is available in the project's information management folder for verifier review. See the files in the supporting documentation folders: [Supports\PDD\A.1\ Ownership]

²² The contact information presented in this table corresponds exclusively to the Project Developer (Project Proponent (PP)). All other project participants or entities involved in the design, implementation, or monitoring processes will be described in the corresponding Monitoring Period, as operational roles may vary over time. These roles are referenced in Section B.7.3 of this document; however, since they are not necessarily executed on a long-term basis by a single entity or individual throughout the project's duration, their description will be updated and detailed in each verification period. For the Project Developer, all legal registration documentation is available in the project information management folder, including the fiduciary trust certificates for FG Proyecto Brújula and FG Proyecto Brújula 2, as well as other relevant legal and environmental compliance records. See the files in the supporting documentation folders: [Supports\PDD\A.1\Legal registry]

Eligibility Requirement	Project's compliance justification
Official development assistance (ODA) declaration	The project has signed the ODA declaration ²³

(Source: Prepared by South Pole (2025), based on information from the initiative holder, and the Gold Standard requirements)

Table 4 below lists the eligibility requirements as per section 2.1.1 of LUF Activity Requirements v1.2.1 and a justification of the compliance for the project.

Table 4 – LUF Activity Requirements v1.2.1

Eligibility Requirement	Project's compliance justification
Afforestation & Reforestation projects (A/R) and Agriculture Projects	The project type is eligible, since the activity applied is a reforestation project, as specified in sections B.1 and B.2.
No deforestation: the eligible area shall not meet the definition of forest 10 years before the project start date and at project start date	The area does not meet the definition of forest 10 years before the project start date and at project start date, see eligibility analysis below.
Evidence provided when eligible area is deforested during last 10 years	No areas that were deforested 10 years prior to the project start date are included in this project.
Operational mandatory national or pan-national cap-and-trade scheme of implementation country	The project is an Afforestation & Reforestation Project located in Colombia, and does not come under an operational mandatory national, pan-national cap-and-trade scheme, or other carbon pricing schemes.

(Source: Prepared by South Pole (2025), based on information from the initiative holder, and the Gold Standard requirements)

Eligibility analysis: No deforestation

Complying with the methodological requirement, an eligibility analysis was carried out to verify that the potential area to be planted is not present nor has presented

²³ See the signed declaration in the supporting documentation folder: [Supports\PDD\A.1\ODA]

deforestation processes during the last 10 years. This section contains the eligibility assessment, which was prepared in compliance with the Land Use and Forestry Activity Requirements v1.2.1, detailing the supervised classification process used to distinguish between forest and non-forest land cover, as well as the supporting analysis of exclusion variables that condition eligible and ineligible areas and at the end the results obtained from the whole analysis are shown.

Methodology

Areas considered

The assessment was carried out with an extent in the region and covering an area of 1,615,175 ha (area of influence or region of expansion), however, the results presented are focused in the "Prioritized Area", with a total evaluation area of 55,619.7 ha, distributed among the 59 properties (see the location of the properties in Figure 2 and the name and area in Table 5).

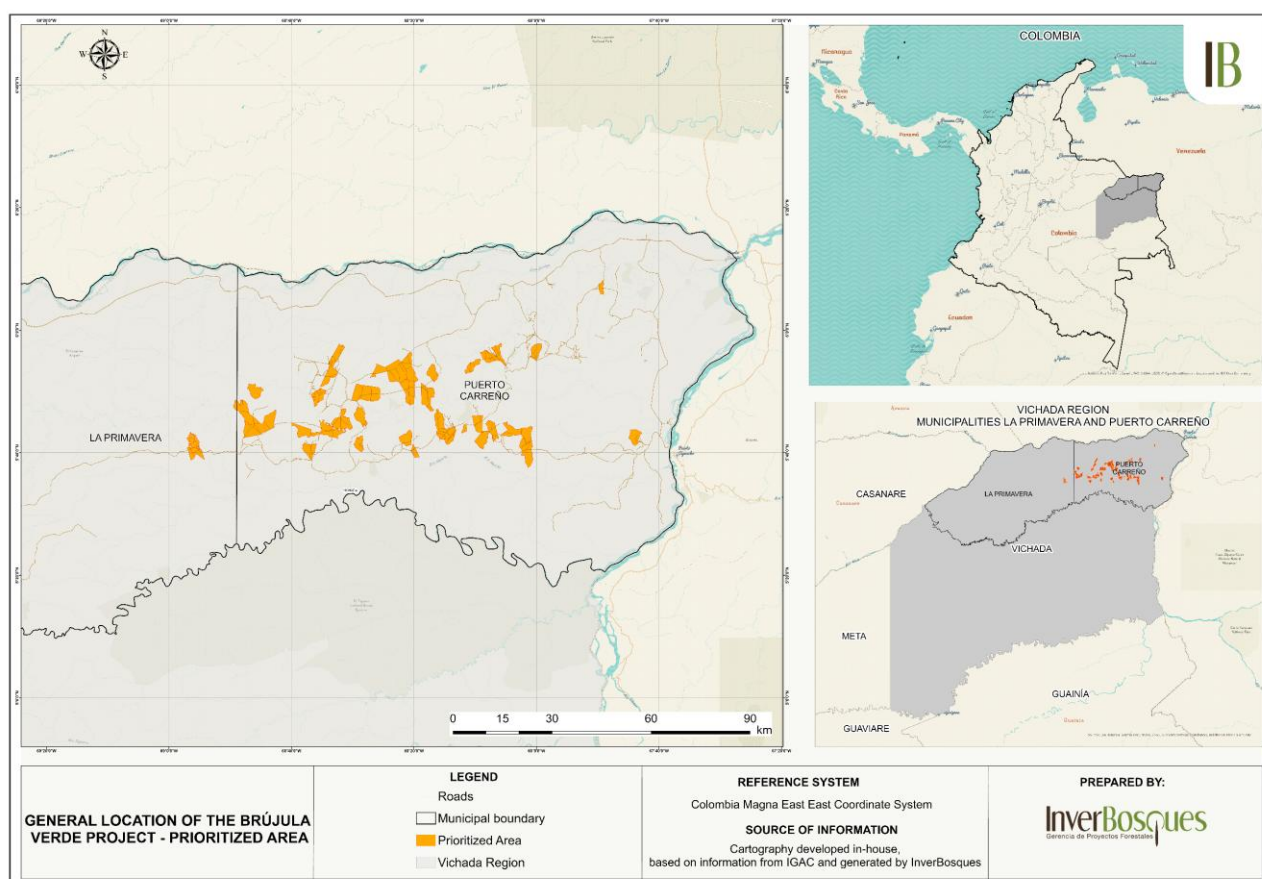


Figure 2 – Location of the Brújula Verde project Prioritized Area

(Source: Prepared by Inverbosques (2025))

Table 5 – Name and total area of the 59 properties that make up the Brújula Verde “Prioritized Area”²⁴

Property name	Total area (ha)	Property name	Total area (ha)
Angosturas	1,042.1	La Luna	854.7
Camaguay	1,238.6	La Trinidad	1,175.2
El Algarrobo	302.7	La Yuli	294.4
El Canoero	432.6	Las Acacias	374.3
El Caricari	1,242.6	Las Carmelitas	1,265.8
El Chaparral	1,169.0	Las Margaritas	1,100.6
El Condolirio	1,258.7	Las Neblinas	1,164.4
El Estero	1,135.4	Las Palmeras	1,049.0
El Estribo	445.8	Los Alpes	1,353.0
El Futuro	301.0	Los Araguatos	1,122.8
El Gavan	1,235.6	Los Claveles	1,264.0
El Guayabal	299.2	Los Laureles	1,235.2
El Mirador	1,303.6	Los Manantiales	723.1
El Morichal 2	1,100.1	Los Rosales	1,227.4
El Refugio	978.3	Los Sabanales	300.6
El Tesoro	1,238.5	Los Sabanales Carroquemado ²⁵	1,233.9
El Topacio	3,046.9	Lt El Consuelo	822.9
Hacienda Maria Paz	399.8	Lt San Diego	309.0
Juan de Dios	305.4	Marquetalia	1,064.9
La Azabache	280.6	Moriche Solo	298.9
La Azabachera	985.9	Palmarito	951.3
La Brasilia	295.3	Paso Rial	298.9
La Candelaria	1,151.0	San Jorge	480.1
La Conquista	1,139.3	Santa Barbara	1,042.2
La Esmeralda Tecnoquimicas ²⁶	1,305.6	Santa Cruz	1,284.9
La Esperanza 2	1,356.3	Sejalito	1,185.6
La Fortaleza 2	1,295.0	Villa Salome	1,171.3
La Guahiba	1,079.6	Villa Tranquila	853.4
La Ilusion	1,279.4	Yerbabuena	1,233.3
La Lucecita	240.5		
TOTAL		55,619.7	

(Source: Prepared by Inverbosques (2025), based on properties spatialization)

²⁴ The values are rounded to one decimal place; therefore, the direct sum of the values may differ in the total result. To confirm the total value, please refer to the calculations in the Excel file.

²⁵ Carroquemado is a nickname added to the name to differentiate the property from another one with the same name

²⁶ Tecnoquimicas is a nickname added to the name to differentiate the property from another one with the same name

Coordinate system

The cartographic files used in the eligibility analysis were projected in two different coordinate systems, depending on the type of file. Raster files, such as satellite images and the intermediate products generated from them, were projected in WGS 84 geographic coordinates. On the other hand, vector formats, such as points, lines and polygons, were projected in the MAGNA-SIRGAS Colombia East East system.

Raster format

The raster files were initially processed under the WGS 84 geographic coordinate system to minimize geometric distortions, measurements errors and misalignments between datasets. This ensured an accurate representation of large areas and enabled the proper overlay of multiple geospatial layers. Table 6 presents the details of the WGS 84 coordinate system (EPSG:4326).

Table 6 – WGS 84 coordinate system specifications.

Geographical Coordinate System	WGS 1984
WKID	4326
Authority	EPSG
Angular unit	Grades (0,0174532925199433)
First meridian	Greenwich (0,0)
Datum	D WGS 1984
Spheroid	WGS 1984
Semi-major axis	6378137
Semi-minor axis	6356752,314
Reverse flattening	298,2572236
Geographical coordinate system	WGS 1984
WKID	4326
Authority	EPSG
Angular unit	grades (0,0174532925199433)
First meridian	Greenwich (0,0)
Datum	D WGS 1984
Spheroid	WGS 1984
Semi-major axis	6378137
Semi-minor axis	6356752,314
Reverse flattening	298,2572236

(Source: ESRI, ArGIS pro.)

Vector format

The raster files generated during the eligibility analysis were converted to vector format and projected in the MAGNA-SIRGAS Colombia East East coordinate system. This procedure was critical to ensure accurate area calculations and to perform overlay analyses with other data layers.

Given the project's location in the department of Vichada, specifically in the municipality of Puerto Carreño, it is essential to process the cartographic files in vector format using the MAGNA-SIRGAS Colombia East East coordinate system. This system is specifically tailored to the geographic characteristics of the region, providing greater accuracy and consistency in the representation of the territory.

Unlike the CTM 12 (Single Origin) system, which can generate significant distortions in the determination of areas, especially in this region located in the far east of the country. This projection introduces more noticeable distortions in areas far from the central meridian (69°W), such as Vichada, where areas may be altered due to their geographical extension and distance from that meridian.

For this reason, it is essential to use the MAGNA-SIRGAS Colombia East East system, which is optimized to minimize distortions across Colombian territory, including regions such as Vichada. This ensures more precise and reliable calculations for accurate decision-making. Table 7 below presents the details of the MAGNA Colombia East East coordinate system (EPSG:3118).

Table 7 – MAGNA Colombia East East coordinate system specifications.

Projected Coordinate System	MAGNA Colombia East East
Projection	Transverse Mercator
WKID	3118
Authority	EPSG
Linear unit	Meters (1,0)
False East	1.000.000
False North	1.000.000
Central Meridian	-68,07750792
Scale factor	1
Latitude of origin	4,596200417
Geographic coordinate system	MAGNA
WKID	4686
Authority	EPSG
Angular unit	degrees (0,0174532925199433)

Prime meridian	Greenwich (0,0)
Datum	D MAGNA
Spheroid	GRS 1980
Semi-major axis	6378137
Semi-minor axis	6356752,314
Reverse flattening	298,2572221

(Source: ESRI, ArGIS pro.)

Eligibility period

The eligibility period of the project covers 13 years with an additional period in between (2010 – 2014 – 2022). Landsat images from 2010, were used as start of the analyzed period due to the limitations of satellite imagery and the presence of banding errors in images from the years 2011, 2012 and 2013.

Definition of forest for Colombia

For the eligibility process, the definition of forest used was the one submitted by Colombia in the Forest Resource Assessment²⁷, adopted according to Cabrera et al., 2011.²⁸ In which natural forests are described as an area predominantly occupied by trees that may also include shrubs, palms, bamboos, grasses and lianas, but trees must be the main component. For an area to be formally considered as a forest, it must meet the following specifications:

- Minimum area: At least 1 hectare (10,000 m²).
- Tree cover: A minimum canopy cover of 30% is required, meaning that at least 30% of the area must be covered by tree crowns.
- Tree height: Trees must reach a minimum height of 5 meters at maturity.

Tree cover from commercial forest plantations (coniferous and/or broadleaved), palm crops, trees planted for agricultural production (fruit trees or other permanent crops) and areas of secondary vegetation are excluded.

²⁷ See Colombian 2020 Forest Resources Assessment in FAO webpage: <https://openknowledge.fao.org/server/api/core/bitstreams/ce692245-dc47-44c9-b6b2-2d416ce3e508/content>

²⁸ Cabrera E., Vargas D. M., Galindo G., García M. C., Ordoñez M.F., Vergara L.K, Pacheco A.M., Rubiano J.C., Giraldo P, (2011). Technical Report of the Quantification of National Historical Deforestation at coarse and fine scales, Instituto de Hidrología, Meteorología y Estudios Ambientales - IDEAM- (Institute of Hydrology, Meteorology and Environmental Studies). Bogotá, D. C., Colombia. 106 p.

Eligibility procedure

The methodology comprises five steps. In the first step, acquisition of ALOS AVNIR for 2010 and Landsat multispectral images for years 2010, 2014 and 2022 were performed, followed by the creation of mosaics for 2014 and 2022. In the second step, land cover classification, visual interpretation and accuracy assessment was conducted. In the third step, forest and non-forest layers were generated for each year, from which eligible areas were identified. In the fourth step, exclusion variables were determined. Finally, in the fifth step, the eligibility information was integrated according to the forest and non-forest layers combined with the excluded areas.

Step 1: Image acquisition and mosaic creation

Multispectral images from Landsat were downloaded from the Earth Explorer platform²⁹, developed by the United States Geological Survey (USGS). Landsat 5 and 7 was used for the 2010 period, Landsat 8 for the 2014 one and Landsat 9 for the 2022 one.

These images correspond to Level 2 processing, which provides significant improvements in absolute geolocation accuracy, digital elevation modeling, radiometric calibration and atmospheric correction (surface reflectance). This indicates that the satellite imagery is “ready to use”, requiring no further correction.

The images used have a spatial resolution of 30 m, cover an area of 185 km² and feature a revisit period of 16 days. Mosaics were created for 2014 year from Landsat 8 and for 2022 from Landsat 9.

With respect to the atmospheric conditions of the study area, it is important to note that during the evaluation period there was no significant cloud cover or observable shadow effects, whether from clouds or topography. The absence of topographic shadows is attributed to the predominantly flat terrain of the region. These favourable atmospheric and geomorphological conditions enabled the acquisition of imagery with minimal interference, ensuring high-quality inputs for subsequent image processing, classification, and analysis.

Additionally, ALOS AVNIR was used for 2010 in an area not covered by the Landsat imagery.³⁰ This image have a spatial resolution of 10m.

²⁹ <https://earthexplorer.usgs.gov/>

³⁰ <https://search.asf.alaska.edu/>

Step 2: Land cover classification and visual interpretation

A visual interpretation was carried out for the 2010 period, on the other hand for the 2014 and 2022 period supervised classifications were performed using the Support Vector Machine (SVM) classifier in ArcGIS Pro software, to differentiate forest, non-forest, water, clouds and cloud shadows. Several iterations were carried out until results were consistent with ground conditions, requiring adjustments to the training areas as necessary.

The training areas were spatially distributed across the project's area of influence, separating the aforementioned classes throughout the extent of analysis. The spectral separability of the training areas was then evaluated using the Jeffries-Matusita statistical method, which measures the separability between training areas to assess their similarity or difference. Values close to 2 indicate that the training areas have distinct spectral signatures, while values close to 0 indicate they are identical.

Once separability was validated, supervised classifications were generated for each year. These raster classifications were converted into vector format, and land cover classes were assigned in the attribute tables. Areas smaller than 1 ha were excluded from the vector results to comply with the definition of forest, established for Colombia. To ensure that clouds and shadows did not affect the classification results, the methodology included:

- Quality masks (QA Pixel): Embedded in Landsat products, used to exclude pixels affected by clouds, cloud shadows, and snow.
- Temporal compositing: Selection of multiple scenes per year and generation of mosaics, prioritizing cloud and shadow free pixels to maximize coverage of the study area.
- Visual Validation: Post processing manual review to confirm that no residual clouds or shadows remain in key areas used to determine project eligibility.

The accuracy of the classified layers was evaluated using a confusion matrix, accounting for errors of commission (pixels incorrectly classified into a land cover class) and errors of omission (pixels belonging to a land cover class but not classified as such). This analysis provided the overall classification accuracy for each year.

To validate accuracy, control points were generated within the study area. The sample size was determined following the methodology proposed by Morillas (2007)³¹, based on a formula applicable to limited or large populations (Equation 1).

$$n = \frac{Z^2 * p * (1 - p)}{E^2} \text{ Equation 1}$$

Where:

n	= Sample size
z	= Critical value associated with the confidence level
p	= Estimated proportion of the population
E	= Margin of error

The control points were assigned the land cover classes observed in the mosaics generated from Landsat images and images available in Google Earth. These data were then matched with the value assigned by the classification performed.

Step 3: Land cover analysis

Classified land cover layers were combined to analyse changes. To the resulting layer, the eligibility field was added, where the eligible is what has always been non-forest in the analysis period and ineligible is other land cover. Areas classified as “clouds” and “cloud shadows” were reclassified as No Data in all years³².

Step 4: Exclusions

Once the forest and non-forest were determined an assessment of exclusion variables was also included. The exclusions correspond to areas where it is not possible to develop the project due to technical, environmental and/or legal conditions defined by the environmental authority. From the cartographic component, the layer of forest and non-

³¹ Morillas, A. (2007). Sampling in Finite Populations. Retrieved from https://www.u-cursos.cl/ingenieria/2010/1/IN3401/1/material_docente/bajar?id_material=280296

³² The combined use of official Landsat QA masks, temporal compositing of multiple scenes, visual validation, and the absence of significant cloud cover in the study area during the evaluation period ensures that cloud and shadow effects do not compromise the land-use/land-cover classification results. These measures guarantee the reliability, consistency, and transparency of the eligibility analysis in full compliance with the applicable methodological requirements.

forest was joined with the exclusion areas. This implies that eligible areas that overlap with these zones won't be considered for the establishment of plantations.

Table 8 – List of variables for the analysis of exclusion areas.

Variables for determining exclusion areas	Description
Roads	The existence and condition of roads in the region was evaluated, as well as the relevance of considering them as an exclusion variable.
RAMSAR - POMCA	Land that overlaps with the RAMSAR site will be submitted to the provisions established in the Bitá River basin management and land-use planning plan. (POMCA, Plan de Ordenamiento y Manejo de la Cuenca del Río Bitá).
Type of soil	Through the use of secondary sources, the type of soil present in the analyzed properties was characterized.
Environmental determinants	Other regulations additional to the POMCA, established by the environmental authority of the region, CORPORINOQUIA, were considered.
Other carbon projects	Existing carbon projects in the region were identified.

(Source: Prepared by Inverbosques (2025))

In the case of environmental factors, it was necessary to carry out a detailed analysis of land cover using the IPCC (Intergovernmental Panel on Climate Change) categories, in order to delimit the forests and the protection zones established by the environmental authority. This analysis was conducted by photo interpretation of Sentinel 2 images and those available in Google Earth, complemented by field visits.

A precision analysis using a confusion matrix was applied to the generated land cover layer, using the same methodology as previously used for forest and non-forest classification.

Step 5: Eligibility and exclusions

As a final process of the analysis, all layers were merged to further identify eligible areas that truly present characteristics that justify their exclusion from the project. This approach enabled a more robust eligibility analysis to be obtained by considering a larger number of determining variables.

Results

Step 1: Image acquisition and mosaic creation

Images were downloaded for the area of influence with two multispectral images per year being required to cover the entire area; the spectral bands used for the analysis were 2, 3, 4, 5 and 6. Table 9 present the respective acquisition dates, rows and columns (path/row), on the other hand, Table 10, Table 11 and Table 12 presents the characteristics of the spectral bands of the satellite images used.

Table 9 – Satellite image information.

Number	Satellite	Collection	Path	Row	Acquisition Date
1	LC09	T1_L2	4	56	5/12/2022
2	LC09	T1_L2	5	56	28/12/2022
3	LC08	T1_L2	4	56	21/01/2014
4	LC08	T1_L2	5	56	12/01/2014
5	LT05	T1_L2	4	56	02/11/2010
6	LE07	T1_L1	5	56	01/09/2010
7	ALOS AVNIR	V2A	444	3480	01/20/2010

(Source: Prepared by Inverbosques (2025))

Table 10 – Band characteristics of Landsat 5 images.³³

Band	Wavelength (µm)	Resolution (m)
Band 1 Blue-Green (Visible)	0.45 - 0.52	30
Band 2 Green (Visible)	0.52 - 0.60	30
Band 3 Red (Visible)	0.63 - 0.69	30
Band 4 Near-Infrared (NIR)	0.76 - 0.90	30
Band 5 Shortwave Infrared 1 (SWIR 1)	1.55 - 1.75	30
Band 6 Thermal Infrared (TIR)	10.40 - 12.50	120
Band 7 Shortwave Infrared 2 (SWIR-2)	2.08 - 2.35	30

Table 11 – Band characteristics of Landsat 7 images.³⁴

Band	Wavelength (µm)	Resolution (m)
Band 1 Blue-Green (Visible)	0.45 - 0.515	30
Band 2 Green (Visible)	0.525 - 0.605	30
Band 3 Red (Visible)	0.63 - 0.69	30

³³ <https://www.usgs.gov/landsat-missions/landsat-5>

³⁴ <https://www.usgs.gov/landsat-missions/landsat-7>

Band 4 Near-Infrared (NIR)	0.77 - 0.90	30
Band 5 Shortwave Infrared 1 (SWIR 1)	1.55 - 1.75	30
Band 6 Thermal Infrared (TIR)	10.40 - 12.50	60
Band 7 Shortwave Infrared 2 (SWIR-2)	2.09 - 2.35	30
Band 8 Panchromatic	0.52 - 0.90	15

Table 12 – Band characteristics of Landsat 8 and 9 images³⁵.

Band	Wavelength (μm)	Resolution (m)
Band 1 Coastal	0.43 - 0.45	30
Band 2 Blue	0.45 - 0.51	30
Band 3 Green	0.53 - 0.59	30
Band 4 Red	0.63 - 0.67	30
Band 5 Near Infrared (NIR)	0.85 - 0.88	30
Band 6 Shortwave Infrared 1 (SWIR-1)	1.57 - 1.65	30
Band 7 Shortwave Infrared 2 (SWIR-2)	2.11 - 2.29	30
Band 8 Panchromatic	0.50 - 0.68	15
Band 9 Cirrus	1.36 - 1.38	30
Band 10 Thermal Sensor 1	10.60 - 11.19	100
Band 11 Thermal Sensor 2	11.50 - 12.51	100

(Source: Prepared by Inverbosques (2025))

With the previously downloaded information, mosaics were generated for 2014 and 2022 and delimited to the area of influence. Figure 3 shows the satellites images of 2010 while Figure 4 and Figure 5 show the satellite image mosaics for the years 2014 and 2022, respectively.

³⁵ Own elaboration with information from USGS: <https://www.usgs.gov/landsat-missions/landsat-9>

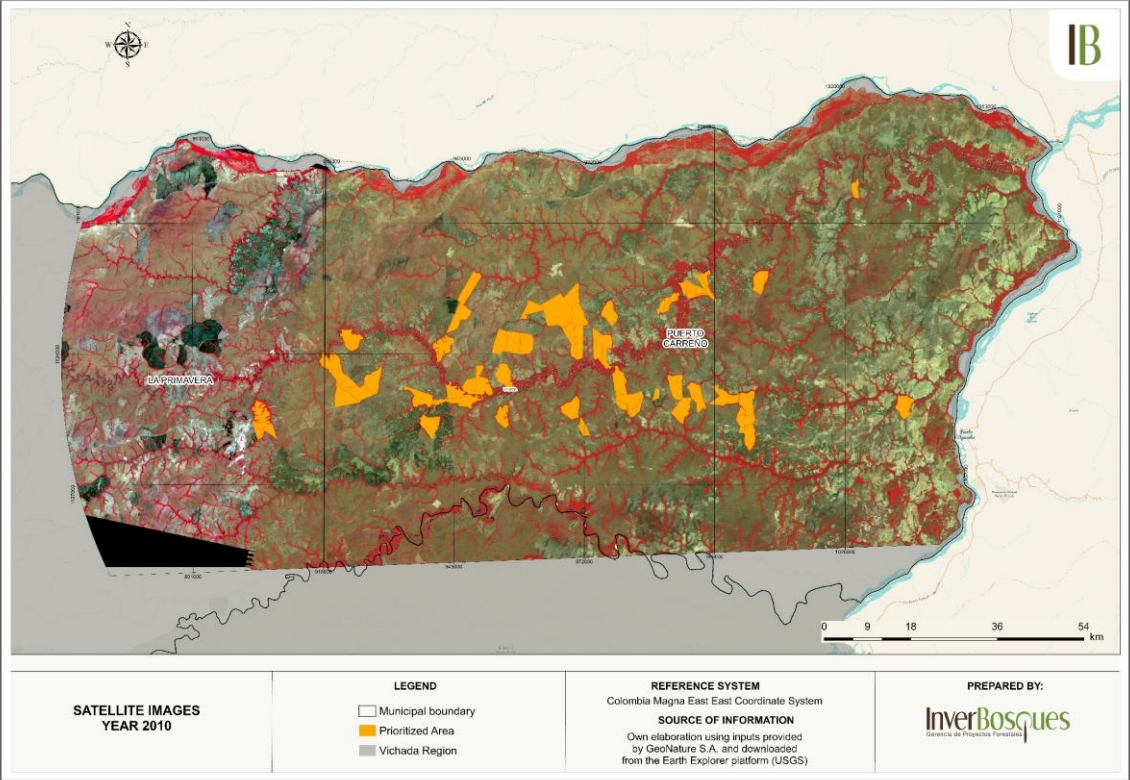


Figure 3 – Satellite images used for 2010.

(Source: Prepared by Inverbosques (2025))

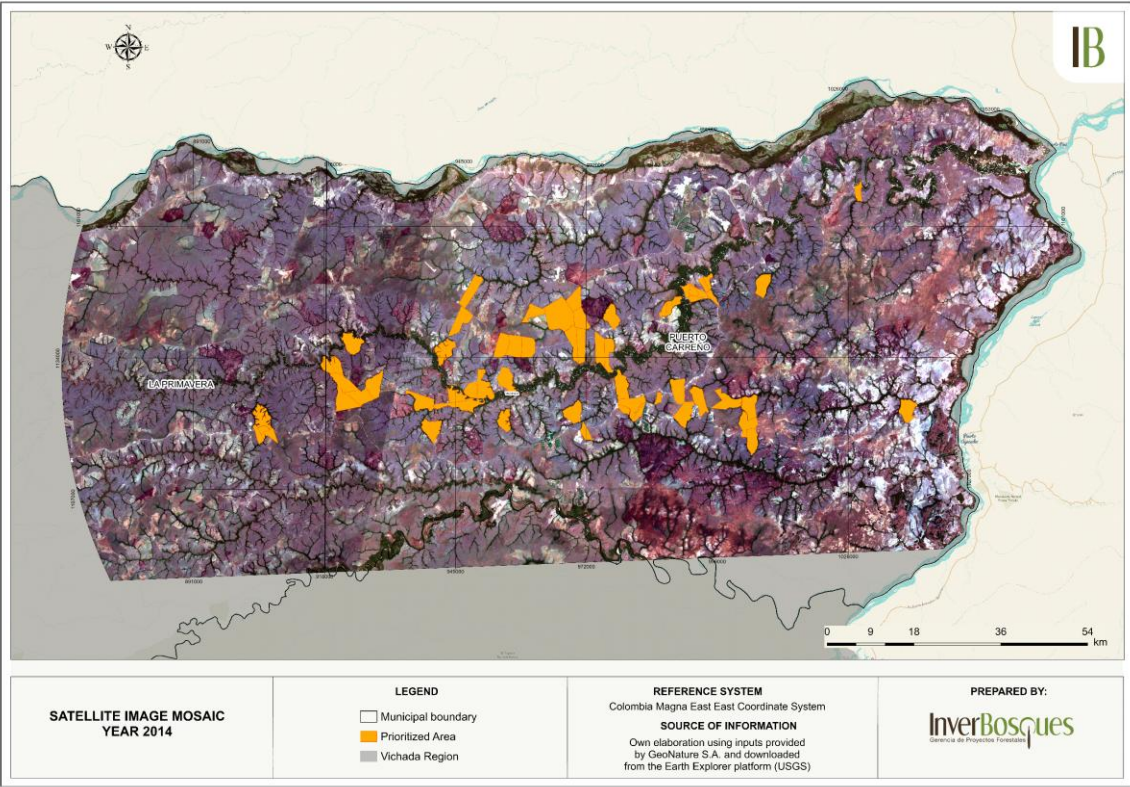


Figure 4 – Mosaic image 2014.

(Source: Prepared by Inverbosques (2025))

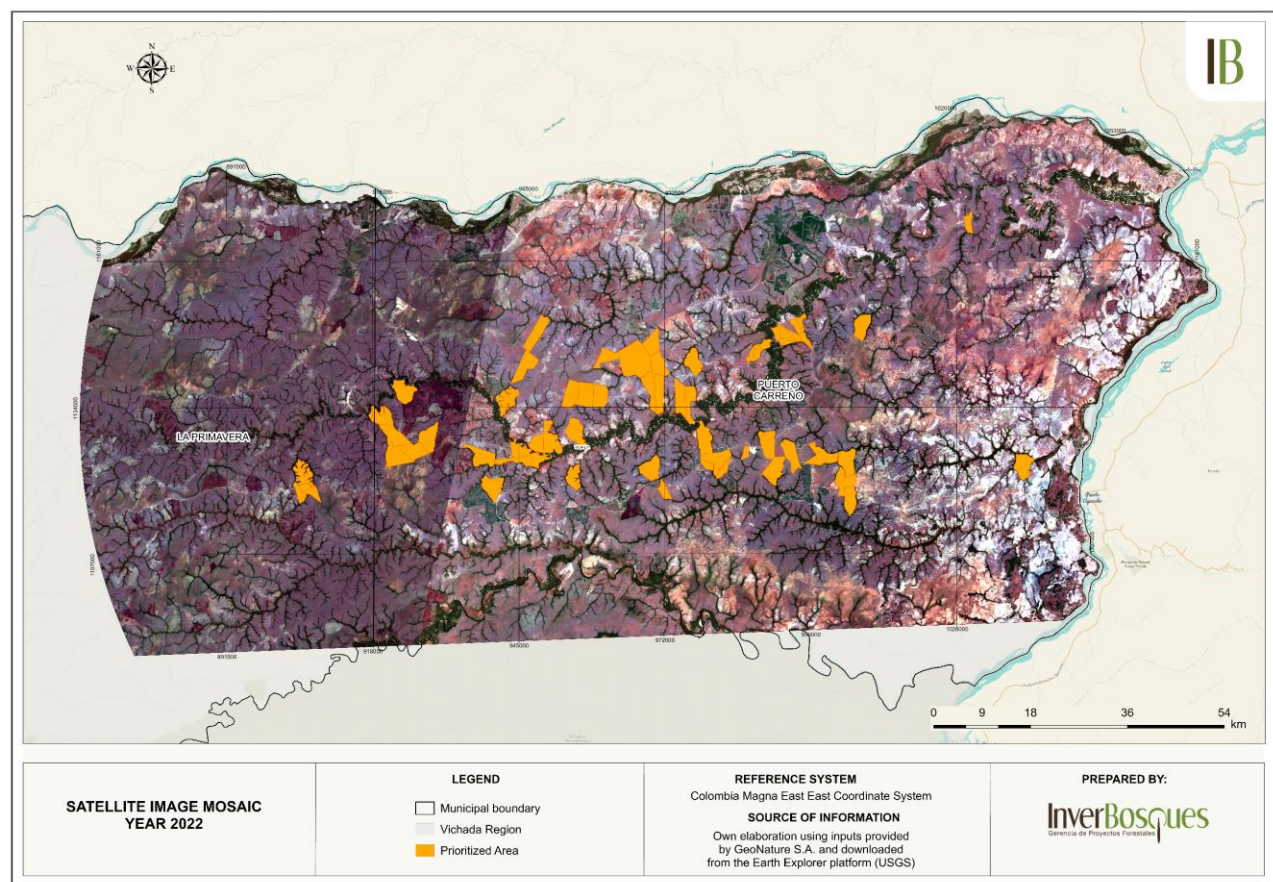


Figure 5 – Mosaic image 2022.

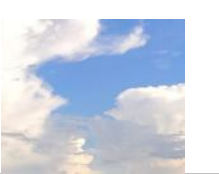
(Source: Prepared by Inverbosques (2025))

Step 2: Land cover classification and visual interpretation

In 2010 a visual interpretation was carried out following the classes described in Table 13 for the prioritized properties. On the other hand, in 2014 and 2022, a land cover classification was done with 790 and 784 training polygons respectively. These polygons were then spatially distributed along the extent of the images (Figure 6) according to the classifier's criteria. The classes used and the number of training areas per year are shown in Table 13 and Table 14.

Table 13 – Description of the classes used for land cover delimitation.

Land cover	Description	Image
Water bodies	Land areas covered by water	 

Land cover	Description	Image	
Forest	See section 3.4. for the definition of forest for Colombia. This land cover is seen in the visible spectrum with dark green tones and continuous pixels, showing corrugated textures.		
Non-forest	Refers to all land cover that does not meet the definition of forest. These include grassland, cropland, settlements and bare land.		
Cloud	Visible masses formed by small water droplets or ice crystals suspended in the atmosphere		
Shadow	Corresponds to the shadows or dark areas associated with the geographical elements of the landscape, generated by the obstruction of sunlight.		

(Source: Prepared by Inverbosques (2025))

Table 14 – Number of training polygons by year and class.³⁶

Class	2014	2022	Total by Land Cover
Water bodies	79	81	160
Forest	167	168	335
Non-Forest	544	535	1,079
Cloud	0	0	0
Shadow	0	0	0
Total	790	784	1,574

(Source: Prepared by Inverbosques (2025))

³⁶ There was no supervised classification for 2010, instead a visual inspection was carried out.

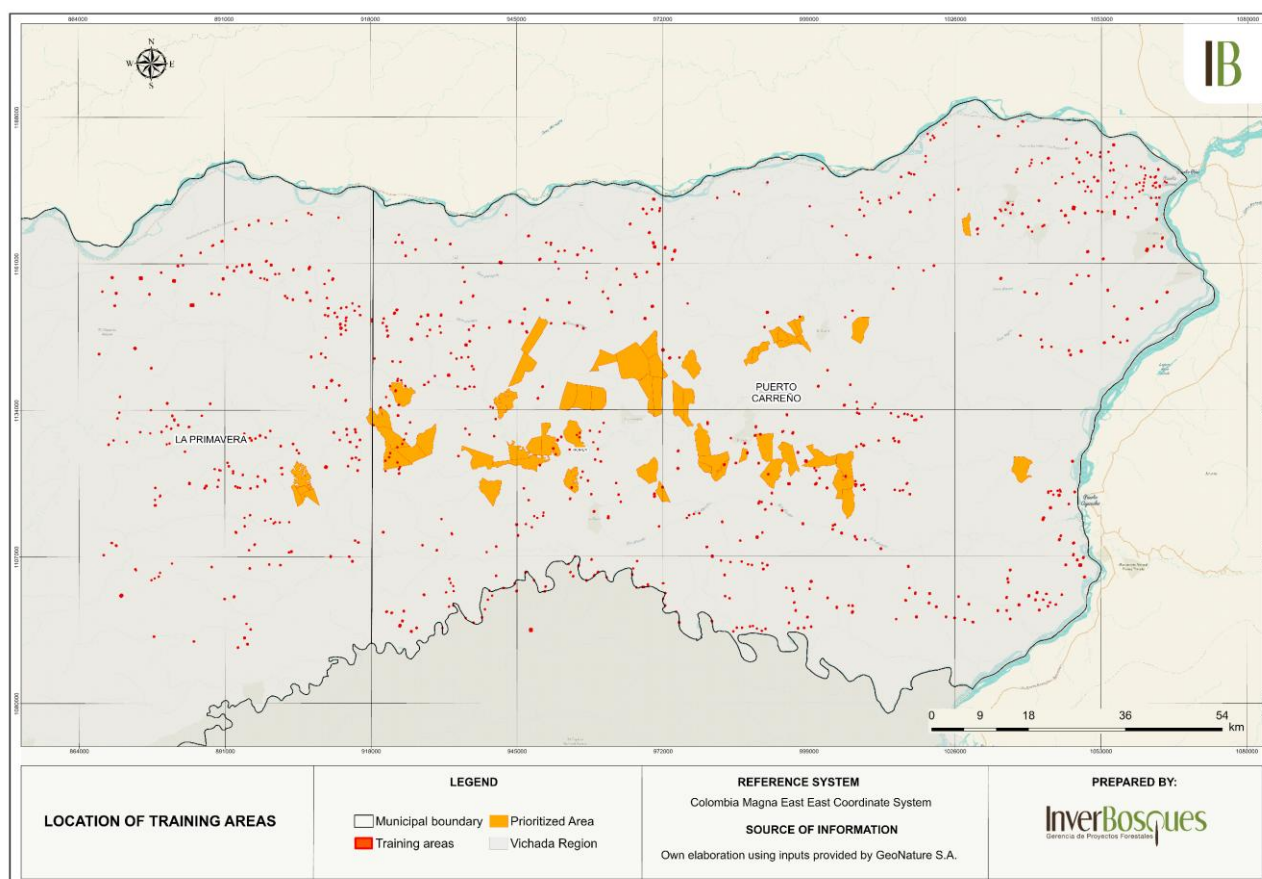


Figure 6 – Location of training areas for supervised classification (2014, 2022).

(Source: Prepared by Inverbosques (2025))

Additionally, the separability among classes was calculated, and all values obtained were statistically significant (Table 15), with values equal or close to 2. This indicates that the training areas have distinct spectral signatures, which allows the classes to be separable from each other, without overlapping. Therefore, these training areas are representative of the different land cover types.

Table 15 – Jeffries-Matusita separability measure

Class	2014	2022
Forest / Non-Forest	1.99959717	1.99986103
Water / Non-Forest	1.99999860	1.99984056
Forest /Water	2.00000000	1.99999995

(Source: Prepared by Inverbosques (2025))

Calculation of classification accuracy

The sample size was calculated using the Morillas (2007) equation, with a 95% confidence level, a 10% margin of error, and an estimated population proportion of 50%, resulting in a required sample size of 97 points. However, a larger sample size was selected to strengthen the precision analysis and ensure the reliability of the information generated. Accordingly, 300 control points were created for each year using the Random Points tool in ArcGIS Pro (Figure 7). For 2010, the points were limited to the property area; for 2014 and 2022, they were limited to the area of influence, however, since 5 of the points were located in No Data areas, the calculations were performed with the remaining 295 points. Each point was assigned the land cover class observed in Landsat and ALOS-AVNIR imagery (Table 9) as well as in Google Earth imagery (Table 16). These were then compared to the supervised classification.

Table 16 – Google Earth images used in the accuracy analysis.

Land Cover Analysis	Satellite Image	Date
Forest – Non-Forest 2010	Landsat ALOS AVNIR	01/03/2010 – 01/20/2010
Forest - Non-Forest 2014	Google Earth	24/01/2013 – 26/03/2013
Forest - Non-Forest 2022	Google Earth	25/01/2020

(Source: Prepared by Inverbosques (2025))

Table 17 presents the confusion matrix that includes an overall accuracy of more than 90%.

Table 17 – Confusion matrix - classification accuracy values.

Classes		Forest	Non-Forest	Total	User Accuracy
2010	Forest	62	5	67	93%
	Non-Forest	7	226	233	97%
	Total	69	231	300	
	Producer Accuracy	90%	98%		96% Overall Accuracy
Classes		Forest	Non-Forest	Total	User Accuracy
2014	Forest	29	2	31	94%
	Non-Forest	3	261	264	99%
	Total	32	263	295	
	Producer Accuracy	91%	99%		98% Overall Accuracy
Classes		Forest	Non-Forest	Total	User Accuracy
2022	Forest	35	1	36	97%
	Non-Forest	2	257	259	99%
	Total	37	258	295	

Producer Accuracy 95% 100%

99% Overall Accuracy

(Source: Prepared by Inverbosques (2025))

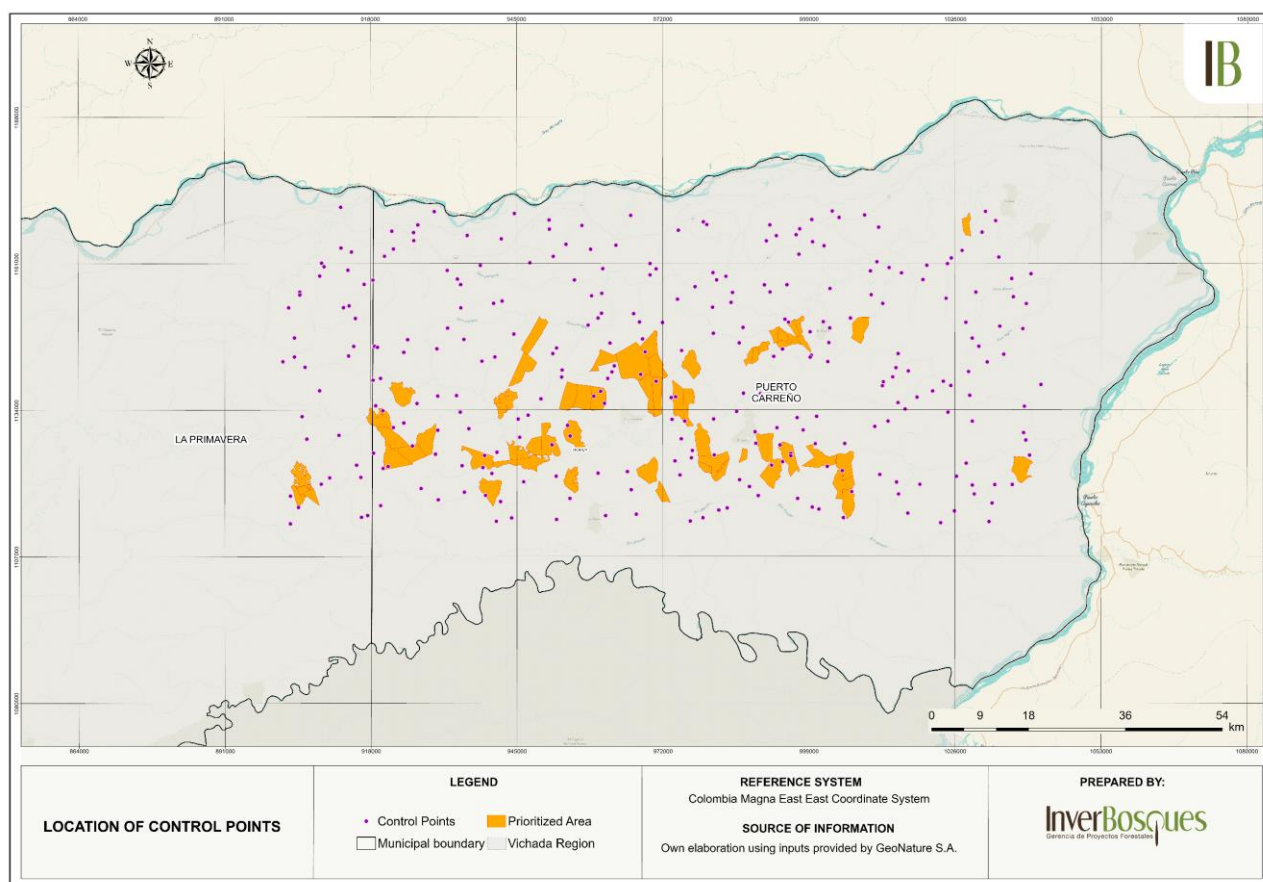


Figure 7 – Location of control points.

(Source: Prepared by Inverbosques (2025))

Step 3: Land cover analysis

Table 18 details the areas of land cover by year, as well as the changes that occurred during the period analyzed.

Table 18 – Forest, non-forest, and water body land cover for 2014 and 2022

Land Cover	2010 Area (ha)	2014 Area (ha)	2022 Area (ha)
Water	86.2	73.1	73.1
Forest	4,541.3	4,521.1	4,538.3
Non-Forest	50,992.2	51,025.4	51,008.2
Total	55,619.7	55,619.7	55,619.7

(Source: Prepared by Inverbosques (2025))

After carrying out the delimitation of cover, discriminating between water bodies, forest and non-forest, it was defined that areas classified as “non-forest” in both time windows (stable non-forest) are considered for the analysis in Step 4. Table 19 presents the

possible combinations of cover in the periods, together with their classification as eligible or ineligible.

Table 19 – Categorization considering forest and non-forest.

2010 Land Cover	2014 Land Cover	2022 Land Cover	Category
Water	Water	Water	Not eligible
Water	Water	Forest	Not eligible
Water	Water	Non-Forest	Not eligible
Water	Forest	Water	Not eligible
Water	Forest	Forest	Not eligible
Water	Forest	Non-Forest	Not eligible
Water	Non-Forest	Water	Not eligible
Water	Non-Forest	Forest	Not eligible
Water	Non-Forest	Non-Forest	Not eligible
Forest	Water	Water	Not eligible
Forest	Water	Forest	Not eligible
Forest	Water	Non-Forest	Not eligible
Forest	Forest	Water	Not eligible
Forest	Forest	Forest	Not eligible
Forest	Forest	Non-Forest	Not eligible
Forest	Non-Forest	Water	Not eligible
Forest	Non-Forest	Forest	Not eligible
Forest	Non-Forest	Non-Forest	Not eligible
Non-Forest	Water	Water	Not eligible
Non-Forest	Water	Forest	Not eligible
Non-Forest	Water	Non-Forest	Not eligible
Non-Forest	Forest	Water	Not eligible
Non-Forest	Forest	Forest	Not eligible
Non-Forest	Forest	Non-Forest	Not eligible
Non-Forest	Non-Forest	Water	Not eligible
Non-Forest	Non-Forest	Forest	Not eligible
Non-Forest	Non-Forest	Non-Forest	Stable non-forest

(Source: Prepared by Inverbosques (2025))

The results of the stable non-forest area and the non-eligible one are presented in Table 20 and Figure 8.

Table 20 – Results of stable non-forest and non-eligible areas³⁷

Property name	Stable non-forest area (ha)	Non-eligible area (ha)	Prioritized Area Total area (ha)
Angosturas	1,004.0	38.0	1,042.1
Camaguay	1,032.2	206.4	1,238.6
El Algarrobo	159.7	143.1	302.7
El Canoero	409.6	23.0	432.6
El Caricari	1,117.0	125.6	1,242.6
El Chaparral	1,031.7	137.2	1,169.0
El Condolirio	1,180.5	78.2	1,258.7
El Estero	1,135.4	0.0	1,135.4
El Estribo	437.0	8.8	445.8
El Futuro	296.2	4.8	301.0
El Gavan	1,176.3	59.3	1,235.6
El Guayabal	285.8	13.4	299.2
El Mirador	1,073.8	229.7	1,303.6
El Morichal 2	1,075.5	24.6	1,100.1
El Refugio	975.5	2.8	978.3
El Tesoro	1,112.8	125.6	1,238.5
El Topacio	2,936.6	110.3	3,046.9
Hacienda Maria Paz	367.8	32.0	399.8
Juan de Dios	300.3	5.1	305.4
La Azabache	275.5	5.2	280.6
La Azabachera	903.5	82.4	985.9
La Brasilia	287.9	7.5	295.3
La Candelaria	1,087.5	63.5	1,151.0
La Conquista	987.2	152.1	1,139.3
La Esmeralda Tecnoquimicas	724.1	581.5	1,305.6
La Esperanza 2	1,210.1	146.1	1,356.3
La Fortaleza 2	1,213.9	81.1	1,295.0
La Guahiba	1,076.7	2.9	1,079.6
La Ilusion	1,028.7	250.7	1,279.4
La Lucecita	239.4	1.2	240.5
La Luna	840.4	14.3	854.7
La Trinidad	1,035.8	139.4	1,175.2
La Yuli	198.5	95.9	294.4
Las Acacias	326.3	48.0	374.3
Las Carmelitas	1,235.6	30.2	1,265.8
Las Margaritas	956.1	144.5	1,100.6
Las Neblinas	1,096.8	67.6	1,164.4

³⁷ The values are rounded to one decimal place; therefore, the direct sum of the values may differ in the total result. To confirm the total value, please refer to the calculations in the Excel file.

Property name	Stable non-forest area (ha)	Non-eligible area (ha)	Prioritized Area Total area (ha)
Las Palmeras	983.1	65.9	1,049.0
Los Alpes	1,163.6	189.4	1,353.0
Los Araguatos	1,096.1	26.7	1,122.8
Los Claveles	1,261.3	2.7	1,264.0
Los Laureles	1,211.3	23.9	1,235.2
Los Manantiales	667.6	55.5	723.1
Los Rosales	1,188.5	38.9	1,227.4
Los Sabanales	300.6	0.0	300.6
Los Sabanales Carro Quemado	1,140.7	93.3	1,233.9
Lt El Consuelo	598.3	224.5	822.9
Lt San Diego	303.7	5.3	309.0
Marquetalia	994.5	70.4	1,064.9
Moriche Solo	287.1	11.8	298.9
Palmarito	836.7	114.6	951.3
Paso Rial	274.5	24.4	298.9
San Jorge	477.2	2.9	480.1
Santa Barbara	1,003.9	38.3	1,042.2
Santa Cruz	1,173.3	111.6	1,284.9
Sejalito	1,160.7	24.9	1,185.6
Villa Salome	1,016.8	154.6	1,171.3
Villa Tranquila	833.1	20.3	853.4
Yerbabuena	1,177.3	55.9	1,233.3
TOTAL	50,981.9	4,637.7	55,619.7

(Source: Prepared by Inverbosques (2025))

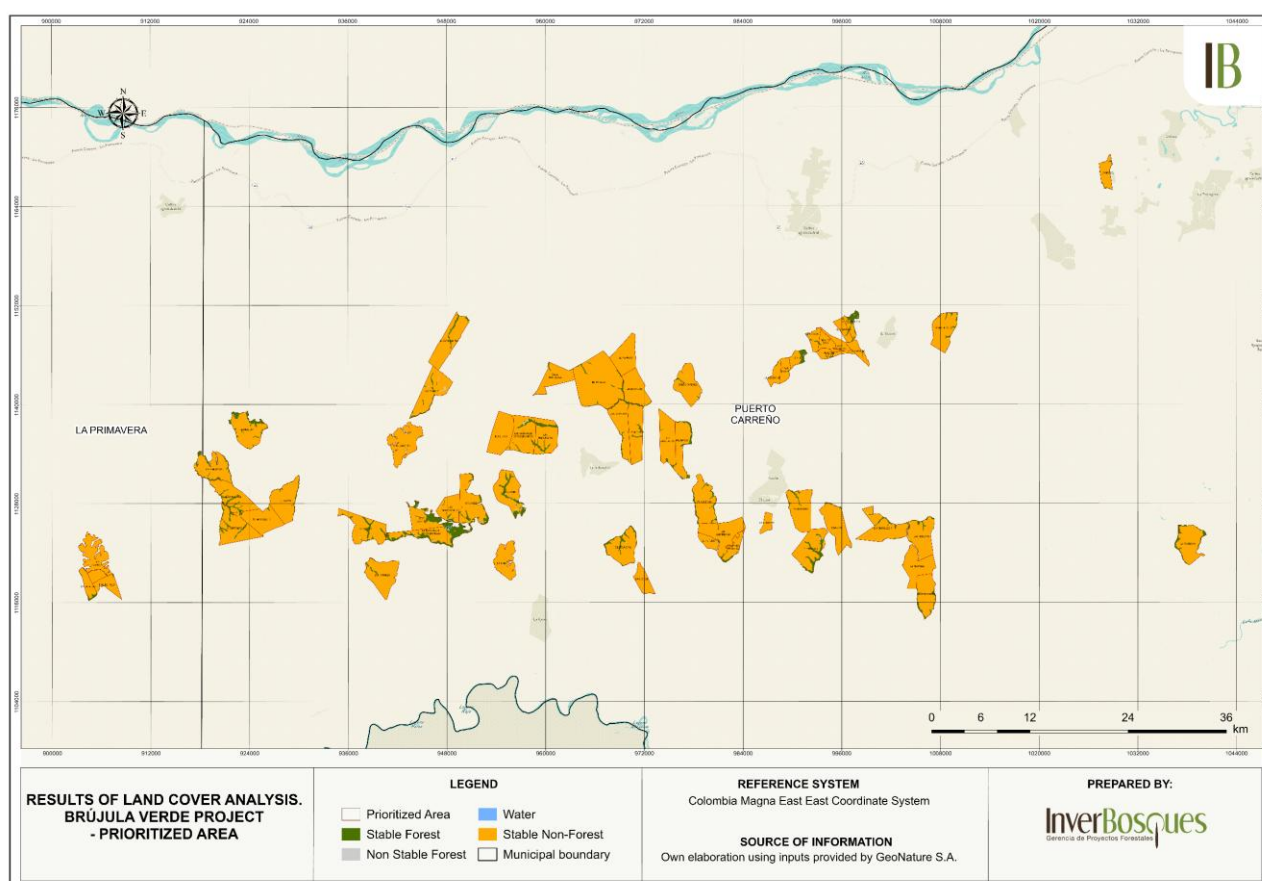


Figure 8 – Results of land cover analysis.

(Source: Prepared by Inverbosques (2025))

Step 4: Exclusions

Roads

Roads in Vichada are mostly precarious and limited. This Colombian department, characterized by its large size and low population density, has a road network composed mainly of dirt roads and trails that become impassable during the rainy season. For this reason, the variable of road exclusion will not be considered in the Brújula Verde Phase I and Phase II project, since their layout depends on the areas that are passable depending on the season, which makes them change throughout the year (Figure 9). Nevertheless, specific roads will be laid out to guarantee access to the planting lots. These roads that cross the properties to access the plots are mainly dirt roads, with no precise delimitation. Their layout varies according to the terrain and climatic conditions, and they do not meet the technical standards established by the Instituto Nacional de Vías (INVIAS) for classifying roads as primary, secondary, or tertiary.

The environmental impact of these roads is minimal and temporary. Because they are unpaved roads with variable layouts, they do not create a significant barrier to the natural regeneration of the ecosystem or to soil ecosystem restoration activities. However, the lack of a precise delimitation makes it problematic to include them as a fixed element in exclusion analyses.

In conclusion, due to the characteristics of the roads in the project area, their low environmental impact, and the difficulty in accurately delineating them, they will not be considered an exclusionary variable.



Figure 9 – Condition of the roads in the region.

(Source: Prepared by Inverbosques (2025))

RAMSAR Wetland and the Bitá River Basin Management and Land-Use Planning Plan.

The Bitá River, an affluent of the Orinoco River, has a basin covering approximately 824,535.7 ha, running west to east across the municipalities of La Primavera and Puerto Carreño. Hydrographically, the basin includes about 5,070 riverbeds of different orders, with the main riverbed extending 510 km length (Trujillo & Lasso, 2017)³⁸. Its low-slope topography, facilitates the formation of extensive floodplains and wetlands, which play an essential role in aquifer recharge and water regulation. These areas act as natural buffers, mitigating floods impacts.

On June 8, 2018, the Bitá River basin was recognized as a wetland of international importance, under the Ramsar Convention, due to its significant biodiversity and the

³⁸ Trujillo, F., & Lasso, C. (2017). Biodiversity of the Bitá River, Vichada, Colombia. Bogotá: Serie Editorial Fauna Silvestre Neotropical. IAvH.

ecological value of its aquatic ecosystems. This recognition was formalized through the Decree 1235 of 2018³⁹, which amended Decree 1076 of 2015, to include the Bitá River basin wetland complex in the RAMSAR list. According to studies conducted by the Ministry of Environment and Sustainable Development, the basin hosts an important diversity of habitats, such as temporarily floodable gallery forests, which play a critical role in water regulation and flood mitigation. It is also vital for local fauna, serving as habitat for migratory and endangered species, including reptiles such as the cachirre (*Paleosuchus trigonatus*), and several endemic fish species. The basin is equally important for its ecological functions and environmental services, which are essential for both biodiversity and human activities in the region.

The RAMSAR Convention does not explicitly prohibit forestry activities in wetlands of international importance. However, it stipulates that all human activities, including agriculture, must be conducted sustainably without compromising the ecological integrity of the wetland. For the Bitá River basin and other Ramsar sites, the principle of sustainable management applies. Agricultural practices are permitted as long as they do not negatively affect the ecological processes of the wetland, such as its biodiversity, water quality, or hydrological functions.

Under Decree 1235 of 2018, Article 2.2.1.4.11.2, that management of the wetland complex must follow the guidelines and directives of the RAMSAR Convention. This ensures that the policies and actions adopted for the conservation and sustainable use of wetlands comply with international standards established for the protection of these ecosystems.

Additionally, Article 2.2.2.1.4.11.3 of the same decree designates the Autonomous Regional Corporation of the Orinoquía (Corporación Autónoma Regional de la Orinoquía) - CORPORINOQUIA as the entity responsible for issuing and enforcing the Environmental Management Plan for the Bitá River. The plan must align with the regulations established in prior articles guarantee compliance with the legal provisions for the conservation of water resources and associated ecosystems, such as wetlands. As the competent environmental authority in the region, CORPORINOQUIA is responsible for ensuring sustainable environmental management in the Bitá River basin,

³⁹ See the Decree in the supporting documentation folder: [Supports\PDD\A.1\Eligibility]

in compliance with legal requirements and strategies for natural resource preservation. In this sense, Resolution 300.36.21.0891 of August 2021⁴⁰ approves and adopts the Bitá River Basin Management and Land-Use Planning Plan (POMCA), identified as SZH 3801.

The main objective of the basin Watershed Management and Ordering Plan (POMCA for its acronym in Spanish) is to identify areas designated for sustainable use within the basin. These areas, when integrated with RAMSAR zoning, must ensure a balance between conservation and development while maintaining ecosystem integrity. Therefore, the Bitá River POMCA is positioned as the main planning and environmental management instrument for the department of Vichada.

As is well known, the basin has been designated as a RAMSAR site. This wetland complex covers a total of 824.535,7 ha, of which 795.234,6 ha coincide with the area defined for the basin in the land-use planning framework. Therefore, to evaluate the congruence of the eligible areas of the Brújula Verde project, the delimitation of the Bitá River basin was used, which coincides 96% with the area designated as a RAMSAR site. This delimitation was selected because, to date, it is the one that has a basin Management and Land-Use Planning Plan (POMCA).

Of the 59 properties included in the project, 50 are located within the Bitá River basin, which is equivalent to 73.7% (41,015.3 ha) of the total area of the project prioritized properties (Figure 10).

Considering that the Bitá River basin, declared as a RAMSAR wetland, has mapping from the POMCA, this information was included in the eligibility analysis. However, due to the extensive territory it covers, this mapping had not been corroborated in the field. Therefore, adjustments were made to the cartography using images available in Google Earth and field visits, where the existence of drainages was verified. Subsequently, the shape and location of these drainages were adjusted based on the actual data obtained in the field (Figure 11).

⁴⁰ See the Resolution in the supporting documentation folder: [Supports\PDD\A.1\Eligibility]

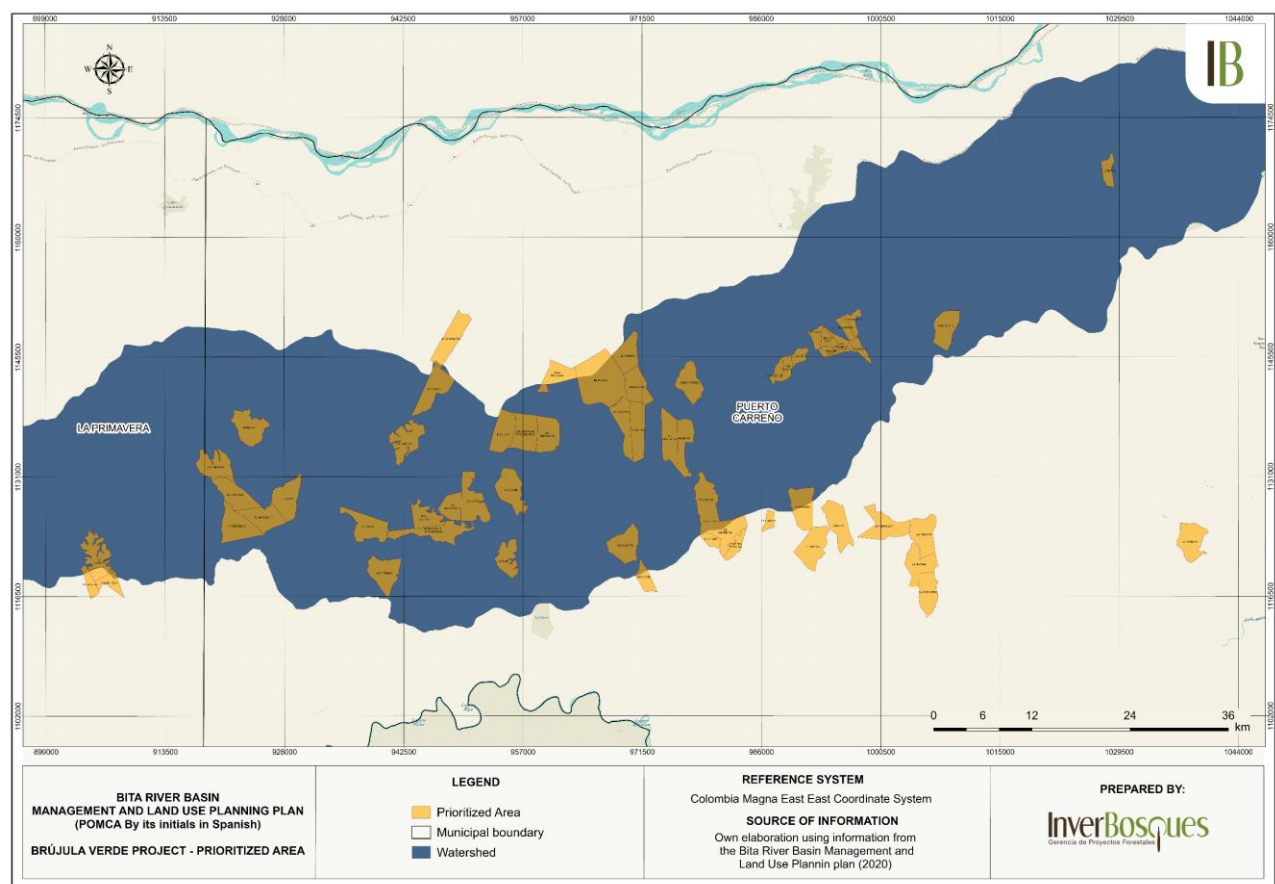
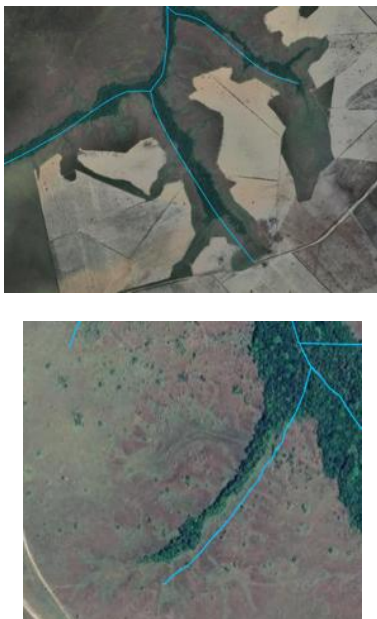


Figure 10 – Location of the Brújula Verde project prioritized properties with respect to the Bita River basin.

(Source: Prepared by Inverbosques (2025))

POMCA Cartography



Adjusted Cartography

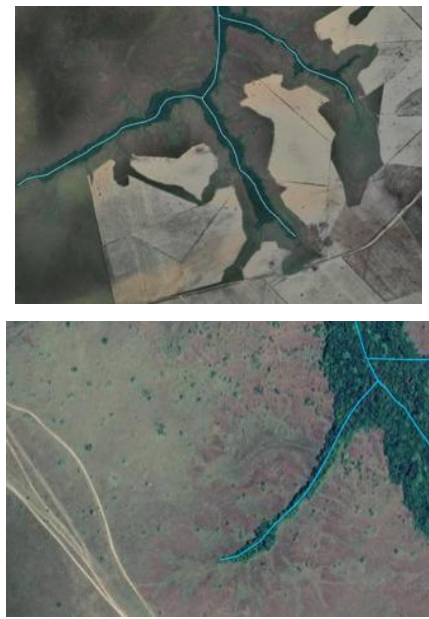


Figure 11 – Adjustment of POMCA information using satellite images and field visits.

The images on the left correspond to the POMCA cartography and the images on the right correspond to the adjusted cartography.

(Source: Prepared by Inverbosques (2025))

The watercourses around wetlands, including secondary and main drainage systems, were adjusted, and defined as exclusion variables in the project analysis. Accordingly, these basins, and their associated water bodies, were classified as exclusion areas. Additionally, land use was incorporated as a key eligibility criterion. Under this approach, areas destined for the following uses were classified as eligible: conservation and/or ecological restoration, recreation, productive forest systems, agroforestry systems, silvopastoral systems and protective forest systems. Conversely, land classified as rivers and lagoons was considered ineligible (Figure 12). In the case of areas designated for conservation and/or ecological restoration, recreation, plays a fundamental role in the project, since its principal objective is the rehabilitation of degraded lands through the planting of native and introduced species. Within the Bitá River basin, these areas do not correspond to strategic ecosystems, but rather to lands degraded by erosion, contamination and other processes, which require urgent restoration (IGAC, 2021⁴¹; CORPORINOQUIA, 2020⁴²). In this context, the project prioritizes areas within the properties that can be dedicated to conservation and/or ecological restoration, as well as recreation zones, rocky outcrops, and gravel lands.

Table 21 – Parameters for the definition of exclusion areas according to the Bitá River POMCA.

POMCA information		Exclusion
Main Land Use	Water bodies and riparian Zone	
Areas for Conservation and/or Ecological Restoration, Recreation	Not applicable	Not applicable
Productive Forest System	Not applicable	Not applicable
Agroforestry Systems	Not applicable	Not applicable
Silvopastoral Systems	Not applicable	Not applicable

⁴¹ Instituto Geográfico Agustín Codazzi (IGAC), 2021. General study of soils and land zoning in Colombia. Bogotá, Colombia: IGAC.
⁴² CORPORINOQUIA (2020). Plan de Ordenación y Manejo de la Cuenca Hidrográfica del río Bitá (POMCA). Technical document. Yopal, Colombia: Corporación Autónoma Regional de la Orinoquía

POMCA information		
Main Land Use	Water bodies and riparian Zone	Exclusion
Protective Forest Systems	Not applicable	Not applicable
Areas for Conservation and/or Ecological Restoration, Recreation	Wetlands	Exclusion Area
Areas for Conservation and/or Ecological Restoration, Recreation	Other water bodies	Exclusion Area
Areas for Conservation and/or Ecological Restoration, Recreation	Main riparian zone	Exclusion Area
Areas for Conservation and/or Ecological Restoration, Recreation	Secondary riparian zone	Exclusion Area
Lagoon	Wetlands	Exclusion Area
Lagoon	Other water bodies	Exclusion Area
Lagoon	Main riparian zone	Exclusion Area
River	River	Exclusion Area
River	Wetlands	Exclusion Area
River	Main riparian zone	Exclusion Area
Productive Forest System	Wetlands	Exclusion Area
Productive Forest System	Other water bodies	Exclusion Area
Productive Forest System	Main riparian zone	Exclusion Area
Productive Forest System	Secondary riparian zone	Exclusion Area
Agroforestry Systems	Wetlands	Exclusion Area
Agroforestry Systems	Other water bodies	Exclusion Area
Agroforestry Systems	Main riparian zone	Exclusion Area
Agroforestry Systems	Secondary riparian zone	Exclusion Area
Silvopastoral Systems	Wetlands	Exclusion Area
Silvopastoral Systems	Other water bodies	Exclusion Area
Silvopastoral Systems	Main riparian zone	Exclusion Area
Silvopastoral Systems	Secondary riparian zone	Exclusion Area
Protective Forest Systems	Wetlands	Exclusion Area
Protective Forest Systems	Other water bodies	Exclusion Area
Protective Forest Systems	Main riparian zone	Exclusion Area
Protective Forest Systems	Secondary riparian zone	Exclusion Area

(Source: Prepared by Inverbosques (2025))

Therefore, the permitted uses in these areas are completely consistent with the objectives of the Brújula Verde project whose purpose is to establish plantations of introduced and native species, which will be conserved without any purpose of exploitation.

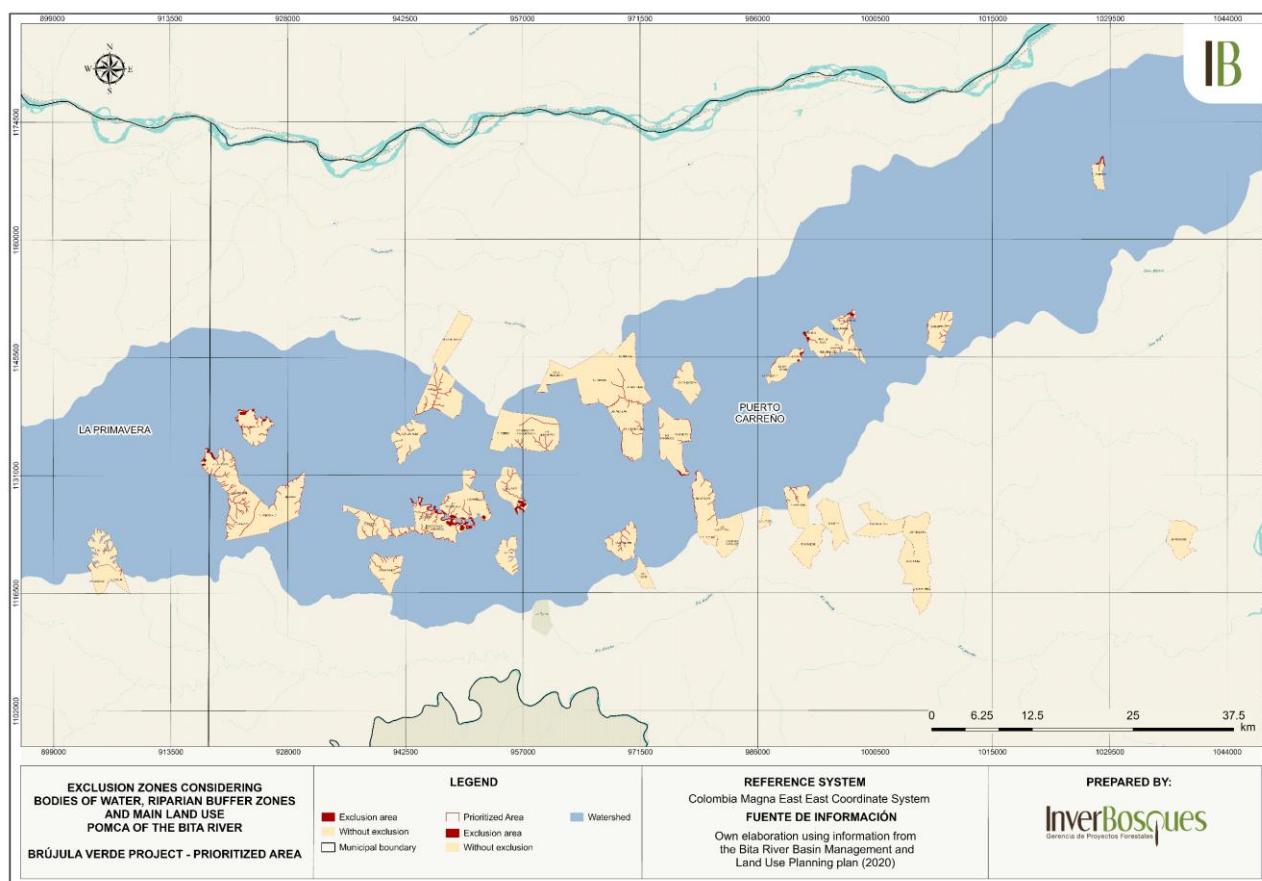


Figure 12 – Exclusion area considering information from the Bitá River POMCA (RAMSAR Zone).

(Source: Prepared by Inverbosques (2025))

It should be noted that the previously defined exclusions will apply only to the 46,604.1 ha that overlap with the basin and are covered by POMCA. In contrast, areas outside the basin boundaries will not be subject to these exclusions.

Soil types

The soil variable, based on SoilGrids data, was not used to delineate exclusion area due to its lack of precision and the absence of field data. Although it provides an overview of soil types in the area, it is not suitable for forestry projects that require high accuracy. SoilGrids is a global digital mapping system that uses machine learning to model soil properties worldwide. The data is adjusted from over 230.000 observations of soil profiles, but the spatial resolution is 250 m, which limits the ability to detect fine variations in soils at a local scale. This lack of detail is especially relevant for forestry projects, where accurate information on texture, fertility, and other soil properties is required at a more detailed scale. In addition, the platform does not integrate field data, which complicates a comprehensive and reliable assessment for planning forestry

interventions. Nevertheless, the soil types available in this data source were consulted in order to identify, broadly speaking, the predominant soils in the project area, finding the following soil types (Figure 13):

- Ferralsols: Ferralsols are a soil type typical of humid tropical and subtropical regions. Their formation is due to an intense weathering process of the rocks, under warm and humid climatic conditions over millions of years. This process causes an intense leaching of the original minerals, leaving as a result a soil rich in iron and aluminum oxides, which gives it its characteristic reddish or yellowish color.
- Cambisols: Cambisols are a type of soil that is in an early stage of development. This means that soil formation processes, such as weathering of rocks and accumulation of organic matter, are still ongoing and have not reached a level of maturity like other soil types.
- Acrisols: Acrisols are a soil type that is characterized by being heavily washed or leached, meaning that many of their nutrients have been washed away by water into deeper layers of the soil. This characteristic gives them a typically deep red or yellow color and an acidic pH. Acrisols form through a process called leaching. Rainwater percolates through the soil, dissolving nutrients and washing them downward.

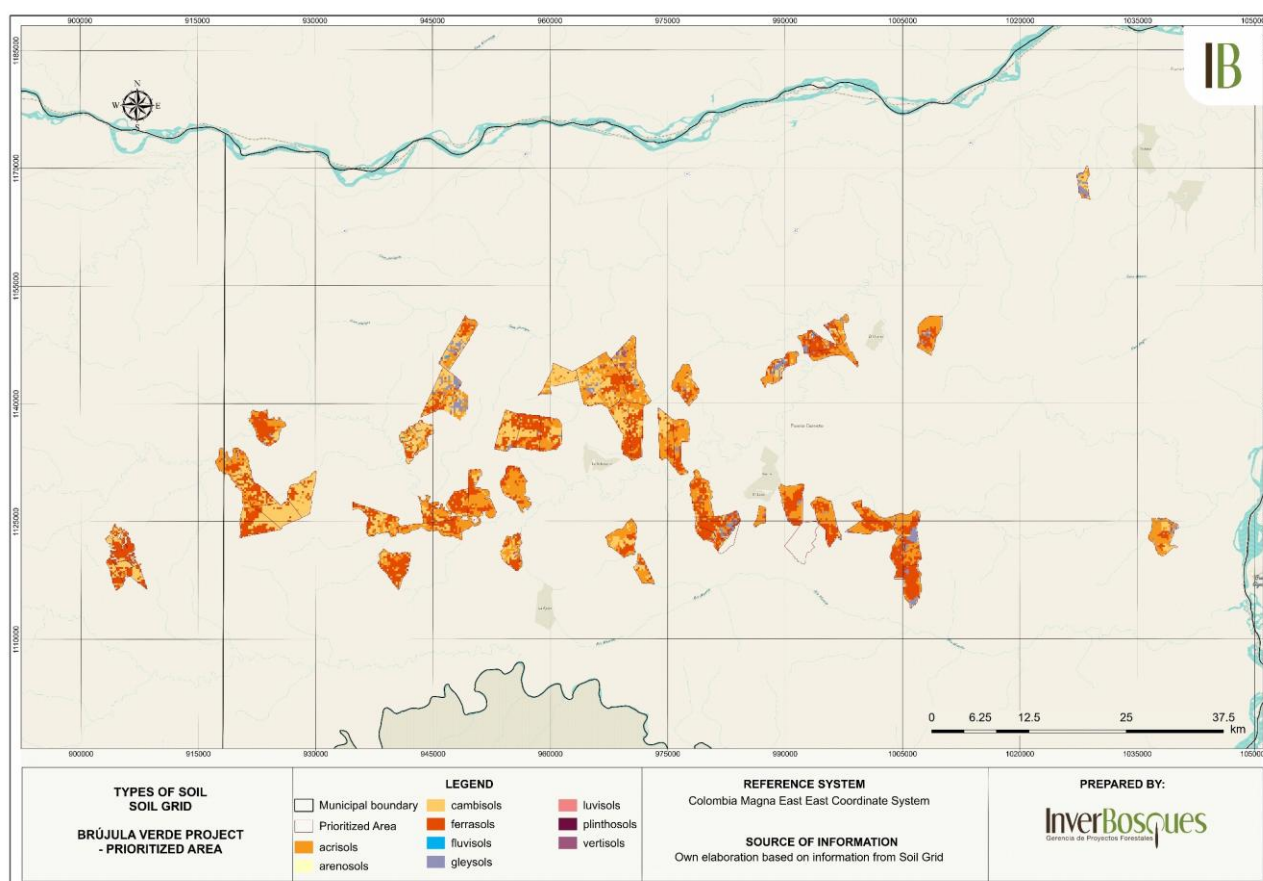


Figure 13 – Consultation of the soil types that predominate in the prioritized properties of the project.

(Source: Prepared by Inverbosques (2025))

On the other hand, it is important to note that the soils in the region have a low organic matter content, around 2%, as shown by the laboratory analysis of soil samples taken from four properties in the project (Figure 14).⁴³

YERBABUENA

CE	0.21	dS/m	1-2	B	Pasta saturada
MO	2	%	5-10	B	Ignición
N-NO ₃	24,8	mg/kg	40-80	B	ISE

CONDOLIRIO

⁴³ See the results of the laboratory analysis in the supporting documentation folder: [Supports\PDD\A.1\Eligibility\Lab Results]

CE	0,07	dS/m	1-2	B	Pasta saturada
MO	2	%	5-10	B	Ignición
N-NO ₃	198,7	mg/kg	40-80	A	ISE

LA FORTALEZA II

CE	0,03	dS/m	1-2	B	Pasta saturada
MO	2	%	5-10	B	Ignición
N-NO ₃	33,9	mg/kg	40-80	B	ISE

SAN JORGE

CE	0,03	dS/m	1-2	B	Pasta saturada
MO	2	%	5-10	B	Ignición
N-NO ₃	31,6	mg/kg	40-80	B	ISE

Figure 14 – Soil analysis results for the properties Yerbabuena, El Condolirio, La Fortaleza II, and San Jorge.

(Source: Prepared by Inverbosques (2025))

CORPORINOQUIA Environmental Criteria

The prioritized properties of the project are located in municipalities under the jurisdiction of CORPORINOQUIA, an environmental authority with jurisdiction over 45 municipalities across five departments (Arauca, Casanare, Vichada, Cundinamarca, and Boyacá).

CORPORINOQUIA plays a key role in the evaluation, control, and environmental monitoring of activities related to the exploration, exploitation, processing, transportation, use, and disposal of non-renewable natural resources, as well as other projects and activities that may generate environmental impacts. It also oversees the use of renewable natural resources, such as water, soil, and air. Within these functions, environmental determinants applicable to forestry projects have been established, including Resolution 500.41.15.1753 of December 3, 2015⁴⁴, “whereby regional environmental criteria are established for the development of forestry projects in the jurisdiction of CORPORINOQUIA and other provisions are established.”:

Article 4: The public, private, natural or legal person that intends to develop any type of commercial forest plantation in the jurisdiction of CORPORINOQUIA, in addition to complying with current environmental regulations, shall comply with the following regional environmental criteria, considering the following degrees of restriction of

⁴⁴ See the Resolution in the supporting documentation folder: [Supports\PDD\A.1\Eligibility]

intervention and/or minimum environmental management to be considered in all phases of the commercial forest plantation:

Criteria 1. Conservation and preservation of forest masses and relicts.

The areas of primary forest and/or important forest relics, for ecological landscape connectivity and all those that fulfill the function of maintaining the ecological balance and biodiversity as they contribute to climate and water regulation, soil conservation and purification of the atmosphere, in addition to constituting virtually the only biological corridors or wooded areas in the region that help preserve both fauna and native flora, as they are habitat for endangered species or on the verge of extinction.

No soil preparation and/or mechanization activities, establishment of commercial forestry plantations, application of agrochemicals, fertilizers and/or fertilizers, construction of internal roads, water discharges, temporary stockpiling, or final disposal of hazardous waste are allowed at least 100m away from the aforementioned areas.

To incorporate this environmental determining factor in the eligibility analysis, a detailed delimitation of the land cover was carried out using high spatial resolution satellite images, such as those obtained from Sentinel-2 and those available in Google Earth for the years 2022 and 2024. This work was carried out through photointerpretation and was complemented with field observations. As a result, the land covers present in the properties were identified and categorized, following the classifications established by the IPCC. This approach allowed a more precise delimitation of the forests, which facilitated the identification of the protection zone corresponding to the 100m distance around the gallery forests.

Table 22 – Satellite images used for the delimitation of land cover with IPCC category.

Mission	Processing Level	Tile	Date
Sentinel-2B	MSIL1C	T19NEG	13/12/2022
Sentinel-2B	MSIL1C	T19NFG	30/12/2022
Sentinel-2A	MSIL1C	T19NFG	9/01/2024
Sentinel-2B	MSIL1C	T19NEG	17/01/2024

(Source: Prepared by Inverbosques (2025))

The delimitation of land cover was subjected to a precision analysis using a confusion matrix, for which it was necessary to determine control points. The sample size was calculated using the Morillas (2007) equation, considering a confidence level of 95%, a margin of error of 10% and an estimated proportion of the population of 50%, which resulted in a sample size of 97 points. However, it was decided to increase the sample

size to 300 points in order to strengthen the precision analysis and guarantee the quality of the information generated. The control points were created using the Random Points command of ArcGIS Pro (Figure 15).

Each point was assigned the land cover observed in the Sentinel-2 images (Table 22) and in the available Google Earth images (Table 23). Subsequently, these land covers were compared with the classification obtained by photointerpretation. It is important to note that the delimited land cover have been validated in the field, which guarantees greater concordance with the real conditions observed.

Table 23 – Google Earth images used for the accuracy analysis.

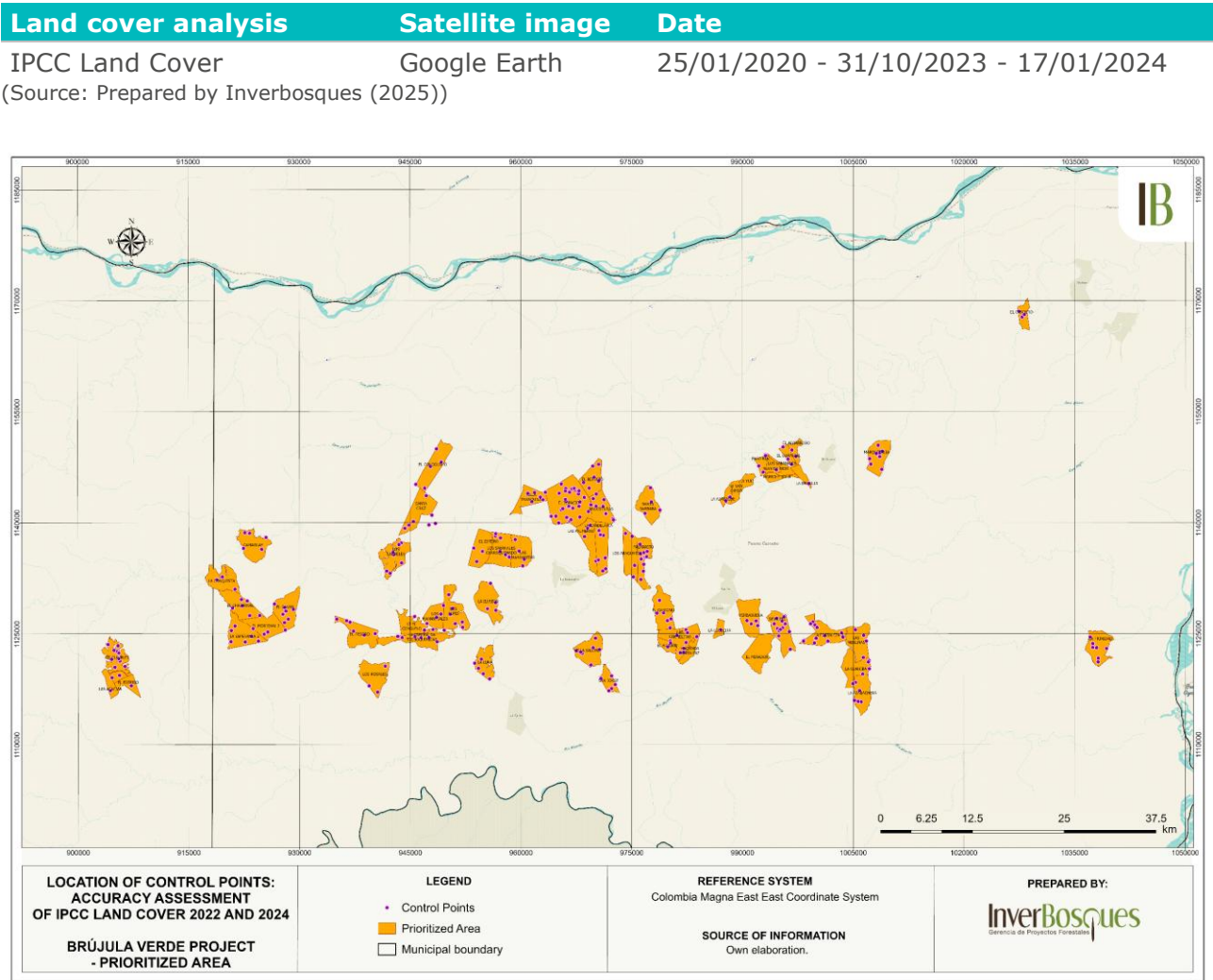


Figure 15 – Control points for the accuracy assessment of land covers using the IPCC categories of 2022 and 2024.

(Source: Prepared by Inverbosques (2025))

The results of the confusion matrix (Table 24) show an overall accuracy of 98% with a Kappa index that guarantees a high concordance of 94%. It is important to highlight

that the actual land covers were also the joint result of the interpretation of available Google Earth images and the concept of another evaluator with knowledge of the region.

Table 24 – Confusion matrix for land cover.

Land cover \	Croplands	Forest Lands	Forest Plantation	Grasslands	Other Lands	Settlements	Water	Total	User Accuracy
Croplands	3							3	100%
Forest Lands		24		1			1	26	92%
Forest Plantation			16	1				17	94%
Grasslands			2	247				249	99%
Other Lands					1			1	100%
Settlements						2		2	100%
Water							2	2	100%
Total	3	24	18	249	1	2	3	300	
Producer Accuracy	100%	100%	89%	99%	100%	100%	67%		98% Overall Accuracy

(Source: Prepared by Inverbosques (2025))

Table 25 and Figure 16 show the IPCC land covers for each of the phases.

Table 25 – IPCC land cover

Land Cover	Area (ha)	Percentage (%)
Settlements	4.4	0.01
Water	18.3	0.03
Other Lands	21.1	0.04
Croplands	73.5	0.13
Forest Plantation	3,613.5	6.50
Forest Lands	12,711.7	22.85
Grasslands	39,177.2	70.44
Total	55,619.7	100

(Source: Prepared by Inverbosques (2025) based on the Intergovernmental Panel on Climate Change (IPCC) Land Use, Land-Use Change and Forestry categories, and the Guidelines for National Greenhouse Gas Inventories (Chapter 4))

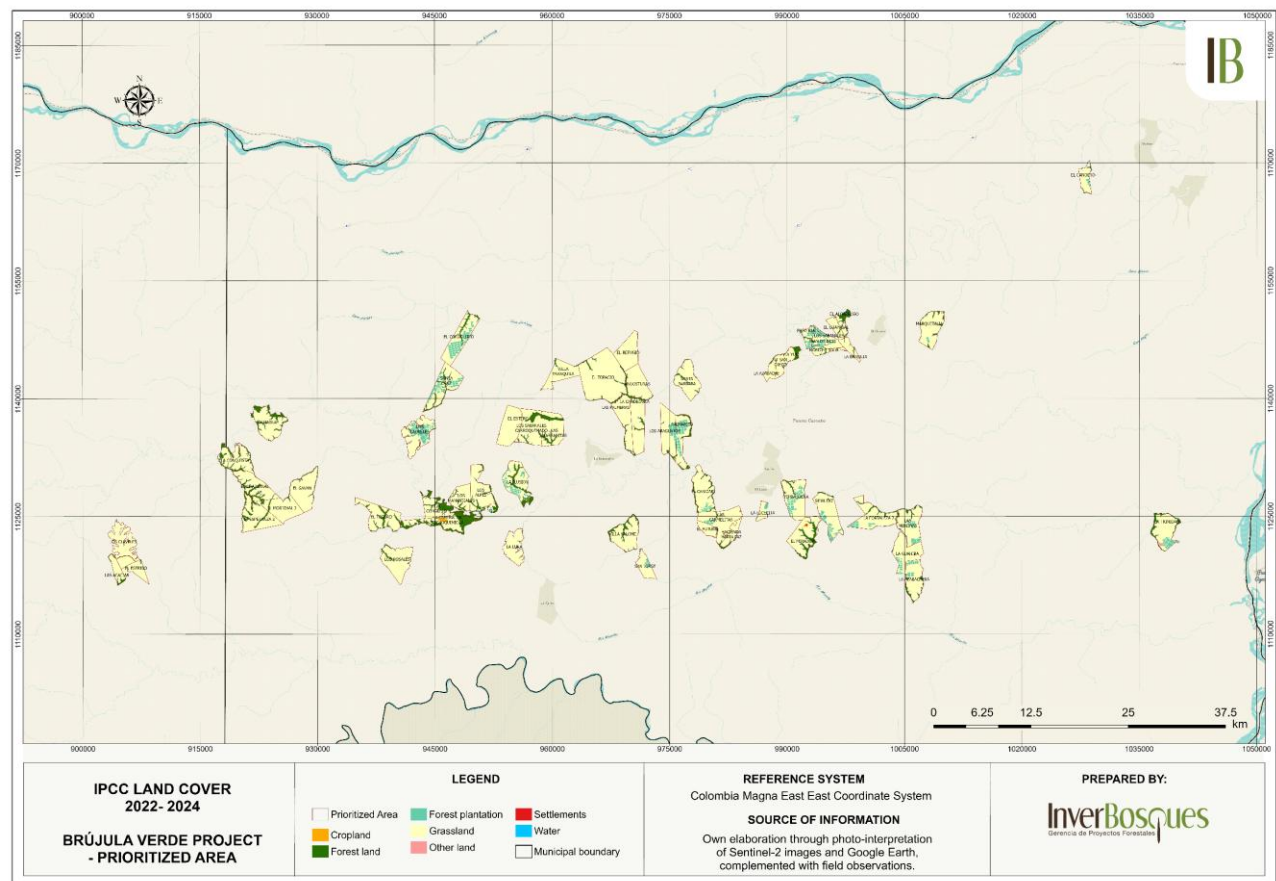


Figure 16 – IPCC land cover categories.

(Source: Prepared by Inverbosques (2025))

As exclusion variables, settlements, Forest Lands, forest plantations, water bodies and the protection zone with a width of 100 m were included. Permitted cover includes pasture and cropland.

In addition to the environmental determinants established by the environmental authority CORPORINOQUIA, another key variable for the conservation of the country's natural heritage was incorporated: the National System of Protected Areas (SINAP). As a result of this evaluation, it was confirmed that none of the 59 properties overlap with these areas, thus ensuring compliance with current regional and national environmental regulations.

Figure 17 shows the exclusion areas considering the parameters shown in Table 26.

Table 26 – Parameters to determine the exclusion areas established by the environmental authority.

Other environmental determinants	Exclusion
Water	Exclusion Area
Settlements	Exclusion Area
Other Lands	Not Applicable

Other environmental determinants	Exclusion
Grasslands	Not Applicable
Forest Plantation	Exclusion Area
Croplands	Not Applicable
Forest Lands	Exclusion Area
Protection Zone	Exclusion Area

(Source: Prepared by Inverbosques (2025))

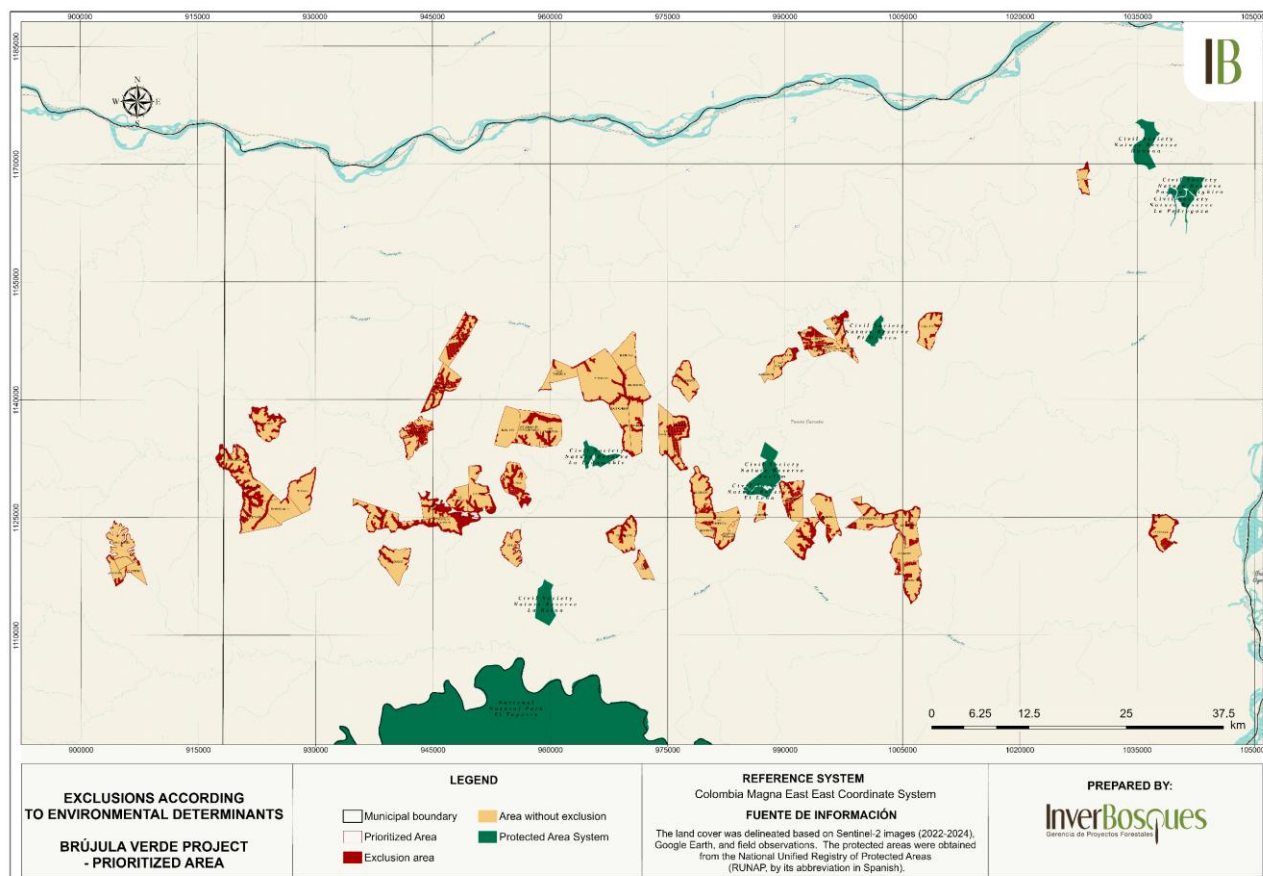


Figure 17 – Exclusion areas considering the environmental determinants of the environmental authority.

(Source: Prepared by Inverbosques (2025))

Carbon projects in the region

The existence of other carbon projects in the region⁴⁵ was evaluated. One project was identified in Gold Standard registry (GS 4221) and three more were identified in Verra's

⁴⁵ In this context, "region" is defined as the immediate project vicinity, encompassing only the adjacent parcels in Puerto Carreño and La Primavera. This limited scope serves to verify that no pre-existing carbon-credit activities overlap or impinge upon the specific planting sites.

Registry: ID 2512_7, ID 1530 and ID 3594 that do not overlap⁴⁶ the project properties (Figure 18).

It is important to highlight that Brújula Verde and GS4221 are both implemented by Inverbosques on behalf of different investors. For this reason there are large properties in the region with separate plantation areas under both projects (although the usufruct is managed separately) and Inverbosques nursery in “Las Bonitas” is considered the headquarter of the operations of both projects, however, Brújula Verde was decided as a separate project with a unique GS ID considering the additional strategies, separate ownership, and procedures followed in the project (more details are included in Appendix 3 - LUF Additional Information).

⁴⁶ A formal declaration has been issued confirming that all Brújula Verde plantations have been and will continue to be established exclusively within properties under valid usufruct agreements, which grant full and uncontested rights for project implementation. The declaration explicitly acknowledges the existence of neighboring projects (GS 4221, ID 2512_7, ID 1530, and ID 3594) and establishes a binding commitment that no overlap currently exists or will occur in the future with any of these initiatives.

As part of the project’s land eligibility process, a spatial verification was carried out using GIS-based analysis that included cadastral boundaries, usufruct polygons, and shapefiles of neighboring projects. This assessment confirmed the complete spatial independence of Brújula Verde from other projects, ensuring there is no risk of double counting or displaced activity. Supporting documentation, including the formal declaration and GIS eligibility assessment outputs, is included in the project’s information management folder. See the files in the supporting documentation folders: [Supports\PDD\A.1\Eligibility] and [Supports\PDD\A.1\Ownership]

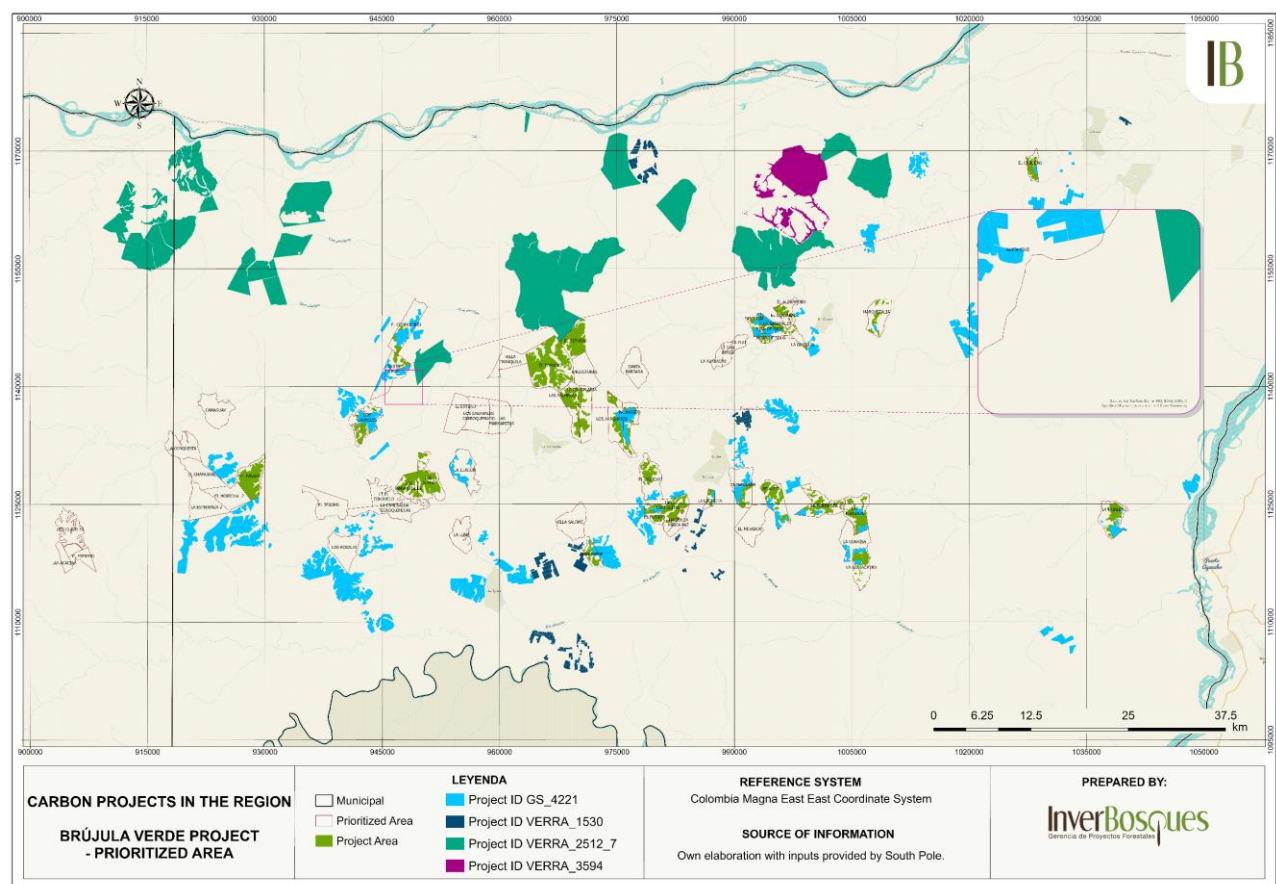


Figure 18 – Carbon projects in the region.

(Source: Prepared by Inverbosques (2025))

Step 5: Eligibility and Exclusions

After delimiting the eligible zones, considering the analysis of forest and non-forest in the selected periods, these results were complemented with the incorporation of exclusion areas. These zones were identified as those in which, due to environmental and/or legal characteristics, the development of the Brújula Verde Project activities is prevented. In this stage, all of the previously mentioned exclusion parameters were combined, integrating legal, environmental, land use, and environmental protection aspects, to ensure that the selected areas are truly suitable for the project. This approach ensures that current regulations are complied with and that the project is developed in a sustainable manner and in accordance with environmental and legal standards.

Eligible and ineligible areas are summarized below, considering the exclusions applied at each stage. Finally, those areas with stable non-forest cover during the whole period analyzed and with no exclusion variables are determined eligible (Table 27 and Figure 19).

Table 27 – Results of eligible and non-eligible areas within the Prioritized Area⁴⁷

Property name	Eligible area (ha) ⁴⁸	Non-eligible area (ha)	Prioritized Area Total area (ha)
Angosturas	894.5	147.6	1,042.1
Camaguay	706.0	532.6	1,238.6
El Algarrobo	82.2	220.5	302.7
El Canoero	305.8	126.7	432.5
El Caricari	815.6	427.0	1,242.6
El Chaparral	659.4	509.5	1,168.9
El Condolirio	594.6	664.2	1,258.8
El Estero	1,120.1	15.3	1,135.4
El Estribo	397.8	48.0	445.8
El Futuro	273.4	27.5	300.9
El Gavan	1,031.7	203.9	1,235.6
El Guayabal	249.9	49.3	299.2
El Mirador	791.2	512.4	1,303.6
El Morichal 2	961.8	138.4	1,100.2
El Refugio	953.3	25.0	978.3
El Tesoro	791.0	447.4	1,238.4
El Topacio	2,700.9	346.0	3,046.9
Hacienda Maria Paz	318.3	81.5	399.8
Juan de Dios	115.7	189.6	305.3
La Azabache	250.0	30.6	280.6
La Azabachera	685.1	300.8	985.9
La Brasilia	228.4	66.9	295.3
La Candelaria	921.3	229.7	1,151.0
La Conquista	601.8	537.5	1,139.3
La Esmeralda Tecnoquimicas	484.5	821.1	1,305.6
La Esperanza 2	940.1	416.1	1,356.2
La Fortaleza 2	941.7	353.3	1,295.0
La Guahiba	931.1	148.5	1,079.6
La Ilusion	601.0	678.4	1,279.4
La Lucecita	190.9	49.7	240.6
La Luna	648.5	206.2	854.7

⁴⁷ The values are rounded to one decimal place; therefore, the direct sum of the values may differ in the total result. To confirm the total value, please refer to the calculations in the Excel file.

⁴⁸ The value of 39,118.7 ha forms part of the current Design Certification framework but is included for contextual and planning purposes only. It represents the total current Eligible Area within the "Prioritized Area" that could be included in the Project. The area is not included in the current carbon accounting and does not generate removals at this stage. Any future inclusion will be subject to effective planting, monitoring, and verification in accordance with Gold Standard requirements.

Property name	Eligible area (ha) ⁴⁸	Non-eligible area (ha)	Prioritized Area Total area (ha)
La Trinidad	735.5	439.6	1,175.1
La Yuli	151.9	142.5	294.4
Las Acacias	271.5	102.8	374.3
Las Carmelitas	1,096.9	169.0	1,265.8
Las Margaritas	753.2	347.4	1,100.6
Las Neblinas	800.0	364.4	1,164.4
Las Palmeras	834.5	214.5	1,049.0
Los Alpes	904.3	448.7	1,353.0
Los Araguatos	889.8	233.0	1,122.8
Los Claveles	1,105.6	158.4	1,264.0
Los Laureles	599.7	635.5	1,235.2
Los Manantiales	509.9	213.2	723.1
Los Rosales	998.5	228.9	1,227.4
Los Sabanales	215.7	84.8	300.5
Los Sabanales Carro Quemado	915.8	318.2	1,234.0
Lt El Consuelo	365.9	457.0	822.9
Lt San Diego	259.3	49.8	309.1
Marquetalia	792.6	272.4	1,065.0
Moriche Solo	370.4	580.9	951.3
Palmarito	109.1	189.8	298.9
Paso Rial	386.9	93.2	480.1
San Jorge	816.3	225.9	1,042.2
Santa Barbara	601.8	683.1	1,284.9
Santa Cruz	906.7	278.9	1,185.6
Sejalito	771.7	399.6	1,171.3
Villa Salome	785.0	68.4	853.4
Villa Tranquila	774.8	458.4	1,233.2
Yerbabuena	894.5	147.6	1,042.1
TOTAL	39,118.7	16,500.9	55,619.7

(Source: Prepared by Inverbosques (2025))

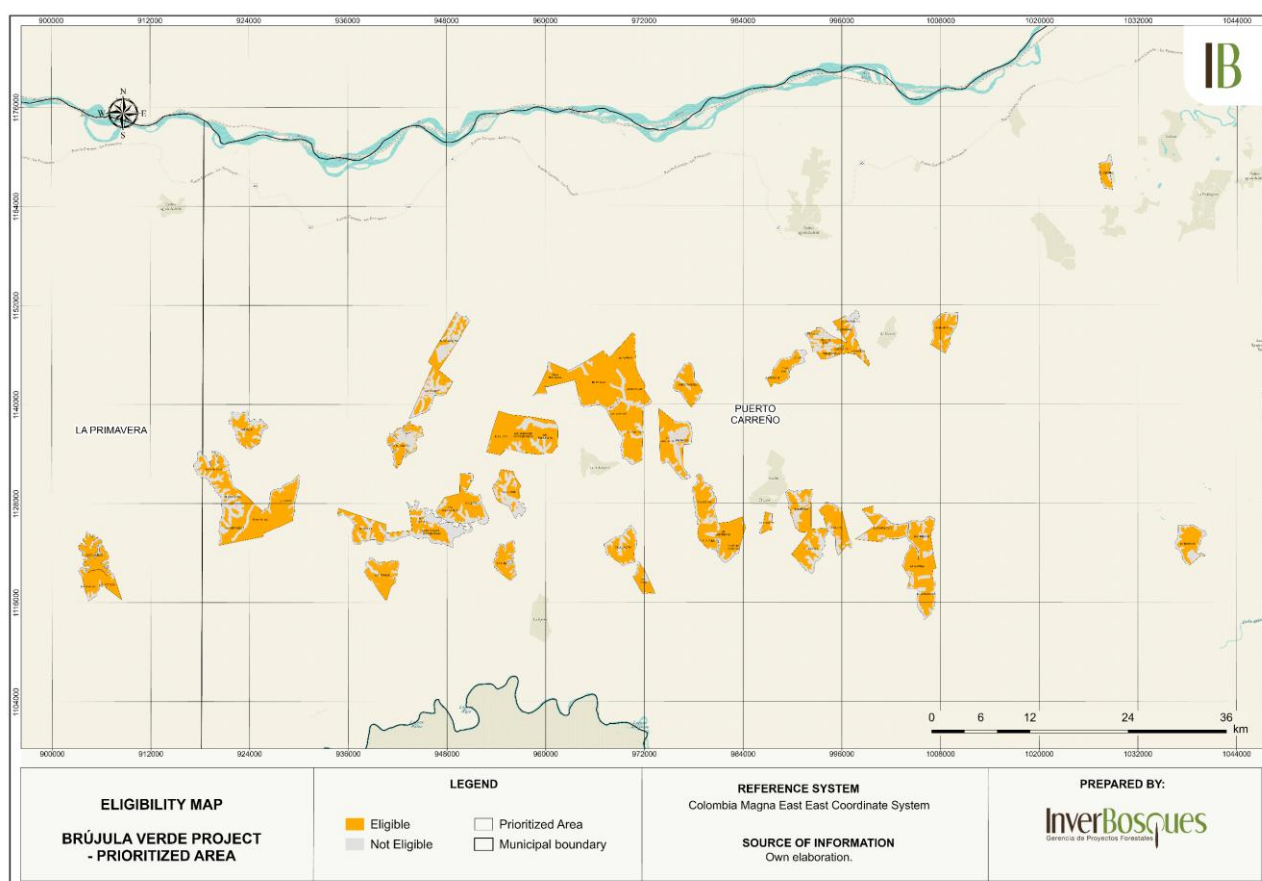


Figure 19 – Eligibility results

(Source: Prepared by Inverbosques (2025))

Conclusions

The eligibility of Brújula Verde project was determined mainly based on the classification of forest and non-forest cover in the years 2010, 2014 and 2022. The areas classified as 'non-forest' in both periods meet the requirement of not having presented forest cover in at least 10 years prior to the start date, which indicates a stability in forest cover during the analysis period. These were considered in the Step 4 where exclusion factors corresponding to those areas that, due to various environmental and legal characteristics, have restrictions on their use for project activities were considered. The methodology used was rigorous and precise, based on Landsat and ALOS AVNIR, with visual interpretation and supervised classifications that reached more than 90% overall accuracy. This analysis was complemented with field visits and the use of tools such as confusion matrices and spectral separability assessment. The combination of these techniques ensures the quality of the results obtained.

It is important to note that out of the 39,118.7 ha of eligible area 10,260.0 ha have already been planted in 32 properties at the moment of validation ("Project Area" at

validation, see more details in Table 28 and Figure 20). To define the areas to be planted, a two-stage selection and prioritization process was conducted in line with the project's objectives and degradation-related criteria⁴⁹. In Phase I, a preliminary proxy-based screening was carried out using available data and Clear Blue Market (CBM) report insights to identify broader candidate areas. In Phase II, a more detailed property-level assessment was conducted by the Project Developer, incorporating regional and site-specific information to refine area selection, areas with at least one historically identified degradation factor were considered for inclusion. Additional spatial criteria and field data, such as soil sampling and floristic assessments, will be considered in future stages, and the explanation of the process followed, along with supporting documentation, will be included in the relevant Monitoring Report. The remaining eligible area of the prioritized properties will be considered for the development of Phase II.

Table 28 – Planted Areas (Project Area at validation)⁵⁰

Property name	Planted area (ha)
El Algarrobo	42.2
El Canoero	223.9
El Caricari	293.8
El Condolirio	102.9
El Futuro	143.3
El Gavan	859.8
El Guayabal	116.6
El Refugio	757.9
El Topacio	1,778.0
Juan de Dios	46.9
La Azabachera	261.3
La Brasilia	45.5
La Candelaria	309.2
La Fortaleza 2	390.6
La Lucecita	68.7
La Trinidad	340.3
Las Carmelitas	557.2
Las Neblinas	441.3
Las Palmeras	521.1

⁴⁹ See the Assessment (regional and property level) & Methodology process in the supporting documentation folder: [Supports\PDD\A1\Degradation assessment]

⁵⁰ The values are rounded to one decimal place; therefore, the direct sum of the values may differ in the total result. To confirm the total value, please refer to the calculations in the Excel file.

Property name	Planted area (ha)
Los Alpes	624.5
Los Araguatos	311.5
Los Laureles	250.0
Los Manantiales	400.3
Los Sabanales	77.9
Marquetalia	150.3
Moriche Solo	59.3
Palmarito	130.9
Paso Rial	60.7
San Jorge	177.5
Santa Cruz	125.7
Sejalito	431.6
Yerbabuena	159.4
TOTAL	10,260.0

(Source: Prepared by Inverbosques (2025))

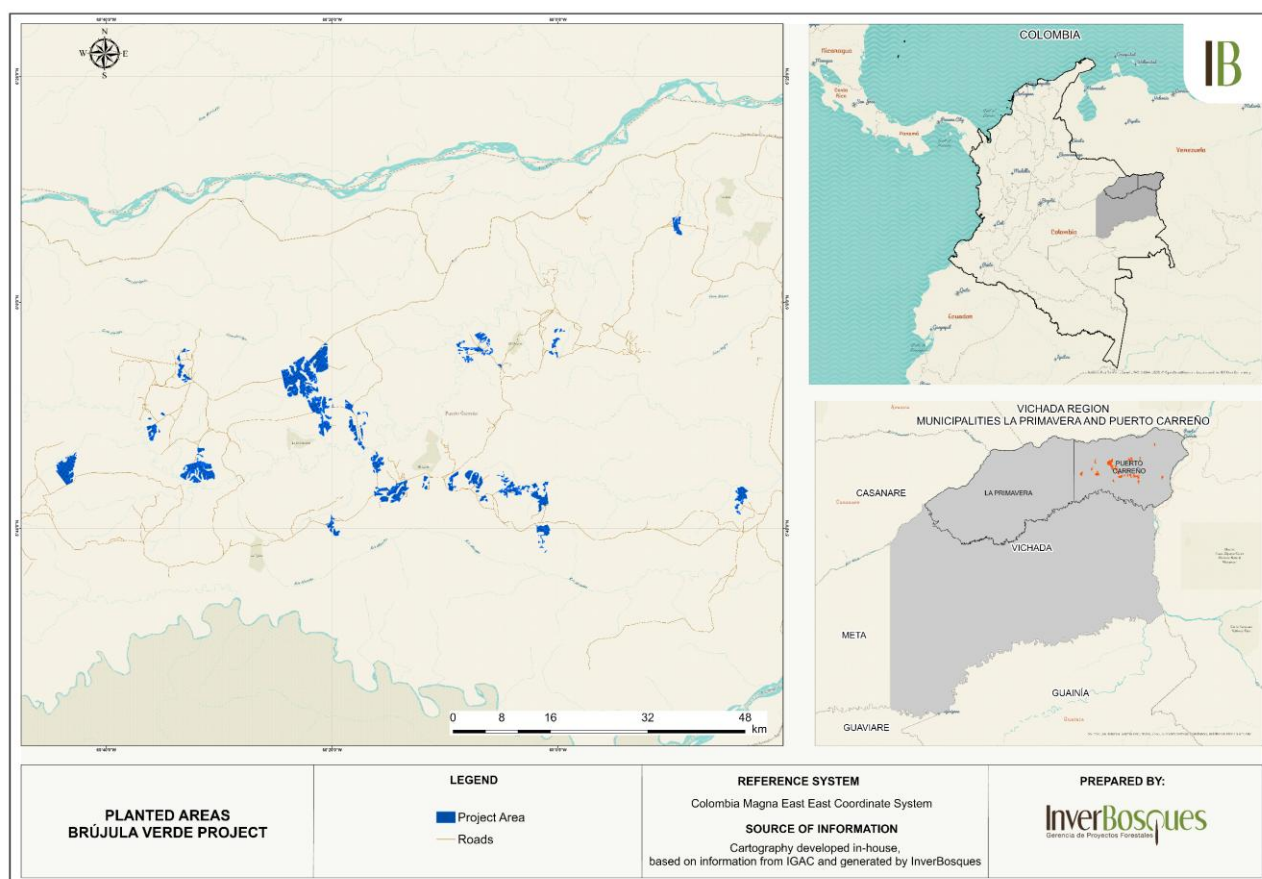


Figure 20 – Planted Areas (Project Area at validation)

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

For the development of the project Inverbosques created a trust fund (called *FG Proyecto Brújula* for the first phase and *FG Proyecto Brújula 2* for the second phase) in

which it is the sole trustor.⁵¹ In addition, the trust fund, has signed with every landowner an usufruct contract.

These contracts give Inverbosques and the trusts legal rights to implement the project as well as the legal ownership of all products that are generated under Gold Standard Certification by the project. For the first phase of the project a total of 31 properties were used and the same numbers of usufructs were signed and for the second phase a single property has been planted, and the usufruct was also signed. The same process will be followed in the other prioritized properties with eligible area soon to be planted.⁵²

A.2 Location of project

The project is in Vichada, Colombia. Vichada borders with Venezuela by the east, Meta department by the west, Casanare and Arauca departments by the north, and Guainía department by the south. As previously stated, the project boundaries are:

Expansion Region is the whole department of Vichada while the Project Area at validation is the eligible area already planted.

As already described above in section A.1, currently there are 59 properties prioritized for the project (the Prioritized Area), located in Puerto Carreño and La Primavera, that were used for the eligibility assessment and 32⁵³ of them have planted areas (the Project Area at validation), all of them located in Puerto Carreño municipality, the remaining are still prioritized and could be used to plant in the second phase. Figure 21 below presents the prioritized properties, the planted ones and in the right upper corner the overall location of Vichada's department within Colombia and in the right lower corner Puerto Carreño and La Primavera municipalities.

⁵¹ See the certificate of the trust funds in the supporting documentation folder: [Supports\PDD\A.1\Ownership]

⁵² See *Certificado de Tradición y Libertad* and *Usufructos* in the supporting documentation folder: [Supports\PDD\A.1\Ownership]

⁵³ Section A.1.1 refers to the 31 properties corresponding to Phase 1 of the project, all located in Puerto Carreño, Vichada. Section A.1.2 includes an additional property from the planned Phase 2 that was incorporated into the validation area. This reflects the project's phased implementation and the inclusion of one early Phase 2 property within the current validation scope.

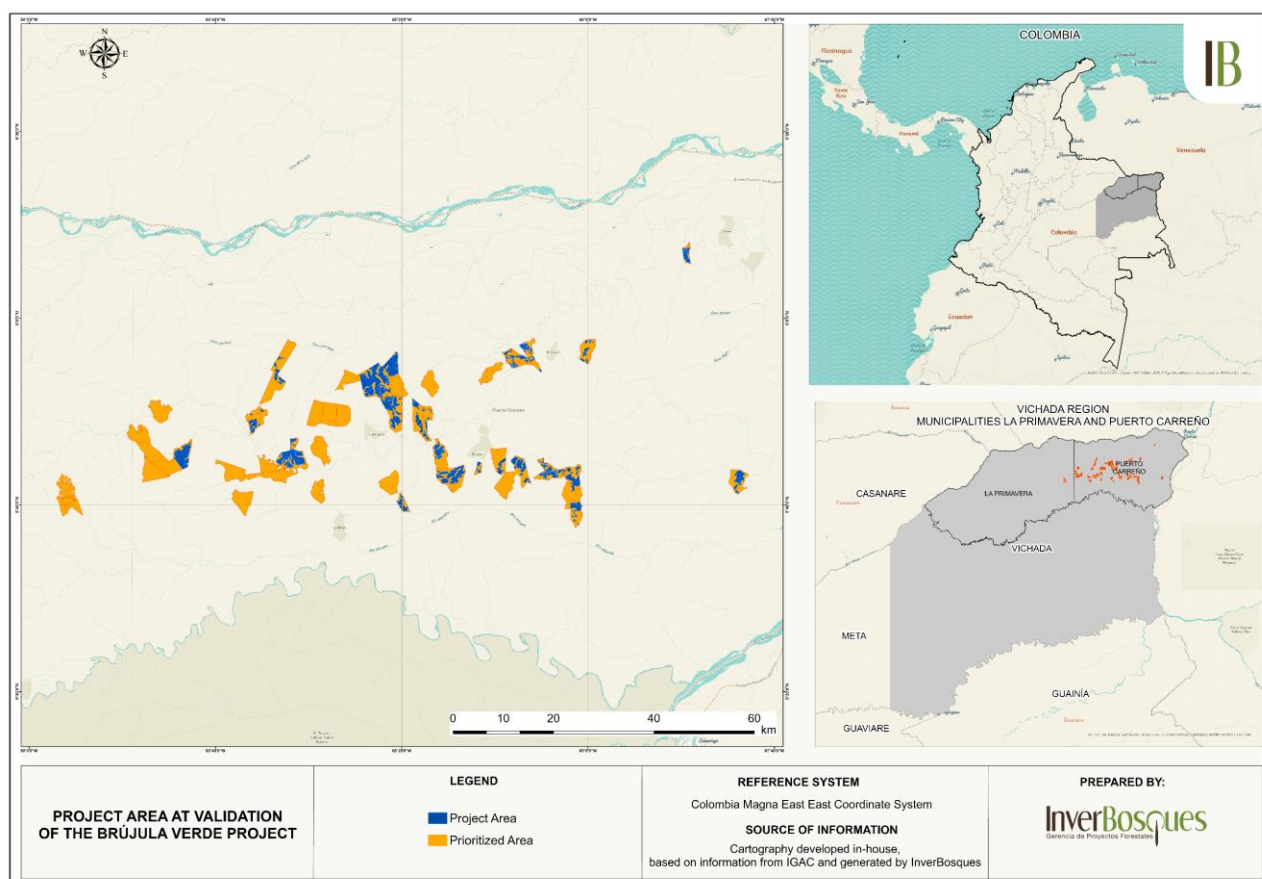


Figure 21 – General location of the project

(Source: Prepared by Inverbosques (2025))

A.3 Technologies and/or measures

As already mentioned, the measure employed in the project to remove GHG from the atmosphere is afforestation. To do so the project developer uses a clone of *Eucalyptus Pellita* and a set of native species. So far, for the enrichment planting done in the first phase and the 250 ha planted in the second phase, the following native species have been used: Aceite (*Copaifera pubiflora*), Congrio (*Acosmium nitens*), Macano (*Terminalia Amazonia*), Simaruba (*Simarouba amara*), Yopo (*Anadenanthera peregrina*), Nauno (*Albizia guachapele*) Saladillo Blanco (*Vochysia lehmannii*) and Carbonero (*Calliandra pittieri*).

The silvicultural activities of the project comprise samplings production at the company nursery, site preparation, planting, fertilization, weed control, pests and diseases

control, phytosanitary thinning, and forest fires preventive measures. Below is a description of the silvicultural activities followed to develop and maintain the project.⁵⁴

Nursery:

Inverbosques has a nursery in the property Las Bonitas (coordinates 5°44'21.23" N, 68°13'25.84" W) with a capacity to produce around 19,000,000 seedlings per year using a clonal selection method for the *E. pellita* and seeds method for the native species. The steps followed within the nursery to obtain a seedling ready to plant are:

- Substrate selection and tube filling.
- Seeds planting or clone selection
- Classification and selection by germination
- Fertilization
- Irrigation
- Rooting
- Quality assessment and seedling dispatching



Figure 22 – Seedlings of native species in the nursery

(Source: Prepared by Inverbosques (2025))

Site preparation

⁵⁴ For more details of the silvicultural activities see the "Plan de Manejo Forestal Sostenible" in the supporting documentation folder: [Supports\PDD\A.3]

This process begins with the Operational Risk Assessment, which has three (3) essential components: Personal, Environmental and Operational safety. After this evaluation, clearing of the site is done, when the cover is grass or low grass, double harrowing is performed and then the subsoiling is done.

The people in charge must first carry out an inspection of the area to be intervened; the activity must begin in the parts furthest from the road and with the highest vegetation height and consists of cutting all weeds to a maximum height of 10 centimeters, the residues remain on the site to allow the incorporation into the soil through decomposition processes.

Seedling distribution and planting

It consists of distributing the seedlings in the lots to be planted, placing each seedling in the definitive planting site and carrying out the planting. The activity is carried out with the greatest possible care to minimize damage to the seedlings, avoiding unloading abruptly on the site, placing the trees as straight as possible in order to avoid deviation of the main stem.

Once the seedlings are in the lot, they are planted in each site guaranteeing the placement in an upright position, the hilling should not be more than three (3) centimeters from the stem, measured from the root collar. The density of the plantation is around 3.5 m x 2.38 for an average density of 1,200 trees per hectare.

Fertilization

It consists in the application of compound or simple chemical nutrients in the establishment and maintenance stages. These nutrients are made up of the physical or chemical mixture of various chemical elements necessary for the development of the planted trees.

Chemical nutrients, depending on their type and composition, could be applied by injecting the fertilizer into the soil at a depth of 5 to 25 centimeters, and at a distance of 25 to 80 centimeters from the tree, depending on the size of the tree (the larger the tree, the greater the distance of application) or superficially by means of mechanized equipment, subject to an adequate control of weeds that exist within the plantation, and the type of chemical compounds that make up the fertilizer mixture to be used.

In the case of the project, the fertilizers used primarily come from natural mineral sources ((208 g/tree of phosphorus, a mixture of potassium and micronutrients 150 kg/ha) in compliance with Regulations (EU) 2019/1009 and 2024/2516 (European Parliament, 2019; 2024).

Additionally, the project adheres to ISO 14001 environmental management standards, minimizing ecological impact, such as sulfates and chlorides, which are extracted and processed for agricultural application. The selection of these inputs is based on their availability, quality, and low environmental impact. Potassium application is limited to two years in tree establishment and only once time per year in a non-intensive manner carried out in a controlled and planned manner, addressing the specific needs of the soil and the various development stages of the trees.

Furthermore, phosphorus is applied in encapsulated or granulated controlled-release formulations, allowing for its direct incorporation into the soil and facilitating its absorption by trees while simultaneously reducing the risk of runoff or dispersion outside the required area. All applications are strategically scheduled during periods of light to moderate precipitation, coinciding with seasonal transitions, which minimizes nutrient loss and improves absorption efficiency.

Based on the above, fertilizer implementation in the project is grounded in the use of certified inputs and innovative technologies that ensure efficient and responsible soil nutrition. According to the certificate issued by Mezclas Integrales Programadas MiP SAS Colombia, the company has been working for over five years with AVENTECH technology, which includes the use of NiproN and NeoPhos. These technologies reduce nutrient loss, minimize soil acidification, and decrease the carbon footprint through the use of biodegradable plant-based additives. Additionally, the conformity certificate issued by IBD Certificaciones Ltda. supports the approval of the BYO N input as a fertilizer additive, meeting international organic production standards. This approach enhances soil quality in a regenerative manner, promoting sustainable environmental balance and ensuring compliance with technical and environmental regulations.⁵⁵

Weed control

When the plantations are already established, the maintenance process consists of controlling unwanted vegetation (weeds) inside the planted lots. The purpose of the activity is to minimize the competition for resources that weeds exert on the plantations. When the weed is grass or low grass, chemical cleaning is carried out.

⁵⁵ See the Certificates in the supporting documentation folder: [Supports\PDD\A.3]

For this purpose, the weed is cut homogeneously, leaving a height of about 10-15 cm. The cutting will be done only and exclusively on the planting line (furrow), or it can also be done on the streets, depending on the size of the existing vegetation inside the plantation. The intervention is done in areas with a vegetation larger than 50 centimeters, the width of the strip to be intervened will be between 1.4 and 1.8 meters. It is important that the residues remain on the site in such a way that they are incorporated into the soil through decomposition processes.

In the project InverBosques applies glyphosate in a controlled and strict method, both in terms of dosage and duration, specifically during land preparation to manage dominant weeds in degraded savannas, ensuring sufficient nutrient availability for young forest species. Failure to do so would otherwise lead to high mortality rates. As trees mature and shade suppresses weeds, further applications are unnecessary after land is prepared.

The use of glyphosate in land preparation for historical plantations implemented by Inverbosques has decreased over time due to improved soil preparation techniques and the selection of more competitive clones. With over 18 years of experience, InverBosques has continuously been working on optimizing forest management practices. That translates in reducing intensive maintenance from five to two years, lowering input applications and minimizing environmental impact. The company follows strict protocols for chemical use, ensuring glyphosate is rapidly absorbed and inactivated upon soil contact, minimizing contamination risks.

InverBosques employs an optimized low-dose application (1.2 – 1.7 L/ha, (1.2 - 1.7 kg/ha)) compared to standard practices (3.5–4.0 L/ha), aligning with best environmental practices. Additionally, its practices comply with EU regulations, which set maximum allowable glyphosate doses per hectare based on use type.

Some products used in forest plantations require applications of 3.5 L/ha for weeds under 20 cm in height and 4.0 L/ha for weeds between 20 and 35 cm in height. However, our optimized management scheme employs a significantly lower dose of 1.5 L/ha, ensuring effective weed control while reducing environmental impact and the use of chemical inputs.

Finally, considering that Inverbosques complied with FSC's requirements and had a positive audit conclusion in November 2024⁵⁶ we can conclude that the management of glyphosate and other inputs complies with environmental and safety standards without identifying any warning signs in their storage or application. The responsible use of herbicides at InverBosques is based on an integrated weed management approach that combines mechanical and chemical methods, ensuring controlled and limited application during the initial plantation establishment phase. Additionally, plantation areas maintain safe distances from protected zones, and no environmental damage resulting from pesticide use has been recorded.

Pest and diseases control

One of the pillars of InverBosques is the Phytosanitary Control framed in the Integrated Management of Pests and Diseases (also known as MIPE "*Manejo Integrado de Plagas y Enfermedades*"), this process is defined from the economic level of damage and the integrality of the ecosystem in the selection of different activities such as Biological Control, Cultural Control of pests, Mechanical Control and species selection with genetic improvement: Biological Control, Cultural Control of pests, Mechanical Control and the selection of species with genetic improvement. Likewise, InverBosques has as its objective the whole preventive process framed in two strategies:

- Training of employees
- Phytosanitary evaluation

It is worth noting that Inverbosques has laboratory facilities that support Inverbosques with the monitoring and life cycles of insect pests or that can become pests and based on this information it is possible to make the taxonomic identification of them.

Phytosanitary thinning

According to the forestry monitoring that will be carried out every year, two variables that support the forest intervention will be evaluated: basal area (occupation of the plantation), and ecological function and conservation values (natural regeneration of species of the area or native), with these two premises are put under consideration of the technical committee of the company to evaluate the type of intervention, the initial

⁵⁶ See the FSC Certification in the supporting documentation folder: [Supports\PDD\A.3]

proposal is to perform phytosanitary thinning that fulfill an ecological function that is to improve the remaining population and facilitates the regeneration of new species and improve soil conditions (moisture and organic material), see Figure 23 for an example of natural regeneration present in old plantations of Inverbosques.



Figure 23 – Natural regeneration present in old plantations of Inverbosques

(Source: Prepared by Inverbosques (2025))

The silvicultural management plan includes scheduled girdling ("anillamiento") operations. By the 5-year mark, a 20 percent one is conducted: densely clustered or suppressed saplings are cut in place to reduce competition, and all cut material (small stems, branches, leaves) remains on-site as deadwood. This is strictly a silvicultural improvement, not harvesting, no timber ever leaves the site or enters commerce, fully compliant with "conservation forest" requirements (LUF Activity Requirements v1.2.1). Following girdling, gaps are replanted with native species as part of the enrichment strategy. Subsequent periodic girdlings occur at Year9 (10 percent), Year 14 (10 percent), and at age 19 a final 10 percent, each girdling event is performed under the same conditions, used to replace suppressed invidious, and capture long-term pressures, including disease, structural instability, and other ecological impacts that can accumulate in maturing stands.

Fire management

One of the key processes in forest plantations is fire management. InverBosques focuses in two areas: establishment of firebreak barriers around the plantations and creation of fire brigades.

Firebreaks are a process by which strips of vegetation on the periphery of the planted area that could become combustible material during the spread of a fire that could affect the plantation are eliminated. Firebreaks are intended to isolate and protect the plantations to prevent fire from entering the planted areas.

The fire brigade's activities start with the selection of personnel for fire prevention and control activities. It is important to identify in the work team the ideal people who meet the appropriate physical, mental and social characteristics, according to the activity to be performed, during the different processes. The people chosen may be the same people who make up the Emergency Brigade, and they must undergo periodic theoretical and practical training.

The brigade is made up of 22 members, all company employees. The brigade leader is the project's Heritage Coordinator. In the absence of the leader, this position will be assumed by the coordinators or forestry assistants. It is important to keep in mind that no member of the brigade will act alone, they must always act at least in pairs and must have a communication radio and elements that allow them to give an alert signal.

The communication process during forest fires is carried out by means of an initial meeting, in a place defined as the unified command post (PMU). The PMU is where the members of the emergency brigade are informed of the distribution of functions and activities during firefighting; after that, all communication is subject to the radios owned by company personnel. InverBosques has a communication system at all work fronts with mobile and fixed radios.

A.4 Scale of the project

According to the Land Use & Forests Activity Requirements, Version 1.2.1, the project is classified as a 'large-scale project' due to the planted area exceeding 500 hectares and the emission removals achieved being more than 10,000 tCO₂e. As a large-scale project, it is subject to the complete requirements outlined in the mentioned version.

A.5 Funding sources of project

The project is financed by private sources and has not received any public funding.

As required by the standard, considering that the project is taking place in a country part of the ODA recipient list a signed Official Development Assistance (ODA) Declaration is included in the supporting documentation.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

- Gold Standard Principles & Requirements – Version 2.1
- Gold Standard Land use & Forestry Activity Requirements – Version 1.2.1
- Gold Standard Methodology for Afforestation/Reforestation (A/R) GHG emission reduction & sequestration – Version 2.1
- Gold Standard "A/R Soil Carbon Tool" ('403_V1.0_0.7_LUF_AR Methodology_Soil Carbon Tool.xlsm')
- Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities

B.2. Applicability of methodology (ies)

The project meets each applicability condition of the Methodology Afforestation/Reforestation (A/R) GHGs Emissions Reduction & Sequestration Methodology – version 2.1, as demonstrated below.

Eligible land not meeting the definition of a forest

Projects that include the planting of trees on land that do not meet the definition of a forest at planting start are eligible to apply this methodology: The proposed project intends to actively restore a natural (secondary) forest on former pastureland in the eastern plains of Colombia by planting a variety of site-adapted native tree species, and one non-native tree species, in close-to-nature mixed stands.

The project complies with the applicable eligibility requirements of the Land Use and Forests Activity Requirements (see Table 4). The project has undergone an eligibility analysis based on the Annex C of the Gold Standard's Land Use and Forests Activity Requirements, which provides guidelines on how to conduct a spatial forest/non-forest assessment and the areas proposed in the project does not meet the definition of forest 10 years before project start date and at project start date, more details are available in section A.1.1).

Methodological requirements

The proposed project applies to the Gold Standard for the Global Goals Principles & Requirements and all other associated and referenced documents.

*Gold Standard Methodology Afforestation/Reforestation (A/R) GHGs Emissions
Reduction & Sequestration Methodology – version 2.1*

The project area meets all the requirements described in section 2.1.2 of the methodology:

a. Projects can apply all silvicultural systems: (i) Conservation forests (no use of timber), (ii) Forests with selective harvesting, (iii) Rotation forestry:

The silvicultural system applied is the "conservation forest" (no use of timber)⁵⁷. The forests planted are conservation forests, no selective harvesting nor rotation forestry is performed after the years in which trees are planted and replanted if there are trees that died. The project follows the eligible conservation forest silvicultural system under this methodology. It does not involve commercial timber use and is designed to maximize conservation benefits, improve ecosystem services such as carbon sequestration and biodiversity, and provide direct benefits to local communities.

To ensure post-project permanence, the following measures and legal safeguards are in place:

1. Legal protection: Under Colombian Environmental Law (Law 99 of 1993 and Decree 2811 of 1974, which establish the environmental licensing regime and classification of forested lands as protected, prohibiting conversion without authorization), once land is officially designated and registered as forest, it falls within the protected category of "forested area" and may not be cleared or converted without a prior environmental license from the Regional Autonomous Corporation (CAR). This effectively prohibits any future harvesting or land-use change.

⁵⁷ Although the Brújula Verde project is classified as a conservation forest (no commercial timber use), it incorporates periodic girdling ("anillamiento") to optimize stand health and growth. During each girdling event, tightly clustered, suppressed Eucalyptus saplings are cut in place to reduce competition for light and nutrients. All felled material, small stems, branches, leaves, is left on-site as deadwood, enhancing soil fertility, moisture retention, and habitat complexity. No wood is ever extracted from the project area or sold.

These girdlings are strictly a silvicultural improvement measure, not "harvesting" because no timber leaves the site or enters commerce, this practice does not constitute selective harvesting under LUF Activity Requirements v1.2.1 and is fully permissible within the "conservation forest" category. Following these interventions, the areas are replanted with native species to further enhance biodiversity and ecosystem functionality. This replanting is part of the enrichment strategy, ensuring that canopy openings created by girdling are used to establish native tree cover and increase species diversity over time.

2. Fire prevention and monitoring: A comprehensive fire-management strategy, including training, early-warning systems, and seasonal patrols, is implemented to prevent wildfires and unauthorized burns.
3. Stakeholder agreements: Landholders within the project boundary have signed legally binding covenants (usufructs) guaranteeing that no timber extraction will occur for the duration of the crediting period and to provide certainty beyond the crediting period, as part of the post-crediting strategy. In the future is idea is to potentially designate the area as a Civil Society Natural Reserve, under Colombia's National System of Protected Areas (SINAP). This voluntary designation should landowners choose to pursue it would reinforce long-term legal and ecological protection, supporting continued forest stewardship beyond the crediting period. Independently of this designation, landholders have signed usufruct agreements that include binding commitments to safeguard the restored forest, both during and after the crediting period.. In parallel, the project will explore diversified income streams, including the generation of additional environmental credits (e.g., biodiversity or water-related credits) and the sustainable use of NTFPs aligned with conservation goals. The strategy is currently under development and will be formally socialized with stakeholders during upcoming verification periods to ensure transparency, alignment, and lasting commitment from all parties involved. This integrated approach reinforces the financial sustainability and ecological permanence of the restored ecosystems.

These legal and financial mechanisms ensure that the forest established by Brújula Verde remains permanently protected, thereby maximizing long-term conservation benefits, carbon sequestration, and ecosystem resilience.

b. All projects can include agriculture (agroforestry) or pasture (silvopasture) activities:

The project does not include any agriculture or pasture activities.

c. Project Areas shall not be on wetlands

The project area does not meet the criteria of a wetland as defined by IPCC. As shown in Figure 13 The predominant soil on the eligible planting area are Ferralsols, Cambisols and Acrisols, which are not classified as wetland by IPCC. Furthermore, the wetland

inventory from the Humboldt Institute in Colombia locates any type of wetland away from the project area, exclusively on water streams. The project area does not provide the conditions for wetlands other than creeks.⁵⁸

In addition, the DMRV (Digital Measurement, Reporting, and Verification) performed by the project, which integrates advanced remote sensing, reinforces the conclusion that there are no permanent water bodies within the project area. The DMRV process employs high-resolution LiDAR technology to generate and provide precise three-dimensional representations of the terrain, enabling the identification of even subtle topographical features such as depressions, water channels, and potential wetland zones. In the case of the Brújula Verde project, the LiDAR-derived data clearly shows that the landscape is well-drained and lacks the characteristic low-lying areas or persistent water bodies that would indicate the presence of wetlands. This detailed spatial data (at tree-level) reinforces the conclusion that there are no permanent wetlands within the eligible planting area. Furthermore, the integration of LiDAR data within the DMRV framework allows for continuous monitoring and verification of land cover changes over time. This ensures that any future alterations in the landscape, whether due to natural processes or project activities, are promptly detected and assessed, thereby supporting ongoing compliance with eligibility criteria.

Although apart of the “Prioritized Area” is included within an area cataloged by Ramsar as *Complejo de humedales de la cuenca del Río Bita* (Of the 59 prioritized properties, 50 are located within the Bita River Basin, representing 73.7% (41,015.3 ha) of the total “Prioritized Area”), the eligible area is mostly classified as grassland (70.44%) without the presence of floodplain forests (see Table 25).

In accordance with the methodological requirements, under literal 2.1.2 of the Gold Standard Methodology Afforestation/Reforestation (A/R) GHGs Emissions Reduction & Sequestration Methodology – version 2.1, and in accordance with the land cover details (Table 25), and life zones, the project area does not contain a type of flooded forest (wetlands, or wooded wetlands) growing on peat which should be excluded.

However, given that the Bita River Basin has been designated as a Ramsar site, cartographic information from the POMCA was incorporated into the eligibility analysis.

⁵⁸ See reports Instituto de Investigación de Recursos Biológicos Alexander von Humboldt: <http://reporte.humboldt.org.co/biodiversidad/2016/cap4/412/#seccion12>, and <https://rsis.ramsar.org/es>

The following land uses were deemed eligible: conservation and/or ecological restoration, recreation (CRE), productive forestry systems (FPD), agroforestry systems (AGS), silvopastoral systems (ASP), and protective forestry systems (FPR). Conversely, areas classified as rivers or lagoons were designated as ineligible

The zoning of the Bita River serves as a framework for land-use planning within the basin but does not imply that the entire basin falls under a strict protection category that prohibits all activities. Conservation agreements and the environmental best practices implemented by reforestation companies are aligned with the conservation/restoration strategies outlined in the POMCA.

This is further evidenced in the POMCA of the Bita River, where protective forestry systems are identified as potential land use within the basin. Features such as water bodies, wetlands, organic soils, and legally defined protection areas (e.g., riparian buffer zones and forests, in accordance with environmental regulations) should serve as the criteria for determining eligible areas, rather than considering the entire basin ineligible.

Having a project in an area designated as a Ramsar site does not equate to having the project located within a Ramsar wetland itself. The project area is within a region zoned as Ramsar, but it has not involved any intervention or alteration of Ramsar wetland ecosystems. In other words, no wetland ecosystems have been drained or modified as part of the project.

The GIS eligibility analysis excludes rivers, water bodies, and wetlands from the eligible areas (as described in Step 4: Exclusions of the eligibility assessment). Therefore, the project area does not contain areas that, due to their wetland characteristics and organic soil conditions, are considered peat and should be excluded. In turn, the characterization of soils does not demonstrate the presence of organic soils and, according to the information on ecosystems reported by CIFOR, ecosystems without peat formation and swampy areas covered with trees on the edge are evidenced.

Since the project activities do not take place in wetlands, the specific carbon stocks (carbon pools) of this type of ecosystems are not considered.

d. Project Areas with organic soils shall not be drained or irrigated (except for irrigation for planting)

The project area does not contain organic soils as per the IPCC soil classification. According to the eligibility assessment the predominant soils type within the eligible project area is Ferralsol, following by Cambisols and Acrisols on less proportion.

Ferralsols are classified as LAC soils under the IPCC default soil classes derived from the Harmonized World Soil Database.

Additionally, laboratory soil sample analyses conducted on four project properties confirm that the soils in the region have a low organic matter content, approximately 2% (see more details Figure 14). This further supports that the project area does not contain organic soils, and therefore, this applicability criterion is not relevant.

e. Project areas with organic soils shall not be drained and soil disturbance on organic soils shall be in less than 10% of the area that is submitted to certification

As stated above, the project area does not contain organic soils, and therefore, this applicability criterion is not relevant.

f. The most likely scenario without the project (baseline scenario) shall be defined for the project area. This scenario shall not show any significant increase (to be more than 5% of the long-term CO₂ removal) of the Baseline biomass ('tree' and 'non-tree'):

The most likely scenario without the project (baseline scenario) was defined for the project area. This scenario does not show any significant increase in Baseline biomass. The landscape is a patch work of grasslands, grasslands with low shrubs, which represent a degraded savannah resulting after years of deforestation and slash and burn agriculture, within this landscape they are also present interspersed areas of abandoned agricultural land and crop fields, see more details in section B.4. Establishment and description of baseline scenario below. Indeed, since the baseline scenario is the continuity of slash-and-burn agriculture of fallows, no increase in biomass is expected on the land.

By applying the above-mentioned applicability conditions the Project is also eligible to apply the Gold Standard Emissions Reduction and Sequestration Product Requirements.

Tool for estimation of changes in soil organic carbon stocks due to the implementation of A/R CDM project activities)

The project area meets all the requirements described in section 3 of the tool:

- **Project area does not fall into wetland category:** The project is not located on the category of wetland, the selected land is generally not close to the rivers

and is generally on plateaus and slight slopes. The GIS eligibility analysis excludes rivers, water bodies, and wetlands from the eligible areas.

- **Do not contain organic soils:** As described above, the project areas do not contain organic soils.
- **Not subject to any land management practices and applications of inputs listed in the tool:** The land was not subject to any land management practices or applications of inputs. On the contrary, these lands are often abandoned because they are too poor and degraded to enable any kind of agriculture.
- **Litter remains on site and is not removed:** Litter is not removed from the plantations.
- **Soil disturbance is in accordance with appropriate soil conservation practices:**

Soil disturbance in the project area is managed in strict compliance with the Sustainable Forest Management Plan (PMFS)⁵⁹, ensuring that all land preparation and planting activities uphold soil conservation principles. While mechanized methods are employed to facilitate efficient establishment of forest cover. While mechanized methods are employed to facilitate efficient reforestation, these interventions are carefully designed to minimize adverse impacts on soil structure and fertility.

The project applies mechanized techniques best suited for preparing the terrain, such as precision subsoiling and contour plowing, with the goal of loosening compacted layers while maintaining soil structure. Once the planting lines have been prepared, mechanized direct seeding is carried out by calibrating equipment to place seeds at specific depths, thereby minimizing disturbance to the topsoil.

In areas with higher natural regeneration potential, interventions are localized, combining direct seeding with natural regeneration and limiting soil disturbance to small holes or planting trenches. Throughout the process, vegetative barriers and controlled drainage structures are implemented to prevent erosion and support moisture retention. Organic matter is retained in the field to enhance soil

⁵⁹ See the Sustainable Forest Management Plan (PMFS) in the supporting documentation folder: [Supports\PDD\B.2]

fertility and reinforce stability. If necessary, fertilization regimes or tillage practices are adjusted to ensure sustainable soil use over the entire reforestation cycle.

Through these measures, the project actively enhances soil stability, minimizes erosion, and preserves long-term fertility, thereby laying the groundwork for resilient forest ecosystems and sustainable land use, ensuring minimal disruption to the soil. The project's focus is on increasing soil stability, reducing erosion, and enhancing soil fertility through the establishment of forests.

- **Soil disturbance limited to site preparation before planting, not repeated in less than 20 years:** After establishment of the plantation and the native species, the soil is no longer disturbed for the rest of the project.

Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities

The project area meets all the applicability conditions of the tool (see section B.5. Demonstration of additionality):

- **No violation of any applicable law:** The project does not violate any Colombian laws by reforesting the planting area.
- **No small-scale afforestation and reforestation project activities:** The project is large scale.

B.3. Project boundary

Geographical boundaries of the project are described in section A.2 Location of project. In Table 29 and Table 38, there is an overview of all the emission sources and GHGs included in the project boundary for the purpose of calculating project and baseline emissions.

Table 29 – Emission sources included in the project

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Aboveground & belowground tree biomass	CO ₂	Yes	Trees could be a major source of CO ₂ emissions
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
	Aboveground & belowground non-tree biomass	CO ₂	Yes	GHG emissions from grasses and shrubs will be considered as baseline emissions
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source

Source		GHGs	Included?	Justification/Explanation
Project scenario	Soil	CO ₂	Yes	Soil organic carbon (SOC) is included as a carbon pool. The A/R Soil Carbon Tool is used to account for soil carbon change.
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
	Litter & Dead wood	CO ₂	No	Insignificant carbon pool which can be conservatively excluded according to the methodology
		CH ₄	No	Insignificant carbon pool which can be conservatively excluded according to the methodology
		N ₂ O	No	Insignificant carbon pool which can be conservatively excluded according to the methodology
	Aboveground & belowground tree biomass	CO ₂	Yes	Major carbon pool subject to the project activity GHG emissions from non-tree, 'treeling' woody vegetation below 2 m in height (part of the natural regeneration and forest enrichment process), which may survive and continue growing due to the project's activities, will be accounted. This acknowledges that, without the project, such regenerating woody species would likely not persist or develop to maturity.
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
	Aboveground & belowground non-tree biomass	CO ₂	Yes	Not applicable to the project scenario
		CH ₄	No	Insignificant carbon pool in project scenario
		N ₂ O	No	Insignificant carbon pool in project scenario
Project scenario	Soil	CO ₂	Yes	An increase of SOC can be expected due to the project activity, in line with the methodology.
		CH ₄	No	Insignificant carbon pool in project scenario
		N ₂ O	No	Insignificant carbon pool in project scenario
	Litter & dead wood	CO ₂	No	Insignificant carbon pool which can be conservatively excluded according to the methodology
		CH ₄	No	Insignificant carbon pool which can be conservatively excluded according to the methodology

Source	GHGs	Included?	Justification/Explanation
	N ₂ O	No	Insignificant carbon pool which can be conservatively excluded according to the methodology
Harvested wood (timber & energy wood)	CO ₂	No	Not applicable to the project scenario
	CH ₄	No	Not applicable to the project scenario
	N ₂ O	No	Not applicable to the project scenario
Use of machinery	CO ₂	No	No significant GHG source
	CH ₄	No	No significant GHG source
	N ₂ O	No	No significant GHG source
Biomass burning (Site preparation)	CO ₂	No	Not applicable to the project scenario
	CH ₄	No	Not applicable to the project scenario
	N ₂ O	No	Not applicable to the project scenario
Fertilisers	CO ₂	No	No significant GHG source
	CH ₄	No	No significant GHG source
	N ₂ O	Yes	Emissions are taken into account
Combustion of fossil fuel	CO ₂	No	No significant GHG source
	CH ₄	No	Not applicable to the project scenario
	N ₂ O	No	Not applicable to the project scenario
N-fixing trees	CO ₂	No	Not applicable to the project scenario
	CH ₄	No	Not applicable to the project scenario
	N ₂ O	No	Not applicable to the project scenario

B.4. Establishment and description of baseline scenario

In accordance with the requirements of the Gold Standard *Afforestation/Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology (version 2.1)*, the Gold Standard Principles and Requirements, and the requirements of GS4GG Principle 1, the baseline scenario for the Brújula Verde project is established as the “reasonable, conservative scenario that would exist in the absence of the project.” Therefore, the baseline scenario for the Brújula Verde project is the situation that would occur in the absence of the project.

The baseline scenario for the Brújula Verde project is the continuation of pre-project land use, which is an entrenched pattern of land conversion, characterized by cyclical burning, extensive grazing systems, and the transformation of natural ecosystems into degraded grasslands. In this case, the project area in Vichada would remain in a state of degraded grasslands. The historical land-use practices, soil conditions, and local

governance frameworks confirms that, without project intervention, these landscapes would remain locked in low-input extensive grazing systems with no tree regeneration.

Alignment with selected Methodology

- **Methodological Consistency:** Following the methodology's guidelines, the most probable land-use scenario by examining historical practices (e.g., frequent burning to maintain pasture) and economic barriers (e.g., low returns from land conversion). This ensures a conservative baseline in which no significant afforestation or natural regeneration would occur without external intervention.
- **Exclusion of suppressed demand:** As this is a large-scale project, no suppressed demand baseline has been applied. The chosen baseline reflects actual conditions in the region, extensive grazing with low productivity.

The main land use in the project (based on the Intergovernmental Panel on Climate Change (IPCC) Land Use, Land-Use Change and Forestry categories, and the Guidelines for National Greenhouse Gas Inventories (Chapter 4), land use classification adopted for Colombia) area are grassland with patches of pastures (see Figure 16). The following key points illustrate why this scenario represents the most realistic baseline:

- 1. Historical prevalence of degraded grasslands:** Vast areas of Vichada have been maintained under extensive grazing, partly due to low soil fertility and limited commercial opportunities for alternative land uses⁶⁰. Since the 1970s, local landowners have adopted annual or biannual burning to control woody regrowth and promote grass for cattle, a practice that further impoverishes soil organic matter and reduces biodiversity (Rippstein et al., 2001)⁶¹. This cycle of low-productivity pasture perpetuates land degradation, as there are few incentives or regulatory pressures to shift to more sustainable practices.
- 2. Poor soil fertility and acidic conditions:** The dominant soils in Vichada, commonly Oxisols and Ultisols, are acidic, with low base saturation and limited

⁶⁰ See studies on Colombia's Orinoquía region (e.g., IDEAM, 2019; Cormagdalena & WWF, 2020)

⁶¹ Rippstein, G. (2001). *Agroecología y biodiversidad de las sabanas en los Llanos Orientales de Colombia* (No. 322). Ciat.

capacity to retain nutrients (IGAC, 2014)⁶². Such conditions deter profitable agricultural expansion without substantial inputs of lime and fertilizers, which are costly and logistically challenging to implement in remote areas. As a result, landowners typically rely on fire to remove coarse grasses and shrubs, thereby maintaining rudimentary pasture at minimal cost (FAO & CIAT, 2015)⁶³. This approach keeps land productivity low and discourages any shift toward tree-based systems in the absence of external support or financing.

3. Limited enforcement of fire controls and restoration policies: While Colombia's environmental regulations acknowledge the importance of reforestation (MinAmbiente, 2017)⁶⁴, enforcement in remote regions like Vichada remains sporadic. Field assessments conducted by local NGOs (Omacha Foundation, 2021)⁶⁵ reveal that prescribed burns frequently exceed intended boundaries, turning into large-scale wildfires. Local authorities lack the resources to effectively penalize or prevent this practice, which remains widely accepted as a cost-saving measure for pasture management (CORPORINOQUIA, 2020)⁶⁶. Consequently, landowners face little immediate pressure to reduce burning or invest in forest restoration.

4. Absence of economic incentives for Land-Use Change: Although Colombia's national policies (e.g., the National Development Plan) include broad targets for reforestation, these are not compulsory at the farm level, and neither the national nor departmental governments provide substantial financial or technical incentives for afforestation. Landowners thus view continued grazing as the only economically viable land-use option, given minimal market returns, and the

⁶² IGAC (2014). Estudio General de Suelos y Zonificación de Tierras. Departamento de Vichada. Instituto Geográfico Agustín Codazzi. 2014

⁶³ Food and Agriculture Organization (FAO) & International Center for Tropical Agriculture (CIAT). Status of the World's Soil Resources: Main Report. Available at: https://knowledge4policy.ec.europa.eu/publication/status-worlds-soil-resources-main-report_en

⁶⁴ Ministerio de Ambiente y Desarrollo Sostenible (MinAmbiente). Plan Nacional de Biodiversidad y Estrategias de Acción 2016-2030 (2017). Available at: <https://www.cbd.int/doc/world/co/co-nbsap-v3-es.pdf>

⁶⁵ Fundación Omacha. Informe de gestión anual 2022. Available at: <https://www.omacha.org/descargas/documentos/informe-gestion-anual-2022.pdf>

⁶⁶ Corporación Autónoma Regional de la Orinoquía (CORPORINOQUIA). Informe de gestión final vigencia 2020. Available at: https://corporinoquia.gov.co/images/docsPdf/INFORME_DE_GESTION_FINAL_VIGENCIA_2020.pdf, and plan de acción 2020-2023, available at: <https://corporinoquia.gov.co/media/attachments/2021/12/09/0-plan-de-accion-2020-2023-p5.3.pdf>

upfront costs associated with reforestation and long-term forest management (Colombia-Purdue Partnership, 2018⁶⁷ and Agudelo-López et al., 2022)⁶⁸.

5. Resulting minimal carbon stocks: Biomass accumulation remains very low where grasslands are maintained through frequent burning. Without an intentional shift toward tree planting and sustainable management, the potential for natural forest regrowth is negligible. Thus, carbon stocks would remain static, or even decline, over time due to soil degradation and the loss of any incidental woody regrowth to repeated fires.

According to this, the most probable land-use scenario in the absence of the Brújula Verde project is an ongoing regime of degraded grasslands with negligible forest cover. By contrast, the project's planned interventions, focused on establishing *Eucalyptus pellita* and native species plantations, alongside sustainable land-management practices, fundamentally diverge from this baseline. The revenue from carbon finance, coupled with technical support, is essential to break the cycle of low-input grazing and burning, enabling a transition toward afforestation and soil ecosystem restoration that would otherwise remain unfeasible.

B.5. Demonstration of additionality

The Brújula Verde project applies the “*Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities*”⁶⁹ to prove that the project could not have occurred without the revenue generated from carbon finance. The demonstration of additionality follows Option 1 according to the requirements described under the “*Land Use & Forests Activity Requirements*” V1.2.1 (April 2020), section 3.1.16, and adheres to the procedural steps established in the applicable guidelines. The process comprises the following steps:

⁶⁷ Colombia-Purdue Partnership. (2018). Estudio de viabilidad para el desarrollo de operaciones agrícolas y forestales en Vichada. Purdue University. Available at: https://www.purdue.edu/colombia/partnerships/orinoquia/docs/Vichada%20Study_CPP_CS18-3_SP_Sep242018.pdf

⁶⁸ Agudelo-López, M., González-Vargas, C., Yepes-Quintero, A., Mora-Rodríguez, E., Chaux-Echeverri, M., Santos-Acuña, L., & Fernández-Ugalde, J. C. (2022). Costos de aprovechamiento del manejo forestal comunitario en Colombia: impactos, lecciones aprendidas y desafíos. *Colombia Forestal*, 25(2), 104-119. Available at: http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0120-07392022000200104

⁶⁹ Available at: https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf/history_view

- **Step 0. Preliminary screening based on the starting date of the A/R project activity:** The project activity is assessed against the eligibility criteria for its start date, confirming that implementation began after the date allowed for claiming additionality under Gold Standard rules.
- **Step 1. Identification of alternative scenarios:** Plausible land-use scenarios are identified and evaluated, including the continuation of existing land practices and any other feasible land-use options in the absence of the project activity
- **Step 2. Barrier analysis:** Demonstrates the existence of significant financial, technological, and institutional barriers that would prevent the implementation of the project without carbon finance.
- **Step 3. Investment analysis (if needed):** Assesses whether the project would be economically unattractive without carbon credit revenues by comparing the NPV (Net Present Value) and IRR (Internal Rate of Return) of the project against standard investment benchmarks.
- **Step 4. Common practice analysis:** Evaluates whether similar land-use or reforestation activities are common practice in the region, thereby confirming that the proposed project represents an additional intervention rather than a standard activity

Supporting documentation includes financial models, investment cost breakdowns, IRR/NPV calculations, to demonstrate that without Gold Standard revenue, the project would not be viable⁷⁰. The Brújula Verde project fulfills the criteria for deemed additionality by demonstrating that it would not proceed under a business-as-usual scenario and that carbon finance is essential for overcoming key barriers.

Therefore, in line with the “*Land Use & Forests Activity Requirements*” and the “*Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities*” guidelines, the following analyses were conducted⁷¹:

⁷⁰ See supporting documentation at folder: [Supports\PDD\B.5]

⁷¹ The complete additionality analysis has been filed in the project's information management folder. For further reference, please consult the following annexed documents: “203_V1.0_AR_LUF_Activity-

Step 0. Preliminary screening based on the starting date of the A/R project activity:

The AR project Brújula Verde, identify credible alternative land use scenarios to support its afforestation or reforestation activities under the CDM framework. This involves demonstrating that the project's starting date was after December 31, 1999, and that the incentive from the planned sale of CERs was a significant factor in the decision to proceed with the project:

- Project Start Date: CDM A/R rules require start after 31 Dec 1999. The project is categorized as retroactive because implementation began on May 15, 2023⁷², corresponding to the initiation of physical planting activities, which is well after the specified date of December 31, 1999. This ensures compliance with the first requirement. Compliance is confirmed by the planned submission date in 2025, which falls well within the Gold Standard's prescribed five-year eligibility window for retroactive Land Use and Forestry (LUF) projects. This ensures that the initiative meets the critical time-of-implementation requirement.

Carbon Incentive Considered: The project's rationale is explicitly carbon driven. The development was financed by carbon investors. The project developer's capacity to initiate the activity prior to securing final certification, despite the significant inherent risks, demonstrates that the revenue from Gold Standard certification was systematically considered from the earliest planning stages. The timing confirms the intent to structure the project around the necessity of carbon finance, ensuring retroactive eligibility and aligning project expenditures with the commitment to carbon market incentives. The project's financial planning documents⁷³ demonstrate that the potential revenue from CERs was seriously considered in the decision-making process. This is supported by official documentation available to third parties prior to the project's start and described in section B.5.1 Prior Consideration.

Requirements_AR_Additionality Assessment" and "T-PreReview_AR_CDM_Additionality_Tool", in that order, as well as the supporting documentation available in the folder: [Supports\PDD\B.5\B.5].

⁷² Start Date (DD/MM/YYYY): 15/05/2023

Justification: In line with the Gold Standard Core document "Land Use & Forests Activity Requirements v1.2.1" for Land-Use and Forestry (LUF) projects, the crediting period can begin up to three years prior to the date of Project Design Certification (Principle 4, section 3.1.11). Since the project is retroactive and started planting on 15/05/2023, this date is used as the official start of the crediting period. Relevant documentation (e.g., planting records) confirms that this date aligns with the earliest eligible timeframe for crediting under the applicable Gold Standard rules.

⁷³ See supporting documentation at folder: [Supports\PDD\B.5\B.2\Step 0]

Step 1. Identification of alternative scenarios:

Sub-step 1a. Identify credible alternative land use scenarios to the proposed CDM project activity

Realistic and credible land-use scenarios were identified, which would have occurred in the project area in the absence of AR project activities. These scenarios are fully feasible for the project area, considering the relevant national or sectoral policies and circumstances, as well as historic land uses, the practices and economic trends of the communities settled in the north of the Vichada Department, in the municipality of Puerto Carreño. The communities have both direct and indirect interaction with forest plantations, and possess ecological and socioeconomic conditions, similar to those that have been present in the project area over the past 10 years.

Alternative Scenario 1: Continuation of pre-project land use

Colombia faces significant challenges related to soil degradation, which threaten the sustainability of its ecosystems and agricultural productivity, the antecedents of the national situation indicate that between 2014, and 2022 the degree of erosion is one of the outstanding issues, with approximately 40% of the territory affected by soil erosion, with 2.9% experiencing severe or very severe erosion levels (SIAC, 2018).⁷⁴ This degradation is accompanied by desertification processes affecting 1.7% of the land, particularly in arid and semi-arid regions, leading to a loss of soil fertility and ecosystem functionality (Ministry of Environment and Sustainable Development, 2023)⁷⁵, followed by 14% water loss, and 4.3% in soils desertification: consequences caused by misuse and management of production systems. Changes in land use and overexploitation of resources are among the processes that impact natural ecosystems. In the country, a large percentage of land is in a serious state of degradation, many of these correspond to pastoral areas (pastures established in areas unsuitable for livestock and mismanagement). Livestock in Colombia is one of the main causes of fragmentation and land degradation, threatening the supply of ecosystem services and biodiversity

⁷⁴ SIAC. (2018). Soil erosion degradation in Colombia. Sistema de Información Ambiental de Colombia. Available at: <http://www.siac.gov.co/erosion>

⁷⁵ Ministry of Environment and Sustainable Development. (2023). Soil degradation by desertification zoning map in Colombia. Available at: <https://www.minambiente.gov.co/sector-ambiente-lanza-mapa-de-zonificacion-de-la-degradacion-de-los-suelos-por-desertificacion-en-colombia/>

conservation (Vergara, 2015)⁷⁶. The primary drivers of this degradation include improper land use practices, such as the establishment of pastures on fragile or unsuitable lands, overgrazing, uncontrolled burning, and nutrient depletion. In regions⁷⁷ like the Orinoquia, these practices have resulted in the fragmentation of natural habitats, loss of biodiversity, and diminished ecosystem services (Holmann, 2004⁷⁸; Rodríguez et al., 2021⁷⁹).

Rippstein et al (2001)⁸⁰ quoted by Abril (2011)⁸¹ mention that the soils of the Orinoco region are low fertility, acids and with toxic levels of aluminum and iron. In addition, they are very prone to erosion and structural degradation. Coverages and predominant land use in the region are represented in pastures.

The pasture degradation is linked to pasture establishment on fragile lands (as slopes); pasture planting poorly adapted; overgrazing during the rainy season; frequent uncontrolled burning of pastures; and nutrient depletion (Spain & Gualdrón, 1991⁸² cited by Holmann, 2004)⁸³. In addition, loss of productive capacity and consequent degradation of grasslands is associated with reduced soil cover, weed invasion, low

⁷⁶ Vergara Paternina, J. A. (2015). Caracterización de la degradación y los cambios de usos de suelo en fincas ganaderas y su relación con la diversidad de aves en el Valle del Río Cesar, Colombia.

⁷⁷ Within the additional assessment, "region" refers to the entire Department of Vichada, and, where indicated, the broader Orinoquia biome. This expanded definition provides a comprehensive reference frame for evaluating prevailing forestry and agricultural practices under similar socio-economic and ecological conditions.

⁷⁸ Holmann, F. (2004). Impact of livestock on soil quality and pastures in Caquetá. *Revista de Ciencias Agrarias*, 12(3), 45-58. Available at: https://www.uniamazonia.edu.co/arainmba/wp-content/uploads/2022/02/03.-Impacto_ganaderia_1_baja2.pdf

⁷⁹ Rodríguez, J., et al. (2021). Soil macrofauna biodiversity in livestock systems in the Colombian Amazon. *Revista de Ecología y Biodiversidad*, 15(2), 134-149. Available at: <https://revistasojis.ucaldas.edu.co/index.php/lunazul/article/view/3107>

⁸⁰ Rippstein, G. (2001). Agroecología y biodiversidad de las sabanas en los Llanos Orientales de Colombia (No. 322). Centro Internacional de Agricultura Tropical (Ciat), Cali –Colombia. 2001. Available at: https://repositorio.unal.edu.co/bitstream/handle/unal/9670/AGROECOLOG%C3%8DA_Y_BIODIVERSIDAD_DE_LAS_SABANAS_EN_LOS_LLANOS_ORIENTALES_DE_COLOMBIA.pdf?sequence=1

⁸¹ Abril, Y. R. (2011). Sistemas agroforestales como alternativa de manejo sostenible en la actividad ganadera de la Orinoquia Colombiana. *Revista Sistemas de Producción Agroecológicos*, 2(1), 103-127. Available at <https://revistas.unillanos.edu.co/index.php/sistemasagroecologicos/article/view/571>

⁸² Spain, J. M., & Gualdrón, R. (1991). Degradación y rehabilitación de pasturas. *Establecimiento y renovación de pasturas: conceptos, experiencias y enfoque de investigación*. Cali: CIAT, 269-283. Available at: http://ciat-library.cgiar.org/Forrajes_Tropicales/pdf/4th/Establecimiento_y_renovacion_de_pasturas.pdf

⁸³ Holmann, F.; Argel, P.; Rivas, L.; White, D.; Estrada, R.; Burgos, C.; Pérez, E.; Ramírez, G.; Medina, A. 2004. ¿Vale la pena recuperar pasturas degradadas? Una evaluación de los beneficios y costos desde la perspectiva de los productores y extensionistas pecuarios en Honduras. International Livestock Research Institute. Community Fund for Commodities. International Center for Tropical Agriculture. Available at: <https://cqspspace.cgiar.org/server/api/core/bitstreams/45733a0c-9140-47f8-b87f-aa294bb3bd3d/content>

nutritional forage quality, low load capacity, slow recovery after grazing and higher production costs⁸⁴.

Furthermore, livestock production, a major economic activity in Colombia, has been identified as a significant contributor to soil degradation and carbon emissions. Studies indicate that low-quality pastures in the Orinoquia region have caused soils to become net carbon emitters for over three decades, releasing approximately 700 kg of carbon per hectare annually, thereby exacerbating climate change impacts (Universidad Nacional de Colombia (UNAL), 2023)⁸⁵.

Given these challenges, it is imperative to implement sustainable land management practices that conserve soil health, enhance biodiversity, and reduce greenhouse gas emissions to ensure the long-term productivity and environmental stability of Colombia's rural landscapes.

For instance, in Puerto Carreño, the traditional practice of biannual pasture burning to stimulate grass regrowth has contributed to soil mineral loss, reduced porosity, increased flood risk during rainy seasons, and damage to gallery forests. This agricultural practice is not executed under any measure or control, and in addition, natural fires occur on the plains with some regularity. Despite the few cattle existing in the area, burning practices do not allow the recovery of pastures and are the fundamental basis of production. In summer months, the native grasses get very hard and dry, and the cattle cannot digest it easily. Therefore, the traditional practice is to burn the pastures twice a year to obtain grass re-sprouts to promote feeding by the cattle. These cyclical fires cause soil degradation since the soil loses minerals and porosity; this produces larger flood prone areas during winter months and decreases the capacity of native flora to recuperate naturally. Furthermore, flames generated during burning practices can occasionally affect gallery forests and decrease their density and land cover. Over-grazing, anthropogenic burning, and the heavy rains

⁸⁴ Rincón Castillo, A. Producción y utilización de recursos forrajeros en sistemas de producción bovina de la Orinoquia y del Piedemonte Caqueteño: manual técnico. Corporación Colombiana de Investigación Agropecuaria (CORPOICA).p. 21-32. Available at:

https://repository.agrosavia.co/bitstream/handle/20.500.12324/13438/Ver_Documento_13438.pdf?sequence=1&isAllowed=y

⁸⁵ Universidad Nacional de Colombia (2023). Low-quality pastures increase carbon emissions in the Orinoquia. Universidad Nacional de Colombia. Available at: <https://agenciadenoticias.unal.edu.co/detalle/pastos-de-baja-calidad-aumentan-emisiones-de-carbono-en-la-orinoquia>

degraded the soils. Additionally, natural fires occur in periods of intense summer or generated by dragging burning ashes of nearby places.

Livestock farming

Livestock farming is a widespread practice in the Colombian Orinoquía, including the Vichada Department, and is considered a socioeconomic activity of great importance for local development. According to the Diagnosis of the Vichada Department (UNAL, 2018)⁸⁶, animal husbandry and livestock activities (primarily cattle farming) are of major socioeconomic importance in the department, with 88.5% coming from livestock (mainly cattle and, to a lesser extent, buffalo production), followed by pig production at 4%, and equine production at 3.7%. In the Vichada Department livestock accounts for 33.2% of land use; followed by forests with 31.5%, and pastures and forages with 25.1%. In Puerto Carreño, a higher percentage of land is used for livestock purposes (42.1%), followed by pastures and forages (32.7%) see

Figure 24.

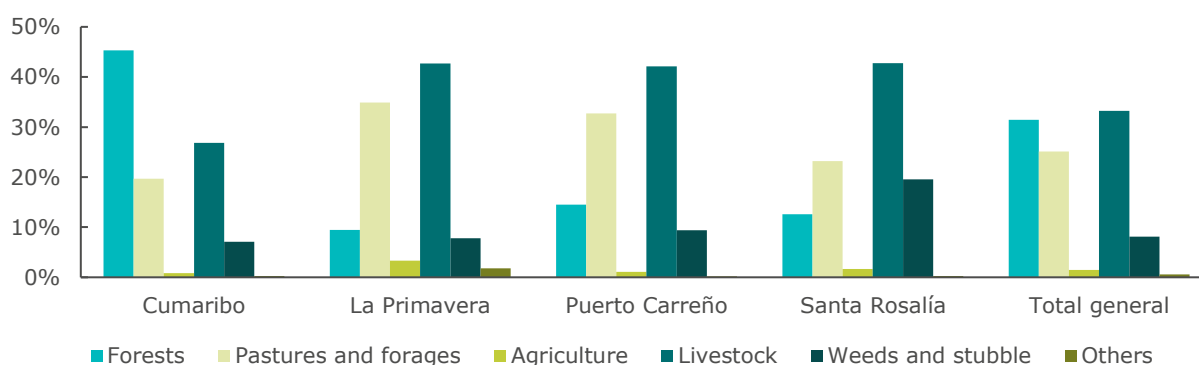


Figure 24 – Land use in Vichada’s municipalities (2019)

Source: Prepared by South Pole (2024), based on Encuesta Nacional Agropecuaria (DANE, 2016⁸⁷, 2019⁸⁸) and Diagnóstico Departamento del Vichada (Universidad Nacional de Colombia, 2018).

⁸⁶ Universidad Nacional de Colombia (2018). Diagnóstico Departamento de Vichada. Available at: http://orinoquia.unal.edu.co/fileadmin/user_upload/Diagnostico_Departamento_Vichada.pdf

⁸⁷ National Administrative Department of Statistics (DANE for its acronym in Spanish), (2016). Encuesta Nacional Agropecuaria (ENA). Available at: <https://www.dane.gov.co/index.php/comunicados-y-boletines/agropecuario/encuesta-nacional-agropecuaria# cosechas-de-algodon> and <https://microdatos.dane.gov.co/index.php/catalog/671/get-microdata>

⁸⁸ National Administrative Department of Statistics (DANE for its acronym in Spanish), (2016). Encuesta Nacional Agropecuaria (ENA). Available at: <https://www.dane.gov.co/index.php/estadisticas-por-tema/agropecuario/encuesta-nacional-agropecuaria-ena#presentaciones-por-departamento> and Geovisor: <https://geoportal.dane.gov.co/geovisores/territorio/resultados-ena/>

Between 2014 and 2022, the expansion of livestock farming in Vichada has been marked by both a steady increase in cattle numbers and a significant transformation of land cover. The cattle inventory in the department nearly doubled between 2004 and 2017, with the municipalities of Puerto Carreño and La Primavera together holding over 66% of total cattle in the Vichada Department (Table 17). The tendency in Puerto Carreño has been to increase the number of cattle and expand to new lands that were not previously devoted to these activities. Between 2014 and 2022 the cattle inventory of the Department increased by 96% (Bernal, 2010,⁸⁹ Vitar-Mendoza, et al 2021⁹⁰, Federación Colombiana de Ganaderos (FEDEGAN) 2022⁹¹, Ramírez, A., Correa, J., 2023)⁹², almost doubling the population. This expansion has been accompanied by an annual increase in land requirements for livestock, estimated at 5.46% per year, reflecting a persistent trend of converting natural ecosystems into grazing areas. As illustrated in Figure 25, approximately 42.4% of the land in Vichada has an aptitude for livestock production.

Table 30 – Livestock census, lands, and cattle population in the Vichada Department, 2023

Municipality	Number of farms	Cattle	Share of total livestock (%)
Cumaribo	739	60,891	23.9%
La Primavera	644	134,631	52.9%
Puerto Carreño	202	18,663	7.3%
Santa Rosalía	169	40,456	15.9%
Total	1,754	254,641	100.0%

Source: Prepared by South Pole (2024), based on the National Bovine Census by Department by Instituto Colombiano Agropecuario (ICA), (2023)⁹³.

⁸⁹ Bernal Adan, J. S. (2010). Evaluación Contextual de la Ganadería Bovina en el Departamento del Vichada (Doctoral dissertation). Available at: <http://bibliotecadigital.agronet.gov.co/bitstream/11348/3942/1/041.pdf>

⁹⁰ Vitar-Mendoza, J., Sandoval Parra, K. X., & Ortiz Moreno, M. L. (2021). Land-cover change in the department of Vichada, Colombia, from 1985 to 2017. Revista De Investigación Agraria Y Ambiental, 13(1), 149-174. Available at: <https://hemeroteca.unad.edu.co/index.php/riaa/article/view/4630>

⁹¹ See at Inventario bovino por edad y sexo Available at: <https://www.fedegan.org.co/inventario-bovino-por-edad-y-sexo>

⁹² Ramírez, A., Correa, J., (2023). Priorización de alternativas productivas agropecuarias y diagnóstico de mercados para el departamento de Vichada. Bogotá: Unidad de Planificación Rural Agropecuaria (UPRA). Available at: https://upra.gov.co/Kit_Territorial/2-%20Informaci%C3%B3n%20por%20Departamentos/VICHADA/Priorizaci%C3%B3n%20de%20Alternativas%20Productivas%20Agropecuarias%20y%20Diagn%C3%B3stico%20de%20Mercados%20para%20el%20Departamento%20de%20Vichada%202023.pdf

⁹³ National Bovine Census by Department. Instituto Colombiano Agropecuario (ICA), (2023). Available at: <https://www.ica.gov.co/areas/pecuaria/servicios/epidemiologia-veterinaria/censos-2016/censo->

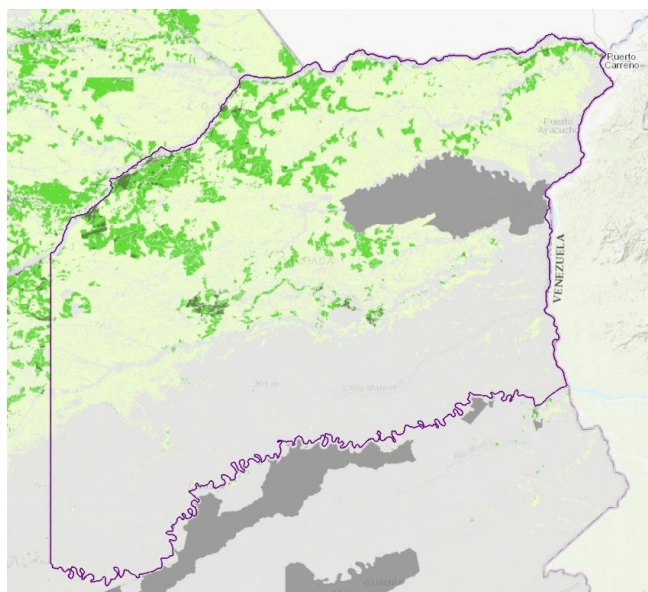


Figure 25 – Livestock aptitude areas in the Vichada Department.

Dark Green: High aptitude, Medium-Light Green: Medium aptitude, Light Green: Low aptitude, Light Gray: Unfit, Dark Gray (or Other Contrasting Color): Legal Exclusion.

Source: Prepared by South Pole (2024), based on Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024⁹⁴)

Over the past three decades, Vichada has experienced a dramatic shift from forest and natural savanna to cropland and pasture, resulting in the loss of approximately 60% of its forest cover between 1985 and 2017 (Vitar-Mendoza, et al 2021)⁹⁵. In Puerto Carreño and the Bitá River basin, this transition has been driven by both government policies and agribusiness investments, which have promoted the establishment of extensive livestock production systems and the introduction of improved, non-native grasses such as *Brachiaria* (Arias, 2004; Andrade-Pérez et al., 2013)⁹⁶. Approximately 1.4 million hectares of the high plain are now covered with these invasive grasses, a

[2018#:~:text=La%20poblaci%C3%B3n%20bovina%20en%20el%20pa%C3%ADs%20est%C3%A1%20distribuida%20en%20633.841,7%25%2C%20respecto%20a%202021.](#)

⁹⁴ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

⁹⁵ Vitar-Mendoza, J., Sandoval Parra, K. X., & Ortiz Moreno, M. L. (2021). Land-cover change in the department of Vichada, Colombia, from 1985 to 2017. *Revista De Investigación Agraria Y Ambiental*, 13(1), 149-174. Available at: <https://hemeroteca.unad.edu.co/index.php/riaa/article/view/4630>

⁹⁶ Arias, J. (2004). El uso de gramíneas africanas en la Orinoquía colombiana. En A. Andrade-Pérez, R. Caraballo, & J. Kattan (Eds.), *Estrategias para la conservación y el uso sostenible de la biodiversidad en la Orinoquía colombiana* (pp. 203–220). Instituto de Investigación de Recursos Biológicos Alexander Von Humboldt.

figure that has continued to rise in recent years, increased by 170,000 hectares from 1992 to 1999, between Meta and Vichada. The practices to transform land use into livestock farming in Vichada requires, burning prairies to produce organic matter and, fertile soil for the germination of African grasses.

In consequence, there are several conditions that make livestock farming a credible alternative land use scenario in Puerto Carreño and the wider Vichada Department, prior to the establishment of the AR Brújula Verde project:

First, extensive livestock farming in the Vichada Department is currently characterized by a lack of modernization; there are high costs associated with the introduction of technological improvements (e.g., intensive pasture management, rotational grazing systems). As a result, ranchers compensate by expanding their holdings rather than improving yields per hectare, driving a steady increase in cattle inventories (see Figure 26) and perpetuating grassland degradation.

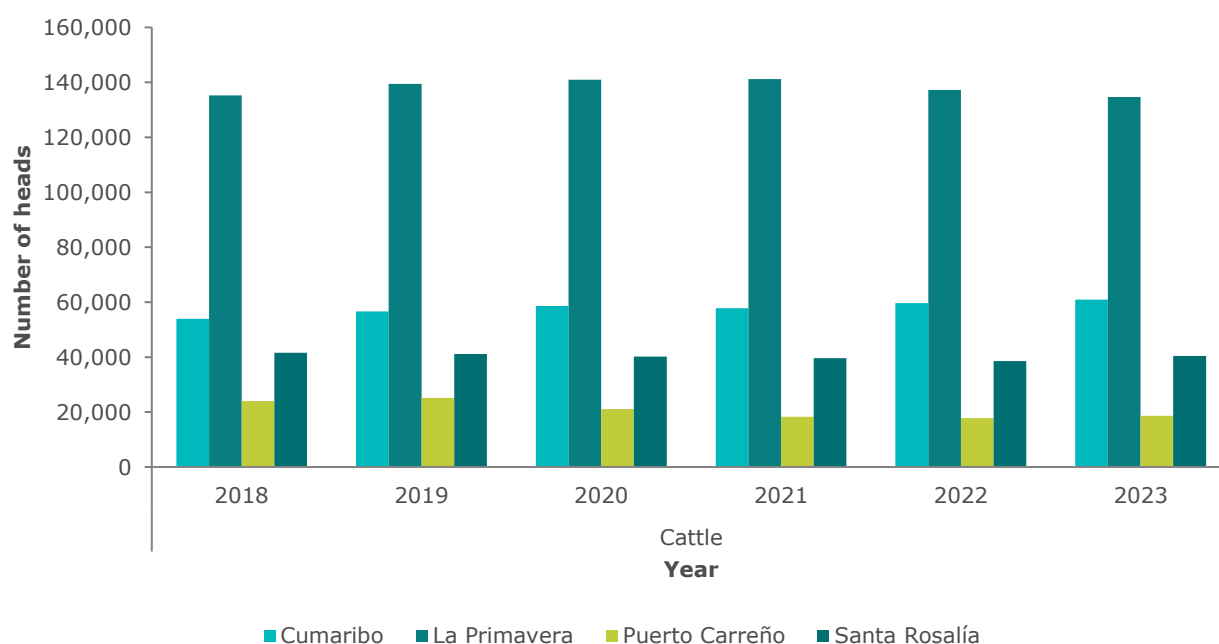


Figure 26 – Inventory of cattle in Vichada. 2018-2023.

Source: Prepared by South Pole (2024), based on the National Bovine Census by Department by Instituto Colombiano Agropecuario (ICA).⁹⁷

⁹⁷ National Bovine Census by Department. Instituto Colombiano Agropecuario (ICA), (2023). Available at: <https://www.ica.gov.co/areas/pecuaria/servicios/epidemiologia-veterinaria/censos-2016/censo-2018#:~:text=La%20poblaci%C3%B3n%20bovina%20en%20el%20pa%C3%ADs%20est%C3%A1%20distribuida%20en%20633.841,7%25%2C%20respecto%20a%202021.>

Second, in Puerto Carreño, annual pasture burning is a traditional management practice intended to stimulate the quality and promote the renewal of grass shoots and improve forage quality for cattle and buffalo. However, these fires are carried out without standardized controls or mitigation measures, leading to chronic soil degradation. Repeated burning depletes essential soil minerals and reduces porosity, which in turn exacerbates surface runoff and flood risk during the wet season and diminishes the natural resilience of native vegetation. Uncontrolled fire escapes can also encroach on gallery forests, often interspersed within extensive grasslands, reducing canopy density and fragmenting these critical riparian habitats (Enciso et al, 2021)⁹⁸.

Although high-fertility soils are ideally suited for livestock production, extensive ranching in Vichada often proceeds on less productive substrates because of the significant logistical advantages offered by the Meta River transport corridor. This waterway enables the movement of large volumes of animals, dairy, and meat products at lower cost and in shorter time frames than overland routes, reinforcing extensive grazing as the region's predominant land use (Hanbury, 2022)⁹⁹. Yet, this expansion of pasture areas, driven by economic incentives and transport efficiencies, has precipitated widespread deforestation, biodiversity loss, and elevated greenhouse gas emissions, both through biomass combustion during burning events and increased enteric methane from larger herds.

The prevalence and expansion of livestock farming in Puerto Carreño and Vichada provide a plausible baseline scenario for land use prior to the implementation of AR Brújula Verde or similar sustainable land management projects. The current landscape is shaped by extensive grazing systems, regular pasture burning, and ongoing conversion of natural ecosystems, underscoring the urgent need for interventions that promote sustainable practices and ecological restoration.

⁹⁸ Enciso, K., Charry, A., Castillo, Á. R., & Burkart, S. (2021). Ex-ante evaluation of economic impacts of adopting improved forages in the Colombian Orinoquía. *Frontiers in Environmental Science*, 9, 673481. Available at: <https://www.frontiersin.org/journals/environmental-science/articles/10.3389/fenvs.2021.673481/full>

⁹⁹ Hanbury, S. (2022). To cut emissions from cattle ranching, beef up the soil, study says. In Mongabay. Available at: <https://news.mongabay.com/2022/12/to-cut-emissions-from-cattle-ranching-beef-up-the-soil-study-says/>

Livestock farming represents the baseline scenario 1 of the project activity, which corresponds to grasslands degraded by regular burning to facilitate extensive cattle and buffalo rearing.

Agriculture

Agriculture in the department of Vichada and the municipality of Puerto Carreño has experienced sustained growth and significant diversification over the past decade, establishing itself as a viable alternative land use in the absence of restoration or conservation projects.

For many years, Vichada Department's lands were classified as unsuitable for agriculture because of their high acidity level. Nevertheless, the Altillanura subregion of Orinoquía, of which Vichada forms part, encompasses approximately 13.5 million hectares, 57% of which is deemed agriculturally suitable; within Vichada alone some 4,731,993 ha (47.3 % of Vichada's territory see Figure 28) exhibit high agricultural aptitude (Vitar-Mendoza, et al 2021),^{100 101 102} this means nearly 10% (995,830 ha) of Vichada's territory is under crop cultivation¹⁰³, of which 22,933 ha were under active cultivation in 2022, and according to a recent zoning of Vichada's lands conducted by UPRA (2023), 17.5% of the department's land is suitable for farming vocation (Figure 27), and, within the land identified as viable for cultivation, 46.9% (20,141,451 ha) is categorized as unconditionally suitable, while the remaining 53.1% (22,803,490 ha) is conditionally suitable, meaning cultivation is possible but subject to specific environmental or management constraints. These figures highlight the significant potential for agricultural and agroforestry expansion in the region, provided that appropriate sustainability safeguards are in place (Figure 28).

Two structural conditions related to agriculture are present in the Vichada Department. On the one hand, there is a significant amount of land that has potential for large-scale soybean, corn, and rice production, which has attracted many investors.

¹⁰⁰ Vitar-Mendoza, J., Sandoval Parra, K. X., & Ortiz Moreno, M. L. (2021). Land-cover change in the department of Vichada, Colombia, from 1985 to 2017. *Revista De Investigación Agraria Y Ambiental*, 13(1), 149-174. Available at: <https://hemeroteca.unad.edu.co/index.php/riaa/article/view/4630>

¹⁰¹ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

¹⁰² Unidad de Planificación Rural Agropecuaria (UPRA). (2023). Microanalysis of Agricultural Evaluations 2023 – Vichada. Available at: https://upra.gov.co/Kit_Territorial/2-%20Informaci%C3%B3n%20por%20Departamentos/VICHADA/3-%20Microan%C3%A1lisis%20Evaluaciones%20agropecuarias%202023-Vichada.pdf

¹⁰³ See the Orinoquía Crop Monitoring System by UPRA Available at: <https://upra.gov.co/es-co/Paginas/monitoreo-cultivos.aspx> and <https://storymaps.arcgis.com/stories/7e0867652af240fcb1db89924b0e87ce>

This cropped area for agricultural production in Vichada in 2022 is dominated by oil palm (38.9 %), cashew (37.2 %), and banana (10.9 %), with smaller contributions from cacao, yuca, rice, and maize¹⁰⁴, while grasslands and pastures cover around 39% (CORPORINOQUÍA, 2013)¹⁰⁵. In total, Vichada has 100,086¹⁰⁶ hectares devoted to agriculture (Figure 27), and the agricultural production reached 141,291 tons (t) in 2023¹⁰⁷ (UPRA, 2023)¹⁰⁸.

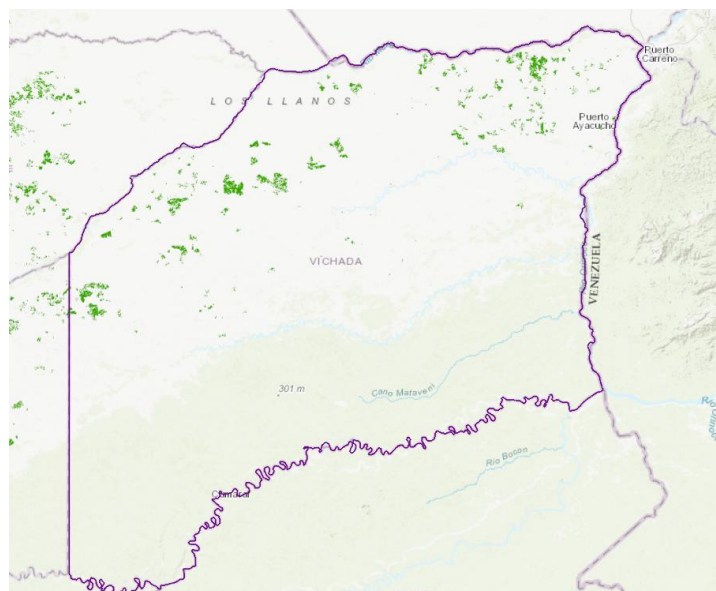


Figure 27 – Agriculture areas in Vichada Department.

Source: Prepared by South Pole (2024), based on Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024¹⁰⁹).

¹⁰⁴ See data according to the 2019-2022 Agricultural Base by municipality (Municipal Agricultural Evaluations - EVA for its acronym in Spanish), according to the data reported by EVA -UPRA, based on information from: Municipalities, SICA of the National Federation of Coffee Growers, ENAM -DANE and Fedearroz; and local producer associations. Available for 2022 at: https://upra.gov.co/es-co/Paginas/eva_2022.aspx, and for the rest of the years at: <https://upra.gov.co/es-co/Paginas/eva.aspx>

¹⁰⁵ Corporación Autónoma Regional de la Orinoquia (CORPORINOQUÍA). (2013). Plan de Gestión Regional Ambiental 2013-2025. Available at: <https://corporinoquia.gov.co/es/la-corporacion/planeacion-estrategica/pgar.html>

¹⁰⁶ See the Orinoquia Crop Monitoring System by UPRA Available at: <https://upra.gov.co/es-co/Paginas/monitoreo-cultivos.aspx> and <https://storymaps.arcgis.com/stories/7e0867652af240fcb1db89924b0e87ce>

¹⁰⁷ Municipal Agricultural Evaluations (2023) (EVA for its acronym in Spanish), according to the data reported by EVA -UPRA, based on information from: Municipalities, SICA of the National Federation of Coffee Growers, ENAM -DANE and Fedearroz; and local producer associations. Available at: <https://upra.gov.co/es-co/Paginas/eva.aspx>

¹⁰⁸ Unidad de Planificación Rural Agropecuaria (UPRA). (2023). Microanalysis of Agricultural Evaluations 2023 – Vichada. Available at: https://upra.gov.co/Kit_Territorial/2-%20Informaci%C3%B3n%20por%20Departamentos/VICHADA/3-%20Microan%C3%A1lisis%20Evaluaciones%20agropecuarias%202023-Vichada.pdf

¹⁰⁹ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

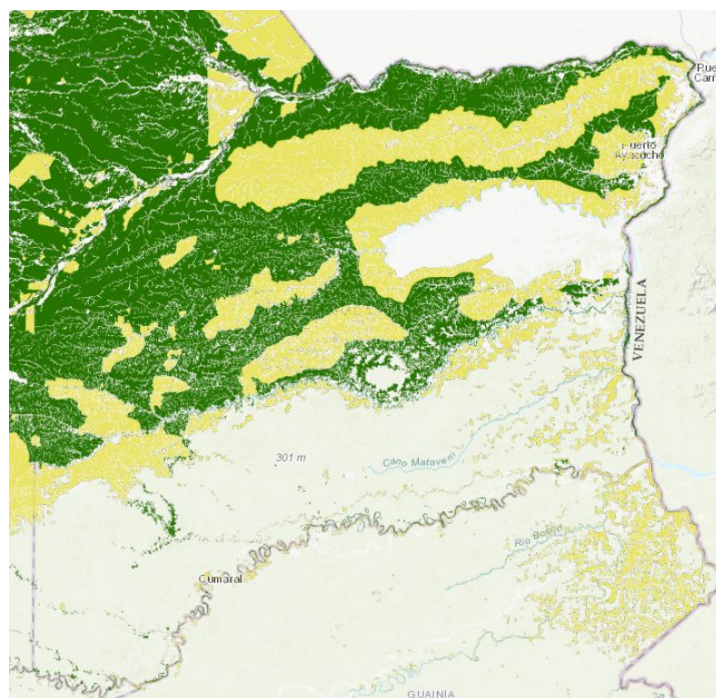


Figure 28 – Agricultural frontier areas in Vichada Department.

Dark Green: Not conditioned, Medium-Light Green: Conditioned.

Source: Prepared by South Pole (2024), based on Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024¹¹⁰)

On the other hand, small-scale agriculture is incipient and is currently only suitable for subsistence due to poor soil conditions, labor limitation, and high production and transport costs (Gobernación de Vichada, 2023). Nevertheless, in municipalities such as Puerto Carreño, cashew cultivation has expanded in recent years thanks to its adaptability to agroclimatic conditions. While the cashew crop is marketed effectively, the agro-industrial chain is incomplete, as it leaves out unprocessed pseudo-fruits, oils, and other potentially valuable elements often left unused.

The structure of agricultural production in Puerto Carreño is different from that of the rest of the Department, as cashew is the main planted crop (89.9%), followed by cotton (4.0%), traditional corn (1.7%), watermelon (1.3%), and other crops (3.2%).¹¹¹ Between 2020 and 2023, total annual agricultural output in the municipality of Puerto

¹¹⁰ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

¹¹¹ Municipal Agricultural Evaluations (2023) (EVA for its acronym in Spanish), according to the data reported by EVA - UPRA, based on information from: Municipalities, SICA of the National Federation of Coffee Growers, ENAM -DANE and Fedearroz; and local producer associations. Available at: <https://upra.gov.co/es-co/Paginas/eva.aspx>

Carreño, averaged 168,403.6 t, of which cashew alone contributed 154,715.8 t (91.8 %), followed by sugarcane at 11,027.0 t (6.5 %), cassava at 1,421.0 t (0.8 %) and corn at 1,239.8 t (0.7 %) (See Figure 29). While the marketing channels for cashew are relatively well developed, the agro-industrial value chain remains incomplete, the incomplete processing chain limits the economic potential of this crop, which could otherwise support a more diversified and value-added rural economy, with kernels, oils and other co-products not yet fully processed for higher-value markets.

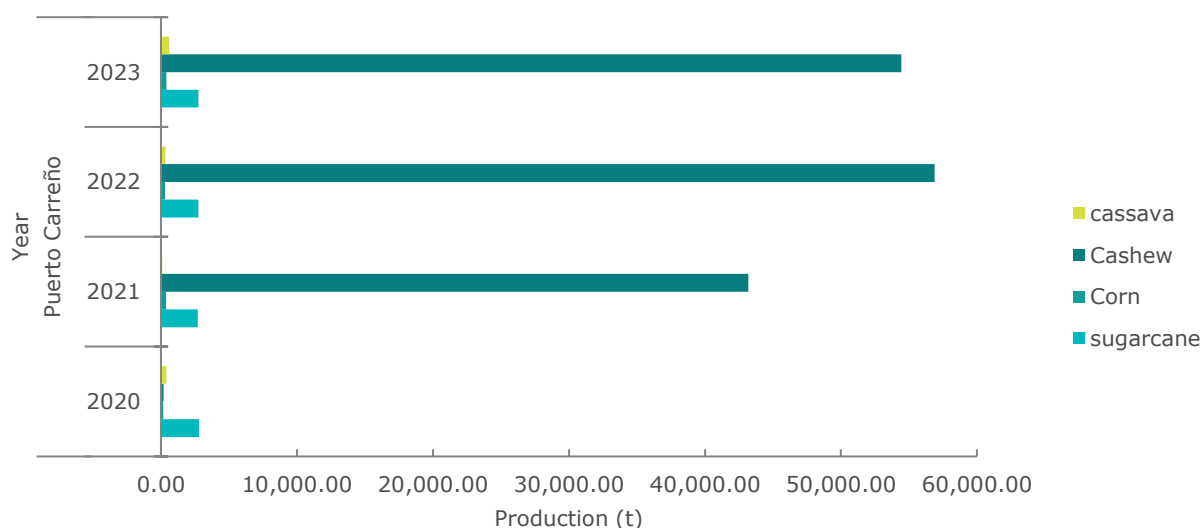


Figure 29 – Production in tons of the main crops in Puerto Carreño, 2023.

Source: Prepared by South Pole, (2024) based on Municipal Agricultural Evaluations, 2023¹¹²

Beyond Puerto Carreño, agriculture is expanding more broadly throughout the Department of Vichada, including into areas that were once forested. This trend reflects the perception of agriculture as a credible and attractive alternative land use, particularly in areas where soils have not been degraded by livestock. In fact, agricultural expansion has been observed primarily in areas with forest or savanna cover, given that these soils are often more easily cultivated than those exhausted by prolonged cattle grazing. Oil palm cultivation, for example, has gained ground in some parts of the Department (Forumo and Mitchell, 2017).¹¹³

¹¹² See data according to the 2019-2023 Agricultural Base by municipality (Municipal Agricultural Evaluations - EVA for its acronym in Spanish), according to the data reported by EVA -UPRA, based on information from: Municipalities, SICA of the National Federation of Coffee Growers, ENAM -DANE and Fedearroz; and local producer associations. Available for 2022 at: <https://upra.gov.co/es-co/Paginas/eva.aspx>

¹¹³ Furumo, P. R., & Mitchell, T. (2017). Caracterización de la expansión de la palma de aceite para uso comercial en América Latina: cambio en el uso del suelo y comercialización (Carlos Arenas, trad.). Palmas, 38(2), 27-48. Available

From an economic perspective, the agriculture, livestock, and fishing sector accounted for 40.0% of Vichada's GDP in 2022¹¹⁴, underscoring the importance of rural production systems and the centrality of crop production to local livelihoods. At the same time, food security assessments reveal that traditional farming practices, often involving monocultures and slash-and-burn techniques, remain widespread despite infrastructural challenges. These methods continue to contribute to savanna conversion, forest loss, and ecosystem degradation.

In this context, the Baseline Scenario 1 of land use in the absence of the project activity corresponds to the degraded pasture lands, mostly by agricultural practices and intensive cultivation practices on marginal soils (primarily monoculture cropping and periodic slash-and-burn clearances), accompanied by extensive pasture conversion by extensive cattle ranching and regular anthropogenic burning of grasses.

Taken together, these data demonstrate that, prior to the establishment of Brújula Verde project, unsustainable agricultural expansion, alongside livestock, constituted the prevailing land-use baseline dynamic, driving deforestation, biodiversity loss, and GHG emissions in Puerto Carreño and across Vichada. This entrenched pattern of land conversion, characterized by cyclical burning, extensive grazing systems, and the transformation of natural ecosystems into degraded grasslands, constitutes the baseline scenario for the AR Brújula Verde project. Under this scenario, unmanaged pasture burning to facilitate cattle and buffalo rearing maintains grasslands in a degraded state, thereby underscoring the urgent need for afforestation/reforestation interventions to restore ecosystem function, enhance soil health, and sequester carbon.

Alternative Scenario 2: Forestation of the land within the project boundary performed without being registered as the A/R CDM project activity

Commercial forest plantations without certification

at: <https://fedepalma.org/wp-content/uploads/2018/02/Caracterizacion-de-la-expansion-de-la-palma-de-aceite-para-uso-comercial-en-America-Latina-cambio-en-el-uso-del-suelo-y-comercializacion.pdf>

¹¹⁴ National Administrative Department of Statistics (DANE for its acronym in Spanish). Departmental National Accounts - Results by department (2022). Available at: <https://www.dane.gov.co/index.php/estadisticas-por-tema/cuentas-nacionales/cuentas-nacionales-departamentales> And, Unidad de Planificación Rural Agropecuaria (UPRA). (2023). Vichada. Regional Document. Available at: https://upra.gov.co/Kit_Territorial/2-%20Informaci%C3%B3n%20por%20Departamentos/VICHADA/2-%20Documento%20Regional%20UPRA%20Vichada.pdf

Colombia has a huge potential to develop commercial reforestation programs (around 17 million of hectares suitable for forestry plantations establishment distributed in different regions of the country¹¹⁵). This country benefits from excellent climatic, geographic and topographic conditions for tree growth, and has the potential for forest plantations and also possesses the necessary geostrategic conditions to potentiate foreign trade, especially with the increase of treaties for free trade signed during the last 10 years¹¹⁶.

The government has actively promoted commercial forestry in the Orinoco region since the early 1990s. The National Geographic Institute Augustin Codazzi has classified the area as appropriate for forestry activities, both for conservation/protection and for production. Building on that, the National Institute for Forestry Research (CONIF) published the "Guide for Commercial Forest Plantations in the Orinoco Region" which mapped the areas with aptitude for commercial plantations in the region, across Casanare, Meta and Vichada. Using the information on soil types, climate, and land-use data from the Regional Environmental Authority Corporación Autónoma Regional de La Orinoquia (CORPORINOQUIA), the study identified a total of 5,954,962 ha as suitable for reforestation in those three departments (Casanare, Meta and Vichada)¹¹⁷.

For over 30 years, silvicultural trials have been carried out on the high plains of Orinoquia¹¹⁸, but until now only a handful of mainly non-native species have been promoted in the country, such as *Eucalyptus pellita*, *E. tereticornis*, *Pinus caribea*, *Pinus oocarpa*, and *Anacardium occidentale*. Research partnerships among Corporinoquia, Universidad de los Andes, The National Corporation for Forestry Research and Development of Colombia (CONIF), the Colombian Corporation for Agricultural Research (CORPOICA (now AGROSAVIA)), the International Center for Tropical Agriculture (CIAT), and the Gaviotas Research Center have carried out research on the silviculture of this species¹¹⁹.

¹¹⁵ Ministerio de Comercio, Industria y Turismo (MICT). 2009. Invierta en Colombia. Trabajo, compromiso, ingenio.

¹¹⁶ Departamento Nacional de Planeación, 2015. COLOMBIA: Potencial de Reforestación Comercial.

¹¹⁷ Corporación Nacional de Investigación y Fomento Forestal (CONIF). 1998. Guía para plantaciones forestales comerciales Orinoquia. Available at [http://www.itto.int/files/user/pdf/publications/PD39%2095/pd%2039-95-9%20rev%201%20\(F\)%20s.pdf](http://www.itto.int/files/user/pdf/publications/PD39%2095/pd%2039-95-9%20rev%201%20(F)%20s.pdf)

¹¹⁸ MADR, IICA. 2005. La cadena forestal y madera en Colombia una mirada global de su estructura y dinámica 1991-2005.

¹¹⁹ Andrade et al. 2009. La mejor Orinoquia que podemos construir.

Several areas of the Vichada Department have favorable conditions to develop forestry on a large scale. Its climate, rich hydrography, location in the tropics, and almost three million hectares suitable for forestry, provide a rich habitat to develop this activity without affecting natural ecosystems, including, gallery forests and wetlands.¹²⁰ According to data provided by UPRA (2022), the Vichada Department has 422 ha with a high potential for the implementation of commercial forest plantations, 120,020 ha with medium potential, and 2,857,485 ha with low potential (see Figure 30). All these areas account for 29.8% of the Department’s territory.

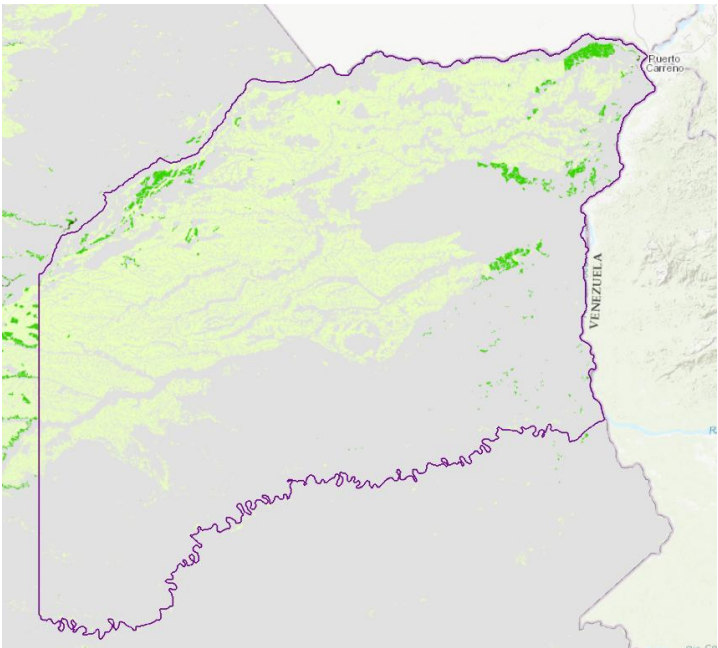


Figure 30 – Suitability for forest plantations, aptitude areas in Vichada Department.

Dark Green: High aptitude, Medium-Light Green:Medium aptitude, Light Green: Low aptitude, Light Gray: Unfit.
 Source: Prepared by South Pole (2024), based on Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024¹²¹⁾

The municipality of Puerto Carreño has the areas with the highest suitability to implement commercial forest plantations (422 ha), whereas, there are 59,721 hectares with medium suitability and 445,150 with low suitability (as shown in Table 31).

¹²⁰ "Vichada visible" Departmental Development Plan 2024-2027. Available at: https://vichada.micolombiadigital.gov.co/sites/vichada/content/files/000825/41215_plan-de-desarrollo-vichada-visible-2024--2027.pdf

¹²¹ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

However, not all the areas suitable for forestry are being used for such activities, because the other alternative land-use scenarios exert steady pressure that leads to other activities or prevents the development of plantations, a topic that is discussed in depth in the following section.

Table 31 – Suitability of Vichada Department territory to implement commercial forest plantations

Suitability	Vichada (ha)	Vichada (%)	Puerto Carreño (ha)	Puerto Carreño (%)
High	422	0.0%	422	0.0%
Medium	120,020	1.2%	59,721	4.95
Low	2,857,485	28.5%	445,150	36.5%
Technically unsuitable	7,030,830	70.2%	715,272	58.6%
Total	10,008,757	100.0%	1,220,565	

Source: Prepared by South Pole (2024), based on Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024¹²²).

The Brújula Verde project is developed in the municipality of Puerto Carreño, Vichada, a region that has increasingly oriented its productive vocation towards reforestation and sustainable forestry over the past decade, commercial forest plantations have become a key land use in Puerto Carreño, especially as an alternative to extensive cattle ranching that has historically contributed to land degradation in the area. The Ordinance N° 08 for the Development Plan of Vichada 2024-2027¹²³, identifies that, over the past years, reforestation has been one the productive vocation in the territory, and Municipal Development Plan of Puerto Carreño 2020-2023 (Alcaldía de Puerto Carreño, 2020) highlighted reforestation as a key productive vocation for the municipality.

According to this information and the historical planting data, Puerto Carreño expanded from 3,247¹²⁴ ha planted in 2014 to 28,863.19¹²⁵ ha in 2022, driven largely by

¹²² Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

¹²³ "Vichada visible" Departmental Development Plan 2024-2027. Available at: https://vichada.micolombiadigital.gov.co/sites/vichada/content/files/000825/41215_plan-de-desarrollo-vichada-visible-2024--2027.pdf

¹²⁴ Municipio de Puerto Carreño, 2012. Plan de Desarrollo Puerto Carreño 2012-2015. Available at: <https://repositoriocdim.esap.edu.co/bitstream/handle/20.500.14471/18978/22847-1.pdf?sequence=1&isAllowed=y>

¹²⁵ See the Orinoquía Crop Monitoring System by UPRA Available at: <https://upra.gov.co/es-co/Paginas/monitoreo-cultivos.aspx> and for Forestal plantations: <https://upra.maps.arcgis.com/apps/dashboards/5eac7ffe59f247f2bdb48ebd0a6868a9> Biocarbono IDE Orinoquia: <https://storymaps.arcgis.com/stories/b2fdf0801e8d44188fe84696b4f39875>. Note: The Agroforestry Trade Association

introduced commercial species such as *Acacia*, *Eucalyptus*, and *Pinus*. in 2022, Puerto Carreño registered 28,863.19 ha of cultivated forest plantations, equivalent to 2.4% of the total of the municipality, compared to 28,578.46 ha reported in 2020; that is, there was a growth of 1.0% over two years.¹²⁶

On the other hand, according al Ministerio de Agricultura, forest plantations composed by only foreign species, are being supported by national regulations that attempt to finance forestry projects through the forestry incentive certificate (Certificado de Incentivo Forestal, CIF by its acronym in Spanish). In 2014, the municipality of Puerto Carreño registered 49 CIF, covering an area of 9,179 hectares all covered by introduced tree species, including *Pinus caribea*, *Acacia mangium*, *Tectona grandis*, *Gmelina arborea*, and *Eucalyptus pellita*,¹²⁷ thereby providing direct financial incentives for establishment and maintenance of these stands (Ministry of Agriculture, 2014)¹²⁸.

For its part, in the Vichada Department, according to the 2022 Crop Monitoring Forest Plantations and Agriculture Survey, there were between 78,557.3¹²⁹ ha and 106,271.3¹³⁰ ha with commercial plantations, accounting for 0.8% of the Department's total land area, and the 19.7% of the country planted area distribution.

The commercial plantations projects that effectively use the land with this potential focus on the use of non-native species with edaphoclimatic requirements available in the Department. Among the species used, *Acacia mangium*, *Pinus caribea*, *Eucaliptus*

of Vichada reported, in the last forestry forum, that there were around 100,000 ha of forest species planted in the Department, of which only about 10,000.0 ha are registered before the Colombian Livestock and Agricultural Institute (ICA), showing the poor coordination with other entities thar are important for the development of forestry activities in the country.

¹²⁶ See the Orinoquía Crop Monitoring System by UPRÁ Available at: <https://upra.gov.co/es-co/Paginas/monitoreo-cultivos.aspx> and for Forestal plantations: <https://upra.maps.arcgis.com/apps/dashboards/5eac7ffe59f247f2bdb48ebd0a6868a9> Biocarbono IDE Orinoquia: <https://storymaps.arcgis.com/stories/b2fdf0801e8d44188fe84696b4f39875>. Note: The Agroforestry Trade Association of Vichada reported, in the last forestry forum, that there were around 100,000 ha of forest species planted in the Department, of which only about 10,000.0 ha are registered before the Colombian Livestock and Agricultural Institute (ICA), showing the poor coordination with other entities thar are important for the development of forestry activities in the country.

¹²⁷ Pacheco, M., Peñuela, L., Solano, C., Galán, S (Eds.) 2014.. "Manejo Forestal Sostenible en plantaciones en la cuenca del rio Bitá, Vichada, Colombia" Proyecto: "Fortalecimiento institucional y de política para incrementar la conservación de la biodiversidad en predios privados en Colombia". Grupo Colombiano Interinstitucional de Herramientas de Conservación Privada (G5): Asociación Red Colombiana de Reservas Naturales de la Sociedad Civil (RESNATUR), Fundación Natura (FN), World Wildlife Fund (WWF), The Nature Conservancy (TNC), y Parques Nacionales Naturales de Colombia (PNN). Serie: Conservación de la biodiversidad en predios productivos. No. 4., 214 páginas. Available at: <https://horizonteverde.org.co/wp-content/uploads/2020/02/LIBRO-FORESTAL-G5-FINAL.pdf>

¹²⁸ Ministry of Agriculture, Colombia. (2014). Regulation and Implementation of the Certificado de Incentivo Forestal (CIF).

¹²⁹ See the Orinoquía Crop Monitoring System by UPRÁ for Forestal plantations Available at Biocarbono IDE Orinoquia: <https://storymaps.arcgis.com/stories/b2fdf0801e8d44188fe84696b4f39875>.

¹³⁰ Federación Nacional de Industriales de la Madera (FEDEMADERAS). (2022). Boletín Estadístico Forestal 2022. Available at: <https://fedemaderas.org.co/boletin-estadistico-forestal-2022/>

grandis, *Eucaliptus pellita*, *Eucaliptus tereticornis* and *Pinus oocarpa* stand out. These plantations belong to private-sector companies and some of them have the Forestry Incentive Certificate (CIF), an economic stimulus from the government for commercial reforestation activities.

Under Alternative Scenario 2, areas within the project boundary undergo spontaneous or policy-driven forestation independent of any A/R CDM registration. In Vichada, this is evidenced by widespread commercial plantation initiatives, often incentivized by national regulations such as the Forestry Incentive Certificate (CIF), that have converted tens of thousands of hectares to non-native tree species (e.g., *Acacia mangium*, *Pinus caribaea*, *Eucalyptus pellita*) since the 1990s. These activities satisfy the A/R CDM criterion of “extrapolation of observed forestation activities in the geographical area with similar socio-economic and ecological conditions” because as explained before, plantations in Puerto Carreño alone expanded from 3,247 ha in 2014 to 28,863 ha in 2022, an eight-fold increase driven by commercial incentives and proven species adaptability. Moreover, regional land-suitability assessments identify nearly three million hectares as having at least low potential for forestry, of which hundreds of thousands of hectares have already been afforested outside any CDM framework (UPRA, 2022). Finally, legal and policy measures, such as municipal development plans and departmental ordinances, have explicitly recognized and promoted reforestation as a productive land-use vocation, effectively creating a de facto forestation rate that predates and operates independently of CDM registration dates. Taken together, these factors confirm that Alternative Scenario 2 is a credible baseline: forestation would have continued on significant portions of project land even without A/R CDM registration, driven by economic incentives, policy mandates, and demonstrated technical feasibility.

Alternative Scenario 3: Activities similar to those proposed by the project in at least part of the project area

Activities similar to those proposed by the project in at least part of the project area, as a result of compliance with legal requirements or by extrapolation of similar activities observed in the geographical area and socio-economic and ecological conditions related to the proposals, which have occurred in a period not exceeding ten years prior to the project start date.

Under the Gold Standard A/R CDM methodology, only two alternative scenarios are required to be evaluated:

- Continuation of the pre-project land use (Alternative Scenario 1).

- Forestation of the land within the project boundary performed without being registered as the A/R CDM project activity (Alternative Scenario 2). Scenario 2 (voluntary forestation without CDM registration) is both credible and observed, as demonstrated by the expansion of non-native commercial plantations under CIF incentives.

Alternative Scenario 3 (“Activities similar to those proposed by the project as a result of legal requirements”) is conceptually distinct of Scenario 2 only in that the Scenario 3 presumes forestation mandated by law. Colombia does not require ranchers to reforest. There is no law forcing afforestation of pastureland, and instead, policy relies on voluntary incentives: e.g. the 1990s CIF subsidy covered 50–75% of reforestation costs, and more recently, Law 2173 (2021) promotes restoration, but there is no enforceable mandate to convert cattle pasture to forest. In the case of Brújula Verde, no legal requirement compels forestation or afforestation on any portion of the project area. All commercial plantations and reforestation efforts in Puerto Carreño and Vichada have been voluntary driven by economic incentives (e.g., CIF), market demand, and supportive policy frameworks rather than by binding legal obligations.

Therefore:

- Scenario 3 (legally required forestation) does not apply, because there are no statutes or regulations that mandate forestation on the project lands.

As a result, the project needs only consider the two standard scenarios; Scenario 3 or others are neither triggered nor evaluated.

Outcome of Sub-step 1a:

In accordance with the above, the alternative land use scenarios are:

- Scenario 1. Continue with the preconditions of land use: Prior to the establishment of the Brújula Verde project, unsustainable agricultural expansion, dominated by monoculture cropping and slash-and-burn field preparation, and extensive cattle ranching with cyclical burning constituted the prevailing land-use dynamic in Puerto Carreño and Vichada. This entrenched pattern degraded soils, drove deforestation and biodiversity loss, and increased GHG emissions. Unmanaged pasture burning to facilitate cattle and buffalo rearing maintained grasslands in a degraded state, underscoring the need for afforestation/reforestation interventions to restore ecosystem function, enhance soil health, and sequester carbon

- Scenario 2. AR activities within the established area are developed without the project being registered, certified in the AFOLU sector for the reduction of emissions: In the absence of CDM registration, significant portions of the project land have nonetheless been converted to commercial forest plantations, often incentivized by the national Forestry Incentive Certificate (CIF). Since 2014, non-native species (e.g., *Acacia mangium*, *Pinus caribaea*, *Eucalyptus pellita*) have expanded eight-fold in Puerto Carreño (from 3,247 ha in 2014 to 28,863 ha by 2022). Regional suitability assessments identify nearly 3 million ha as having at least low potential for forestry, of which hundreds of thousands have already been afforested outside any CDM framework. Municipal and departmental planning instruments have explicitly promoted reforestation as a productive land-use vocation, creating a de facto forestation rate independent of CDM registration dates.

Sub-step 1b. Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

Alternative Scenario 1: Continuation of pre-project land use

This scenario describes the continuation of unsustainable agricultural expansion, dominated by monoculture cropping and slash-and-burn field preparation, and extensive cattle ranching with cyclical burning, which were the prevailing land-use dynamics in Puerto Carreño and Vichada prior to the Brújula Verde project. The following Table 32 describes the regulatory framework and consistency that applies to the alternative land use scenario.

Table 32 – Regulatory framework for land use (Scenario 1).

Laws and regulations	Description
Law 23 of 1973	Grants extraordinary powers to the President to issue the National Code of Renewable Natural Resources and Environmental Protection. It details factors that deteriorate the soil, such as contamination, degradation, and erosion. The practices in Scenario 1, particularly slash-and-burn agriculture and extensive cattle ranching leading to soil degradation, are inconsistent with the objectives of this law, which seeks to prevent environmental damage and promote the recovery of renewable natural resources

Law 0089 of December 10, 1993, and Decree 696 of March 30, 1994	"By which the Livestock and Dairy Promotion Quota is established, and the National Livestock Fund is created." Article 1. The parafiscal contribution for the promotion of the livestock and dairy sector will adhere to the conditions stipulated in this Law, in the terms of numeral 12 of Article 150 of the National Constitution.
Law 99 of 1993	Created the Ministry of Environment and organized the National Environmental System (SINA). This law establishes the framework for environmental management in Colombia, emphasizing the need for environmental licenses for activities with potential impacts, including land-clearing and burning, enforced by regional authorities (e.g., CORPORINOQUIA)
Law 101 of December 23, 1993	General Law of Agricultural and Fishery Development.
Law 160 of 1994	"By which the National System of Agrarian Reform and Rural Peasant Development is created, a subsidy for the acquisition of land is established, the Colombian Institute of Agrarian Reform is reformed, and other provisions are issued."
Resolution 3814 of September 27, 1995	"By which approval is granted for the practice of inspection visits to the accounting books and other accounting supports of those who have the legal obligation to collect and pay the Livestock and Dairy Development Fee."
Law 395 of August 2, 1997, and Decree 3044 of 1997	"By which the eradication of foot-and-mouth disease throughout Colombian territory is declared of national social interest and as a health priority and other measures aimed at this end are dictated."
Law 363 of 1997	Livestock funds are recognized as mixed economy entities in order to encourage, improve and promote the sustainability of the agricultural sector. These funds are constituted or will be constituted with contributions from the nation, territorial entities or territorial entities of any order and from private capital, and will access credits (loans) or rediscounts for specific support to small and medium-sized livestock producers.

Law 388 of 1997	Mandates that all municipalities adopt Land-Use Plans (Territorial Planning Scheme (EOTs), Basic Plan of Territorial Ordering (PBOTs), or Territorial Ordering Plan (POTs) to regulate zoning and permitted activities.
Decree 1615 of 1998	Law 363 of 1997 is partially regulated and the provisions are dictated for the incentive and loan to small and medium-sized livestock farmers through the Fund for the Financing of the Agricultural Sector (FINAGRO, as per its acronym in Spanish).
Decree 1187 of June 30, 1999	"By which the Stabilization Fund for the Promotion of the Exportation of Meat, Milk and its Derivatives is organized."
Law 607 of 2000	"By which the creation, functioning and operation of the Municipal Agricultural Technical Assistance Units (UMATA, as per its acronym in Spanish) is modified and direct rural technical assistance is regulated."
Law 676 of 2001	Laws 363 of 1997 and 510 of 1999 are reformed and additional provisions are issued on the rediscounting of credit (loan) operations before the Fund for the Financing of the Agricultural Sector (FINAGRO) and on the granting of the livestock capitalization incentive to independent livestock funds of the National Federation of Livestock Breeders (Fedegan) and the National Livestock Fund.
Law 811 of 2003	"By which Law 101 of 1993 is modified, chain organizations are created in the agricultural, fishery, forestry, and aquaculture sectors, the Agrarian Transformation Societies (SAT, as per its acronym in Spanish), and other provisions are dictated."
Decree 4296 of 2004:	Establishes the prohibition of open rural burning.
Resolution 532 of 2005	Sets requirements, terms, conditions, and obligations for controlled open burning in rural areas for agricultural and mining activities. While this resolution allows for controlled burns under specific conditions (e.g., for soil preparation or harvesting), it requires adherence to minimum distances from natural vegetation, protected areas, and urban centers, as well as potential permits for larger burns (permits, buffer distances, notification to authorities).

Decree 2255 of 2007	"By which Decree 696 of 1994 that regulates Law 89 of 1993 is modified." Related to livestock promotion and the National Livestock Fund.
Law 685 of 2001 and Law 1382 of February 9, 2010	"By which the Mining Code is issued, and other provisions are issued." Article 1. Promote technical exploration and exploitation of state- and privately-owned mining resources; stimulate these activities in order to satisfy the requirements of their internal and external demand and that their use is carried out in a harmonious manner with the principles and standards of rational exploitation of non-renewable natural resources and the environment, within a comprehensive concept of sustainable development and the economic and social strengthening of the country.
Law 1731 of 2014	"By which financing measures are adopted for the reactivation of the agricultural, fishery, aquaculture, forestry and agroindustrial sector." "By which the Sole Regulatory Decree of the Agricultural, Fishery and Rural Development Administrative Sector is issued." Article 1.1.1.1. The Ministry of Agriculture and Development shall be responsible for guiding, controlling and evaluating the performance of the functions of its affiliated and related entities, without prejudice to the decision-making powers vested in them, as well as their participation in policy formulation, in the preparation of sectoral programs and in the execution thereof. Article 1.1.1.2. The Agricultural, Fishery and Rural Development Sector, in accordance with current regulations, is made up of the Ministry of Agriculture and Rural Development and its attached and linked entities. Article 1.2.1.2. The entities attached to the Ministry of Agriculture and Rural Development without legal person are the following: 1. Rural Agricultural Planning, Land Adequacy and Agricultural Uses Unit (UPRA). Article 1.2.2.1. The entities linked to the Ministry of Agriculture and Rural Development are the following: 2. Fund for the Financing of the Agricultural Sector (FINAGRO). 1. Livestock funds. 2. Supply corporations in which the Nation or the decentralized entities of the sector, at the
Decree 1071 of 2015	

	national level, own shares or have made capital contributions.
Decree 1076 of 2015 ¹³¹	Article. 2.2.5.1.3.14 by which Prohibits open rural burning except controlled burns for soil prep, mining, harvest residue, frost control, subject to Ministry rules
Law 1776 of 2016	"By which the Zones of Interest for Rural, Economic and Social Development (ZIDRES) are created and developed."
Decree 1666 of October 21, 2016	"By which the Single Sole Decree of the Mines and Energy Administrative Sector, 1073 of 2015, related to mining classification, is added."
Decree 2253 of December 29, 2017	"By which article 365 of Law 1819 of 2016 is regulated and the Sole Decree of the Mines and Energy Administrative Sector, 1073 of 2015, is added, in relation to the incentive for investments in hydrocarbons and mining."
Law 1876 of 2017	"By which the National Agricultural Innovation System is created, and other provisions are issued." Article 1. The Zones of Interest for Rural, Economic and Social Development (ZIDRES, as per its acronym in Spanish) are created as territories with agricultural, livestock, forestry and fish farming aptitudes identified by the Rural Agricultural Planning Unit (UPRA, as per its acronym in Spanish).
Resolution 40076 of February 27, 2020	"By which the methodology for the distribution and partial allocation of operating resources is defined to encourage the use and comprehensive exploitation of non-renewable natural resources in the territorial entities for the 2019-2020 biennium and the respective allocation is made."
Resolution 000006 of 2020	"By which the National Plan for the Promotion of the Commercialization of the Peasant, Family and Community Economy Production is adopted, formulated in compliance with the provisions of Point 1.3.3.4 of the Final Agreement."
Resolution 000051 of 2020	"By which the coverage and crops that are part of the Agricultural Risk Management Plan for the period 2020 are established, and other provisions are dictated."

¹³¹ Available at: <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=78153>

Resolution 0358 of 2024

Temporarily suspends all controlled open-burning in rural areas nationwide to prevent wildfires and protect ecosystems

Source: Prepared by South Pole (2024), based on existing Colombian legislation applicable to the sector)

Enforcement Reality:

- Although open-burning is legally restricted, the regions monitoring shows that uncontrolled burns remain widespread across Vichada and Puerto Carreño, indicating systematic non-enforcement by environmental authorities (<30 % enforcement coverage)
- Land-use zoning under Resolution 261 of 2018 (Agricultural Frontier) designates areas where burning and expansion should be restricted, but these provisions are rarely enforced on remote ranches

Conclusion: Scenario 1 technically violates multiple legal provisions (burn bans, licensing, zoning) but persists due to endemic non-enforcement. Accordingly, it remains a credible baseline scenario under the A/R CDM tool criteria

Alternative Scenario 2: Forestation of the land within the project boundary performed without being registered as the A/R CDM project activity

This scenario describes the development of Afforestation and Reforestation (AR) activities within the project area, focusing on commercial forest plantations with non-native species (e.g., *Acacia mangium*, *Pinus caribaea*, *Eucalyptus pellita*), often incentivized by the national Forestry Incentive Certificate (CIF), but without Clean Development Mechanism (CDM) registration. The following table describes the regulatory framework and consistency that applies to the alternative land use scenario.

Table 33 – Regulatory framework for land use (Scenario 2).

Laws and regulations			Description
Decree Law 2811 of 1974			Decree-Law 2811 of 1974 issues the National Code of Renewable Natural Resources and Environmental Protection, in chapters IV and V it dictates the public administration functions to guarantee adequate management of the special management areas, so that conservation, biological ecosystems balance and rational use of natural resources can be promoted (as long as this is possible due to the activities permitted in each area).
Political Constitution of Colombia of 1991		of	Article 8: enshrines the obligation of the State to protect the cultural and natural wealth of the Nation.

	Article 79: declares the right of all people to enjoy a healthy environment and guarantees that communities participate in all decisions by which they will be affected. It also dictates that the State has the duty to protect the diversity and biological integrity of the environment and conserve biologically important areas. Article 80: decrees that the State must plan the management and use of natural resources with the objective of conserving, restoring, or replacing them with the objective of achieving sustainable development. Article 95: the duties of the citizens include the protection of the country's natural resources and ensuring a healthy environment. Article 339: the State must present a national development plan, which must include environmental policies.
Law 99 of 1993	"By which the Ministry of the Environment is created, the Public Sector in charge of the management and conservation of the environment and renewable natural resources is reorganized, the National Environmental System (SINA, as per its acronym in Spanish) is organized, and other provisions are issued." The general principles that environmental policies must follow, such as precaution, prevention, and sustainable development, are set out. In addition, the Ministry of the Environment is created as the governing body for the management of the environment and renewable natural resources, and the National Environmental System (SINA) as the set of guidelines, standards, activities, resources, programs, and institutions that allow the implementation of environmental law. The legal nature of the Regional Autonomous Corporations (CAR, as per its acronym in Spanish) is defined, and the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) created.
	Article 4. Establishes the National Environmental System (SINA), composed of the Ministry of the Environment, the Regional Autonomous Corporations, departments, districts, municipalities, research institutes and civil society.
	Article 31. Determines that it is up to the Regional Autonomous Corporations to comply with the policies and guidelines established by the Ministry of Environment and Sustainable Development.
	Article 108. Declares that the State, through the CAR, must acquire strategic areas or ecosystems for the conservation, preservation and recovery of natural resources.

Law 102 of 1993	Provides incentives and establishes rules for commercial reforestation and sustainable forest management
Law 139 of 1994	By which was created the CIF to promote reforestation by providing financial incentives.
Decree 1791 of 1996	Regulates forest plantation establishment on private lands in coordination with the Ministerio de Agricultura y Desarrollo Rural (MADR) and Ministerio de Ambiente y Desarrollo Sostenible (MADS)
Law 388 of 1997	Mandates that all municipalities adopt Land-Use or zoning Plans (Territorial Planning Scheme (EOTs), Basic Plan of Territorial Ordering (PBOTs), or Territorial Ordering Plan (POTs) to regulate zoning and permitted activities. Zoning plans typically allocate "forest plantation" as a permissible land use in rural zones.
	By which Decree-Law 2811 of 1974, Law 99 of 1993, Law 165 of 1994 and Decree-Law 216 of 2003 are regulated, in relation to National System of Protected Areas (SINAP, as per its acronym in Spanish), the management categories that integrate it and other provisions."
Decree 2372 of 2010, relating to the SINAP	Article 4. The conservation and management of protected areas is the joint responsibility of the national government, the Regional Autonomous Corporations, territorial entities, and other stakeholders involved in the management of protected areas.
	Article 14. The protected areas categories include the National Natural Park System, Regional Natural Parks, and Soil Conservation Districts, under the responsibility of the Regional Autonomous Corporations.
	Articles 34 and 35 specify the different management categories that can be assigned to the zones and determine the activities permitted in each of them.
National Policy for Comprehensive Management of Biodiversity and Ecosystem Services (PNGBSE) of 2011	Emphasis is placed on the need to include other ecosystem services, in addition to those related to water resources, in existing biodiversity management instruments, including PES.
Decree 953 of 2013	Payments for environmental services schemes, mainly associated with water resources, are considered for the first time as an economic alternative.
Decree 1076 of 2015	It is a compilation of the regulations issued by the National Government, headed by the President of the Republic. The intention of this initiative is to collect in a single regulatory body all the current regulatory decrees issued to date on environmental matters.

Law 1753 of 2015	Article 174. Article 108 of Law 99 of 1993 is modified in relation to the authorization of national or regional resources for the implementation of PES or other economic incentives aimed at the conservation of ecosystems of strategic interest. These resources correspond to water use tax, transfers from the electricity sector and the forced investment of 1% from projects that require water resources to compensate for loss of biodiversity, within the framework of environmental licenses. The Ministry of Environment and Sustainable Development must design the terms, conditions, procedures, and sources of financing for the implementation of PES and other conservation incentives.
CONPES 3886 of 2017	Public policy guidelines are developed for the implementation of payment for environmental services in relation to public institutions, the private sector and civil society. Strategies focused on overcoming technical and operational gaps, scarce institutional articulation mechanisms, financial weaknesses and regulatory limitations are also established.
Decree 870 of 2017	It is determined that the owners, possessors, or occupants of properties in strategic areas and ecosystems may be beneficiaries of the payment for environmental services incentive, including those who are subject to restitution or compensation according to Law 1448 of 2011 and those located in protected areas, special environmental management areas or the National System of Protected Areas (SINAP).
Resolution 261 of 2018	Excludes forest-suitable zones from agricultural expansion, implicitly promoting forestry in designated areas.
Decree 1007 of 2018	The general components of the payment for environmental services incentive and the acquisition and maintenance of properties in strategic areas and ecosystems are regulated. This instrument is applicable to environmental authorities, territorial entities and other public or private persons that promote, design, and implement payment for environmental services projects financed or co-financed with public and private resources, or that carry out property acquisition and maintenance processes in accordance with the standards indicated in the previous article.
Decree 130 of 2020	Regulates the CIF, outlining the procedures for accessing the incentive and the requirements for reforestation projects, including the presentation of a Forest Establishment and Management Plan (PEMF) and compliance with land eligibility criteria (e.g., being within the agricultural frontier and in areas with commercial forestry aptitude).

Source: Prepared by South Pole (2024), based on existing Colombian legislation applicable to the sector)

Enforcement Reality:

- Forestry regulations are actively enforced through CIF audits and environmental licensing, ensuring compliance with management plans and technical standards.

- Regional land-suitability mapping (UPRA) guides enforcement of zoning and prevents conversion of protected ecosystems for plantations.

Conclusion: Scenario 2 fully complies with all mandatory legal and regulatory requirements and is in fact promoted by national policy instruments. It therefore represents a legally robust alternative land-use pathway. Accordingly, it remains a credible baseline scenario under the A/R CDM tool criteria.

Outcome of Sub-step 1b:

All land use scenarios identified in Sub-step 1a are in compliance with all applicable laws and legal requirements, operate within a complex Colombian legal regime governing land use, environmental protection, and forestry.

In all scenarios, there are still some exploitations or uses that are not supported by Colombian legislation, like in the case of the Scenario 1, continuation of slash-and-burn cropping and extensive grazing, which formally violates open-burning prohibitions but persists due to widespread non-enforcement.

While Scenario 2 complies with forestry and land-use statutes and is actively promoted by incentive regulations. Consequently, both scenarios remain legally “credible,” but only Scenario 2 fully aligns with enforced laws, whereas Scenario 1 depends on systemic non-enforcement to prevail.

These land uses come from the absence of sustainable economic alternatives appropriate to the needs of the region.

According to the information presented and considering the systematic lack of law enforcement due to financial and institutional barriers in the project area, the same scenarios identified in Sub-step 1a remain.

In accordance with the above, the alternative land use scenarios are:

- Scenario 1. Continue with the preconditions of land use.
- Scenario 2. AR activities within the established area are developed without the project being registered, certified in the AFOLU sector for the reduction of emissions.

Step 2. Barrier analysis:

Sub-step 2a. Identify the barriers that would prevent the implementation in at least one alternative land use scenarios, of the type of project activity proposed

Investment barriers

- Lack of own economic resources allocated to long-term processes to avoid deforestation.

- External administration of resources assigned by the State.
- Difficulty in accessing credit due to the geographical remoteness of the area and the legal characteristics of the collective territory.
- Difficulty in inclusion in regional, national, or international markets due to the lack of intercommunication that is sustainable and helps avoid deforestation.

17 million of hectares are identified in Colombia with potential to establish commercial forest plantation, however, the actual area under commercial plantations remains relatively small. For instance, by 2022 the Orinoco region itself had approximately 183,341 ha of commercial plantations, representing roughly 2.24 % of its estimated 8.17 million ha suitable land (David et al)^{132 133}. WWF, 2015 concluded that 80% of wood and wood products are derived from the exploitation of natural forests¹³⁴.

The very low level of economic activity in the commercial forestry sector is attributed to several factors, among them: low rates of return, the high number of intermediaries¹³⁵, long production cycle, long periods between cash flow disbursements, high concentration of costs in the first years of production, long wait for economic returns and difficulties in obtaining bank credits for these types of activities^{136,137}. There are no commercial bank lines of credit for long-term investments such as reforestation projects¹³⁸. Banks perceive the investment risk for this type of project as very high due to the factors explained¹³⁹.

¹³² Davis, R. R., De la Torre, R., Cubbage, F., & da Silva, B. K. (2024). Prospects for commercial tree farming in Colombia. *Journal of Forest Business Research*, 3(1), 1-33. Available at: <https://forest-journal.com/index.php/JFBR/commercial-tree-farming-colombia>

¹³³ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

¹³⁴ WWF, 2015. Informe: causas de la ilegalidad de la madera en Colombia un estudio sobre los flujos del comercio de la madera, los actores y los impactos de la tala ilegal.

¹³⁵ WWF, 2014. Datos básicos y elementos de contexto sobre el sector Forestal en Colombia.

¹³⁶ Aldana, C. 2004. Sector forestal Colombiano; fuente de vida, trabajo y bienestar. Serie de documentación no. 50. Corporación nacional de Investigación y Fomento Forestal (CONIF), Bogotá.

¹³⁷ CONIF y FAO, 2004. Análisis del Mercado Crediticio para el Sector Forestal Colombiano.

¹³⁸ Aldana, C. 2004.: Sector forestal Colombiano; fuente de vida, trabajo y bienestar. Serie de documentación no. 50. Corporación nacional de Investigación y Fomento Forestal (CONIF), Bogotá.

¹³⁹ FAO, 2006. Tendencias y perspectivas del sector forestal en América Latina Documento de Trabajo. Informe Nacional Colombia. Available at: <http://www.fao.org/docrep/009/a0470s/a0470s00.htm>

In comparison, ample lines of credit and financing sources exist for coffee and cattle farming (Banco Agrario) because of lower perceived risks, proven experience and a steady cash flow. Cattle farming requires a minimal investment (basically the purchase of cattle) and short cycles of profit and reinvestment in the same activity. This investment comes from the income earned with the sale of adult cattle. Additionally, this activity requires a very limited labor force, which is supplied by regional inhabitants who have worked for many years in the ranching sector. Given that this is an extensive activity, the region's ecological conditions permit the supply of grass required for production. Lastly, this activity requires little infrastructure given that the management system consists of herding cattle (to handling centers) across pastures that feed them until they reach a marketable weight¹⁴⁰.

The Certificado de Incentivo Forestal (CIF) has been created to support A/R activities. However, this money is not constant and high transactions costs of obtaining the incentive make it difficult to use (some projects have waited for more than three years for approval). The policies and procedures related to effectively obtaining this incentive are confusing and constantly changing.

The guarantee of continuity of fiscal resources to fund this incentive is not constant. In Colombia, the budget availability has been very fluctuating year to year and therefore cannot attend all requests nor can achieve the goals set for reforestation activity. Such irregular development cannot guarantee a reliable supply for the forest industry and the maintenance and progress in markets¹⁴¹.

On the other hand, the incentive is limited as exposed, and prioritization criteria has been for awarding funding resources. Besides, CIF presents a specific time horizon and short life cycle (5 years¹⁴²) for the initiatives existent where it is not possible to measure the real climate, community and biodiversity impact of the project. This limitation makes the beneficiary of this program must have additional sources for managing cash flow positive during the time of the Project.

¹⁴⁰ de la Hoz, J.V. 2009. Geografía Económica de la Orinoquia. Documento de trabajo sobre economía regional.

¹⁴¹ Blanco, J. La experiencia Colombiana en Esquemas de Pagos por Servicios Ambientales. Available at http://www.cifor.org/pes/publications/pdf_files/colombia_experience.pdf

¹⁴² CIF Available at <https://www.minagricultura.gov.co/tramites-servicios/apoyos-incentivos/Paginas/Certificado-de-Incentivo-Forestal-CIF-2013-v2.aspx>

Further, the level of the incentive is relatively low in terms of the positive externalities generated by reforestation and the high opportunity cost associated with other uses of the land. Second, government deficits often abort the supply of the incentive, even when projects have been approved to receive it¹⁴³. There is no appropriate information to identify the effectiveness of incentives, and it is not possible to determine the real impacts of investors. If a project receives the CIF, it must decline the right to get more incentives or tax exemptions that law gives for forestry sector¹⁴⁴.

Infrastructure barrier (routes of transportation)

The competitiveness of forest sector is closely correlated with the quality of infrastructure and transport. The diagnosis presents the constraints in terms of infrastructure, transport and logistics which constitute the bottlenecks for the commercial plantations in particular.

In general, the departments of the Orinoco region have remained isolated from the rest of the country due to a lack of access by land routes. Infrastructure is thus one of the factors that have disadvantaged the development of the country's forestry potential. On one hand, there is a tremendous lack of highways and railways in areas with forest resources, and on the other hand the nearby rivers are not, or not sufficiently navigable or they do not connect towards centers of consumption. Transportation costs represent 34% of the value of forest products in the market¹⁴⁵.

A large percentage of forestry products in the Colombian market is transported by roads, which is a negative factor given its high costs. According to the calculations of CORMAGDALENA, the cost of transportation by waterway is nine times lower than roads. The poor transportation infrastructure constitutes a costly constraint to the project activity because it hinders and prevents displacement of personnel, increases the costs of all silvicultural practices and timber harvesting, and increases the travel time of all access routes.

¹⁴³ Marín, 2010. Financiación forestal, estímulos y exenciones.

¹⁴⁴ Marín, 2010. Financiación forestal, estímulos y exenciones.

¹⁴⁵ Refocosta, 2007. Comercialización de Madera en Colombia y sus oportunidades.

Another limitation for extraction and transportation of Wood is because the existence of small and medium forest plantations extension, which are found in some inaccessible parts for timber transportation to processing sites.

In terms of wood transportation costs to Puerto Carreño, a truck can transport about 8 tons of load equivalent to an average of 15 trees at a cost of 70 000 COP. Therefore, for the transport of harvested timber of one hectare (1,111 trees) it would cost approximately 4,900,000 COP (direct conversation with the Project owners). This excessive cost is due to road conditions and the level of access that occurs in the region. According to the observed-on field, transportation is very difficult, especially during rainy seasons as the current roads, have been created by the cars themselves and they tend to flood and collapse in winter. Only fully equipped cars can move on the roads of the area. As exposed in Table 34, only 10.44 of roads have been paved and 386 kilometers are dirt packed road (unpaved road) within the department.

Table 34 – Kilometers of roads in the Department of Vichada

Classification of Roadway	Paved road	Dirt packed road	Dirt road	Total
Primary way	9.3	60.95	15.70	85.95
Secondary way	1.14	298.32	1,263.21	1,562.67
Tertiary way		27.40	1,007.17	1,034.57
TOTAL	10.44	386.67	2,286.08	2,683.19

Source: Prepared by South Pole (2024), based on Secretaria de planeación y desarrollo Territorial del Vichada, tomado de Gobernación del Vichada 2011.

According to the zoning study for forest plantations with commercial purposes in Colombia (UPRA, 2015), despite that the departments of Vichada and Meta have large surfaces for commercial forestry activities, the aptitude for this activity is low (dominant aptitude, according to the classification). This qualification is attributed to the lack of road infrastructure and logistics in forestry, as well as soil limitations and ecosystemic restrictions, issues that affect the development of competitive markets¹⁴⁶.

The project owner must invest in infrastructure or in the maintenance of the existent roads to reach the plantations area and transport any equipment, materials, technology and tools needed for the work. These adverse conditions represent an important barrier

¹⁴⁶ Unidad de planificación de tierras rurales, adecuación de tierras y usos agropecuarios, UPRA, 2015. Zonificación para plantaciones forestales con fines comerciales – Colombia.

that must be overcome by the technical team to guarantee competitiveness in the national and international markets.

Social barriers

Barriers due to social conditions and land use practices

- Historical presence of colonization (settlement), deforestation, and praderization dynamics.
- Presence of mining, which promotes other social and land use dynamics.
- Illegal logging that generates a future chain reaction towards cover transformation.
- Lack of skilled labor and properly trained labor force.

Social barriers in the region are deeply rooted in the historical and socioeconomic dynamics that shape land use and community livelihoods. The area has a long history of colonization, extensive deforestation, and conversion of natural forests into grasslands, processes that have defined the productive model of the territory and limited the development of alternative activities such as sustainable forestry. In addition, mining activities have introduced competing land-use pressures and social dynamics that further constrain the adoption of restoration or conservation-oriented land management. Illegal logging remains an ongoing challenge, promoting cycles of forest cover loss and undermining the establishment of long-term forest-based initiatives.

The communities that inhabit the region do not have experience in reforestation. Their economic activity is based primarily subsistence farming and subsistence fishing. There is no local supply of labor with experience in forestry, so training is more costly, and skilled labor must be paid a higher wage to move them from other regions of the country to this remote region, mostly from regions such as Cordoba, Meta, Antioquia, and Boyacá. The population density in the department of Vichada is very low (1.8 inhabitants per km²) and therefore insufficient to supply the labor requirements of the project activity. The project developer must recognize all these obstacles and has to overcome these technical barriers. Part of the capacity work could be financed by the income of the carbon credits.

Moreover, forestry initiatives that have been implemented in the region historically lack sound financial planning, technical guidance, and clarity regarding market strategies, species selection, or sustainable soil management. Many such activities have been coordinated by individuals without formal technical training, and often without adequate supervision or support from local environmental authorities such as CORPORINOQUIA. Studies have shown that approximately 80% of forestry-related projects in Puerto Carreño lack experience in ecosystem services and do not have established procedures for occupational safety, waste management, or labor compliance (Pacheco et al., 2014¹⁴⁷; Focazzi, C. & Rivera, J. 2006¹⁴⁸).

These conditions reveal the profound social and institutional weaknesses that hinder the emergence of successful reforestation or restoration initiatives in the area. Overcoming these barriers requires continuous capacity-building, technical training, and institutional strengthening, elements that can only be sustainably achieved through additional financing mechanisms such as carbon revenues.

Institutional barriers

- External administration of resources allocated by the State
- Inefficiency in the application of regional and national policies that regulate deforestation or strengthen different initiatives for resource use.
- Land tenure
- Government support for forestry
- Social-cultural barriers

Institutional weaknesses represent a significant limitation to the successful implementation of large-scale afforestation or sustainable land-use initiatives in the region. Although Colombia has developed a comprehensive regulatory framework to address deforestation and promote restoration, such as the National Restoration Plan

¹⁴⁷ Pacheco, M., Peñuela, L., Solano, C., & Galán, S. (2014). Manejo Forestal Sostenible en Plantaciones en la Cuenca del Río Bitá, Vichada, Colombia. Bogotá, Colombia: RESNATUR / Fundación Natura / WWF. Available at: <https://horizonteverde.org.co/wp-content/uploads/2020/02/LIBRO-FORESTAL-G5-FINAL.pdf>

¹⁴⁸ Focazzi, C. & Rivera, J. 2006. Implementación de un programa de forestación en el municipio de La Primavera, Vichada; basado en el trabajo desarrollado en infor en la Patagonia chilena, para el Protocolo de Kioto.

and the ENREDD+ Strategy, the translation of these national policies into effective regional action remains limited. Government institutions often lack the administrative capacity, technical resources, and local presence needed to enforce land-use regulations or provide consistent support to landholders willing to engage in reforestation or sustainable management practices.

A major institutional barrier stems from the external administration and centralization of State-managed resources. Financial incentives for forestry or environmental restoration, including national funds or reforestation programs, are controlled primarily at the central level, with limited autonomy or access mechanisms for local actors. This disconnection between national priorities and local implementation restricts the ability of rural stakeholders to access financing, technical assistance, or training necessary for effective afforestation.

Additionally, inefficiencies in the enforcement of regional and national environmental policies reduce the effectiveness of programs designed to control deforestation or promote sustainable land use. Local environmental authorities in the Orinoquía region operate with constrained budgets and technical staff, which results in inconsistent monitoring and weak institutional support for restoration-based activities.

Compounding these administrative challenges, land tenure in the region remains largely informal or contested, with overlapping private, communal, and indigenous claims. This legal uncertainty discourages long-term investments and hinders the establishment of projects that require secure property rights for carbon certification or sustained management over multiple decades.

Finally, the institutional and cultural focus on traditional agriculture and livestock has created structural disincentives for reforestation. Extension services, rural credit lines, and public agricultural programs primarily target crop and livestock production, offering minimal support for forestry or ecosystem restoration initiatives. Moreover, local communities often lack organizational capacity, and the absence of strong forestry associations or cooperative structures limits access to technical expertise, training, and collective negotiation for financial support.

Taken together, these institutional barriers, including centralized management of resources, inefficient policy implementation, insecure land tenure, and limited institutional support for forestry, create a context in which voluntary afforestation or restoration efforts are highly constrained. Without robust institutional engagement and

decentralized access to financing and technical assistance, large-scale restoration activities remain difficult to initiate or sustain independently.

Technological barriers

- Difficulties in accessing alternative sources and technologies for agricultural production.
- Difficulties in accessing equipment, training, and infrastructure for the development of productive projects for sustainable use.
- Increase in travel time to obtain resources due to long distances.
- Remoteness and little existing forestry infrastructure.

Technological limitations represent a major obstacle to the implementation of sustainable land-use transitions and large-scale reforestation efforts in the region. Access to appropriate technologies for agricultural or forestry production remains limited, as rural areas of the Orinoquía region, including Vichada, lack sufficient infrastructure, technical capacity, and institutional support to promote innovation or the adoption of improved management practices. This technological gap has led to the persistence of low-efficiency production systems that maintain extensive and extractive land uses rather than fostering ecological restoration or sustainable forestry.

Access to equipment, training, and technical assistance for productive and sustainable activities is particularly limited. The region has a very low density of technical service providers and specialized institutions that can offer training or operational support for forestry or agroforestry initiatives. Producers and landholders often rely on traditional methods and manual labor, as mechanized equipment and specialized silvicultural tools are scarce and expensive. The absence of continuous technical support from government or private entities results in a slow and uneven transfer of knowledge, which further limits the capacity to implement advanced or sustainable production systems.

Another significant technological barrier is the lack of local infrastructure and logistical support for the establishment of large-scale plantations or restoration areas. Before the emergence of recent reforestation initiatives, there were virtually no nurseries capable of producing high-quality seedlings at the required scale, nor were there adequate storage, processing, or transportation facilities to support sustainable forestry operations. This lack of local capacity means that materials, equipment, and expertise

must often be transported from distant urban centers, significantly increasing costs and travel time. The remoteness of Vichada and its limited road network exacerbate these logistical constraints and reduce the overall feasibility of sustained reforestation or restoration activities.

The availability of genetic material and native species also represents a major technical challenge. Many native trees of the Orinoquía region have irregular seed production cycles, low germination rates, and limited commercial availability. Establishing nurseries capable of cultivating these species requires advanced silvicultural knowledge and controlled propagation techniques that are not widely available in the region. In addition, the local workforce generally lacks formal training in forestry practices such as soil preparation, seedling management, and maintenance operations.

Finally, the absence of a coordinated system for technological development and extension services prevents the region from adopting integrated approaches to sustainable land management. Similar to experiences in other Latin American countries, Colombia's agricultural extension services have shifted from centralized, state-run models to fragmented and project-based mechanisms. As a result, technical assistance is inconsistent and disjointed, with various institutions working independently and without a unified strategy for ecosystem restoration. This fragmentation undermines the continuity of knowledge transfer and weakens the effectiveness of reforestation and sustainable production programs.

The combination of limited access to technology, inadequate infrastructure, lack of trained personnel, and institutional fragmentation creates a context in which implementing or maintaining large-scale afforestation or restoration activities is technologically unfeasible without significant external support. These conditions make it highly unlikely that such initiatives could be independently developed or sustained in the region without specialized technical assistance or external financial incentives.

Ecological barriers

- Low soil fertility and high acidity
- Limited organic matter and poor water retention
- Soil compaction and degradation from prolonged grazing
- Recurrent wildfires and lack of fire management infrastructure
- Seasonal drought and strong climatic variability

- Limited natural regeneration potential
- Scarcity of native seed sources and degraded forest fragments
- Slow growth and low resilience of native species
- Hydrological fluctuations (flooding and drought cycles)
- Limited biodiversity resilience and connectivity
- Need for long-term adaptive management and ecological monitoring

The ecological characteristics of the Orinoquía savanna region create substantial natural constraints for the establishment and maintenance of large-scale reforestation or restoration initiatives. The prevailing ecosystems are open tropical savannas with nutrient-poor, highly acidic soils that have low organic matter content and limited water retention capacity. These conditions significantly restrict plant growth and make the establishment of permanent forest cover technically challenging and costly. Soil degradation caused by prolonged grazing, burning, and compaction has further reduced fertility and biological activity, resulting in a landscape with limited natural regeneration potential.

In addition, the region's climatic and fire dynamics pose serious challenges to vegetation recovery. The annual dry season is typically accompanied by high temperatures, low humidity, and strong winds that favor the spread of wildfires. Fires are often used as a traditional management tool to regenerate grasslands for grazing, but they can cause severe damage to newly established vegetation and soil structure. Without effective fire management systems or community coordination, uncontrolled burning can quickly destroy young plantations or restoration plots, preventing the successful establishment of forest cover. The limited presence of local firefighting infrastructure and the remoteness of the area exacerbate this risk, making long-term maintenance of afforestation activities difficult.

Another key ecological barrier relates to the adaptation and selection of species. Many native species are poorly suited to the harsh conditions of degraded savannas and exhibit slow growth rates, low survival under water stress, and susceptibility to fire and pests. These factors complicate the design of ecologically balanced reforestation strategies and increase the need for technical experimentation and adaptive management over long periods.

Furthermore, the lack of natural forest remnants and seed sources across much of Vichada limits the potential for passive or assisted natural regeneration. Reforestation efforts require continuous seed collection, nursery propagation, and field maintenance

to achieve stable establishment, which adds complexity and cost to restoration programs. In areas where forest fragments exist, they are often isolated and degraded, reducing genetic diversity and resilience to environmental stressors.

Finally, the broader ecological context of the Orinoquía landscape influences projects feasibility. The region's droughtical regime, characterized by alternating periods of flooding and drought, requires highly adaptive management and site-specific planning to avoid losses from excess water or prolonged dryness. Without advanced ecological knowledge, technical guidance, and sustained resource input, maintaining stable forest cover in this dynamic environment is extremely challenging.

In conclusion, the ecological conditions of the Orinoquía savannas, including poor soils, recurrent fires, water stress, and limited natural regeneration, represent significant barriers to reforestation and ecosystem restoration. These factors create a natural context in which large-scale afforestation or restoration would be highly unlikely to occur spontaneously or to be sustained over time without specialized technical design, consistent management, and long-term external support.

Outcome of Sub-step 2a:

Table 35 highlights the key barriers affecting the alternative land-use scenarios identified in Step 1b. Cattle ranching and extensive agriculture largely persist under current conditions and face fewer entry barriers compared with commercial forest plantations developed outside a CDM or similar certification framework, which encounter multiple, overlapping constraints.

Table 35 – Barriers and alternative land use scenarios

Scenario	Alternative land use	Applicable barriers	Justification/Explanation
Scenario 1. Continue with the preconditions of land use	Continuation of the pre-project land use: a) Livestock farming	<u>Infrastructure:</u> seasonal access constraints (affects markets but not the basic viability of extensive grazing). <u>Ecological:</u> soil degradation, low fertility, fire regimes.	Livestock is the dominant, low-investment livelihood in the region. While ecological pressures reduce productivity, they do not prevent extensive grazing as a continuing use, and credit and market channels remain accessible for ranching. Overall barriers are limited in scope for this alternative.
	Continuation of the pre-project land use	<u>Investment:</u> lack of own long-term resources, limited access to credit;	Smallholder agriculture faces multiple overlapping barriers that constrain intensification or diversification and

Scenario	Alternative land use	Applicable barriers	Justification/Explanation
	land use: b) Agriculture	Technological: limited equipment, lack of extension services. <u>Social:</u> low organizational capacity, seasonal labour constraints. <u>Institutional:</u> weak policy implementation, centralized incentives; Infrastructure: poor roads, high transport costs. <u>Ecological:</u> degraded soils, water stress	make a voluntary shift to large-scale A/R unlikely. Limited finance, weak technical support, deficient logistics and degraded soils reduce incentives to invest in long-term restoration.
Scenario 2. AR activities within the established area are developed without the project being registered, certified in the AFOLU sector for the reduction of emissions.	Forestation without registration: a) Commercial forest plantations without certification	<u>Investment:</u> lack of capital, no long-term bank lines, CIF intermittency and high transaction costs, low expected returns. <u>Infrastructure:</u> poor roads, high transport costs, lack of processing and storage facilities. <u>Social:</u> lack of local skilled labour, low population density, weak community organization, competing uses (mining, illegal logging). <u>Institutional:</u> insecure and complex land tenure, centralized resource management, weak extension services, inconsistent policy enforcement. <u>Technological:</u> absence of large-scale nurseries,	Non-certified commercial plantations face nearly all identified barrier types. High upfront costs, long payback periods and weak access to credit, combined with severe logistical, institutional and ecological constraints, make large-scale, permanent, non-certified plantations unlikely to emerge or persist at landscape scale without sustained external support. Even where isolated plantations occur, permanence, restoration quality and market competitiveness are compromised.

Scenario	Alternative land use	Applicable barriers	Justification/Explanation
		limited genetic/propagation capacity, scarce silvicultural training, long input travel times.	
		<u>Ecological:</u> poor soils, recurrent fires, low natural regeneration, hydrological variability.	

Source: Prepared by South Pole (2024), based on project information).

In summary, and considering both Scenario 1 (continuation of pre-project land use, livestock and agriculture) and Scenario 2 (forestation without CDM registration, i.e., commercial non-certified plantations), a combination of financial, infrastructure, social, technical, institutional, and ecological barriers prevents credible, large-scale afforestation or restoration from occurring without external support such as carbon finance. While extensive cattle ranching endures because it requires low upfront investment and benefits from existing local labour and short-cycle finance, smallholder agriculture is constrained by limited access to capital, weak extension services, poor logistics and degraded soils, which make a voluntary shift to long-term restoration unlikely. Non-certified commercial plantations face the most severe and overlapping constraints, including lack of long-term financing, high transaction costs for incentives, poor roads and transport costs, absence of nursery and propagation capacity, insecure land tenure, limited skilled labour, and harsh site conditions such as low soil fertility, recurrent fires and low natural regeneration. Taken together, these interrelated barriers show that, under current conditions, the implementation and long-term sustainability of afforestation or restoration activities would not occur independently, which supports the conclusion that carbon finance is essential and confirms the project’s additionality.

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

In this sub-step, the analysis focuses on evaluating and eliminating the alternative land use scenarios identified in Sub-step 1b, following the procedures outlined in the CDM Combined Tool. The objective is to determine which scenarios are prevented from occurring at scale within the project boundary due to at least one of the barriers identified in Sub-step 2a. The assessment considers the nature, magnitude, and

interaction of financial (investment), infrastructure, social, institutional, technological, and ecological barriers, as well as the regional availability of information, technology, and skilled labor. The results presented below substantiate the elimination or retention of each land use scenario, distinguishing between the continuation of pre-project land uses (livestock and agriculture) and the alternative of establishing forest plantations outside a CDM certification framework.

Table 36 – Elimination of alternative land use scenarios based on identified barriers (Sub-step 2b)

Scenario	Alternative land use	Decision	Justification/Explanation
Scenario 1. Continue with the preconditions of land use	Continuation of the pre-project land use: a) Livestock farming	Not eliminated	Livestock is the dominant and most established productive activity in the region. It requires minimal investment, relies on extensive grazing practices adapted to the savanna ecology, and benefits from accessible credit and stable market demand. While ecological conditions such as poor soils, periodic droughts, and recurrent fires reduce productivity, these factors do not prevent cattle ranching from continuing as a baseline activity. On the contrary, the combination of limited financing for forestry, weak institutional presence, and poor infrastructure indirectly favors livestock expansion, as it remains the most viable and culturally embedded land use. Evidence: Banco Agrario and other financial institutions provide credit for cattle but not for long-term forestry; field studies confirm the persistence of extensive grazing despite soil degradation and limited infrastructure.
	Continuation of the pre-project	Not eliminated, but constrained	Small-scale agriculture continues to be a viable activity, but it faces overlapping barriers that limit its

Scenario	Alternative land use	Decision	Justification/Explanation
	land use: b) Agriculture		capacity to transition into more sustainable or restorative practices. Investment barriers (lack of capital and access to credit), technological gaps (limited machinery and technical assistance), and poor infrastructure restrict productivity and market access. These factors, combined with degraded soils, low organizational capacity, and institutional inefficiency, discourage farmers from investing in long-term afforestation or agroforestry alternatives. However, these barriers do not completely prevent subsistence agriculture, which remains feasible as a livelihood strategy. Evidence: Poor rural connectivity, absence of technical extension services, and limited financial inclusion in remote areas like Vichada maintain agriculture as a marginal yet persistent activity.
Scenario 2. AR activities within the established area are developed without the project being registered, certified in the AFOLU sector for the reduction of emissions.	Forestation without registration: a) Commercial forest plantations without certification	Eliminated as a credible baseline	The establishment of non-certified A/R activities at a meaningful scale is prevented by a combination of financial (investment), infrastructure, social, technical, institutional, and ecological barriers. These include the absence of long-term financing and credit lines for forestry, CIF intermittency and low incentive levels, deficient transport and processing infrastructure, lack of nurseries and silvicultural expertise, insecure land tenure, weak institutional support, low population density, poor soils, recurrent fires, and limited natural regeneration. Although isolated plantations may

Scenario	Alternative land use	Decision	Justification/Explanation
			occur, these are small, dependent on temporary incentives, and lack permanence or economic viability. Evidence: only 9.6% of Colombia’s potential forestry area has been planted^{149 150}, transport costs are excessively high due to poor road access, and CIF approval delays and funding fluctuations demonstrate that large-scale, sustained, non-certified afforestation is not a realistic baseline alternative.

Source: Prepared by South Pole (2024), based on project information).

Outcome of Sub-step 2b:

Scenarios remained for further consideration:

Scenario 1

- a) Livestock farming, remains a plausible baseline, it is not prevented by the identified barriers.
- b) Smallholder agriculture, remains plausible as a baseline, although it is constrained and unlikely to transition voluntarily to large-scale A/R.

Scenarios eliminated as credible baselines:

- a) Small- scale and Large-scale, permanent, non-certified commercial forest plantations are eliminated as a credible baseline for the project area, because financial (investment), infrastructure, technical, institutional, and ecological barriers jointly prevent their realization at landscape scale. plantings are possible in isolated situations, but they do not represent a realistic, comprehensive

¹⁴⁹ Davis, R. R., De la Torre, R., Cubbage, F. ., & Kanieski da Silva, B. (2024). Prospects for commercial tree farming in Colombia. Journal of Forest Business Research, 3(1), 1–33. <https://doi.org/10.62320/jfbr.v3i1.43>. Available at: <https://forest-journal.com/index.php/JFBR/article/view/commercial-tree-farming-colombia>

¹⁵⁰ Sistema de Información para la Planificación Rural Agropecuaria, SIPRA, 2024. Available at: <https://sipra.upra.gov.co/nacional>

baseline for the project area and are therefore not retained as a primary baseline scenario for the A/R CDM analysis.

The analysis of barriers demonstrates that only the continuation of pre-existing land uses, namely extensive livestock farming and smallholder agriculture, are not prevented by the identified barriers and can therefore be considered viable under current regional conditions. These activities persist despite ecological degradation, institutional weaknesses, and limited infrastructure because they require low investment, depend on traditional knowledge, and benefit from established cultural practices and short economic cycles. Extensive cattle ranching remains the dominant livelihood in Vichada, supported by accessible credit and local labor, while small-scale subsistence agriculture continues to provide minimal income and food security, even under unfavorable environmental conditions. In contrast, all afforestation or reforestation alternatives, particularly non-certified commercial plantations, are constrained or eliminated due to the combination of the identified barriers that make their scale or long-term implementation unfeasible. Therefore, the only land-use scenario not prevented by barriers is Scenario 1. Continue with the preconditions of land use with the baseline uses of livestock grazing and subsistence agriculture, both of which are capable of continuing under current circumstances without external support mechanisms such as carbon finance.

The identified barriers represent decisive limitations that prevent the realization of Scenario 2 under current regional conditions, while they enable and reinforce the persistence of Scenario 1 activities. Extensive livestock and subsistence agriculture prevail because they fit within existing infrastructure, local labor availability, and short-cycle financial systems. In contrast, non-certified forestation depends on substantial technical expertise, long-term financing, and institutional support that are currently absent. Although isolated efforts could emerge, the cumulative impact of financial, infrastructural, technical, institutional, and ecological constraints makes large-scale, non-certified afforestation infeasible. Consequently, only through sustained external mechanisms, such as carbon finance, could these activities become viable, confirming that they do not constitute a credible baseline scenario.

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)

The following section applies the decision tree outlined in the A/R CDM "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project

activities” to the alternative land-use scenarios identified in Sub-step 1b. This step evaluates, based on the results of the barrier analysis, which scenarios remain viable under current regional conditions, and which are prevented by the identified constraints. The decision tree is therefore applied separately to each alternative scenario to determine whether they can credibly occur in the absence of the proposed A/R CDM project activity, and to establish the baseline scenario accordingly.

- Is forestation without being registered as an A/R CDM project activity included in the list of land use scenarios that are not prevented by any barrier?

Answer: **No**.

→ If no, then:

- Does the list contain only one land-use scenario not prevented by barriers?

Answer: **Yes**.

→ If yes, then the remaining land use is the baseline scenario. Continue with Step 4: Common practice test

Alternative scenario 1: Continuation of the pre-project land use

The continuation of the pre-project land use, comprising extensive livestock farming and smallholder agriculture, remains the only viable land-use scenario under existing economic, social, and environmental conditions. These activities are not prevented by the identified barriers and continue to dominate due to their low capital requirements, established local practices, and short financial cycles. Therefore, Scenario 1 is determined to be the baseline scenario.

This baseline reflects ongoing land degradation, limited productivity, and negligible carbon sequestration, consistent with the historical land-use trajectory of Puerto Carreño and the wider Vichada region.

Alternative scenario 2: Forestation of the land within the project boundary performed without being registered as the A/R CDM project activity

Scenario 2 is eliminated as a credible baseline due to the combination of financial (investment), infrastructure, social, institutional, technological, and ecological barriers that preclude the establishment of sustained, large-scale forestation without external support. Although small, isolated plantations may occur under temporary incentive schemes such as CIF, these do not represent a viable or replicable land-use pathway.

Consequently, Scenario 2 cannot be considered the baseline scenario, confirming that the only feasible baseline corresponds to the continuation of existing degraded land uses (Scenario 1).

Outcome of Sub-step 2c:

The determined baseline scenario is **Scenario 1: Continuation of the pre-project land use**, characterized by extensive livestock grazing and smallholder agriculture. This scenario remains the only viable land use under current conditions, as it is not prevented by the identified barriers and reflects the prevailing pattern of low-intensity, unsustainable land management in the region.

According to the decision tree of the A/R CDM tool, Step 3 (Investment Analysis) is not required, since only one land-use scenario remains feasible. However, a brief description of the investment context is provided for completeness, followed by Step 4 (Common Practice Analysis) to further support the demonstration of project additionality.

Step 3. Investment analysis:

Projected cash flows show that, without income from carbon credits, the Internal Rate of Return (IRR) would remain below acceptable thresholds. By contrast, carbon finance enables the project to recoup reforestation costs, provide local employment, and maintain sustainable forest management practices over the long term. The investment analysis demonstrates that the project is not financially viable in the absence of carbon finance. Without the income generated from carbon credits, the project would not be implemented, as the revenues from the primary activities alone are insufficient to justify the substantial upfront investment required. While traditional financial metrics are commonly used to assess profitability, in this case, the project does not present a realistic baseline scenario for comparison without carbon revenues. The IRR in a no-carbon scenario is not only below investment thresholds, it reflects a fundamentally non-viable initiative.

Conversely, with carbon finance, the project becomes feasible, allowing for the recovery of initial costs, the generation of local employment opportunities, and the implementation of long-term sustainable land management practices. The analysis confirms that the income from carbon credits is essential for the project's viability and implementation, underscoring its additionality.

Step 4. Common practice analysis:

Common practice in Vichada¹⁵¹, has historically focused on forestry trials and planned commercial plantations limited in scale and scope. Reforestation of large tracts of degraded land, under a conservation-oriented approach, without commercial timber harvesting, is uncommon but not unique. While reforestation is almost always conducted as monocultures of fast-growing exotics (primarily *Acacia mangium*, *Pinus caribaea*, *Tectona grandis*, *Gmelina arborea*, and common *Eucalyptus* seedling plantings), managed on short rotations with limited financing; the regional carbon-credit landscape includes a few carbon project initiatives registered (some lie immediately adjacent to the Brújula Verde project area as detailed in Figure 18), most of these identified carbon projects involve commercial forestry activities, suggesting that carbon financing plays a role in making these ventures viable, particularly in areas with degraded land, and other two are 100% conservation-focused projects. Nevertheless, the model of establishing mixed stands of cloned *Eucalyptus pellita* (clone TQ274) and native species, combined with rigorous climate-adaptive management and binding no-harvest covenants, like the integrated, conservation-first silvicultural system proposed by Brújula Verde, remains far from business-as-usual activities.

Moreover, although seedling stock continues to dominate many regional plantings, clonal propagation is gaining ground; major developers such as InverBosques now operate in clonal-reliant nurseries alongside seedling production. The Brújula Verde model, establishing mixed stands of *E. pellita* and native species, managed explicitly for ecosystem services (carbon sequestration, biodiversity enhancement, soil restoration) rather than timber yield, represents a clear and distinct departure from business-as-usual (both the predominant monocultures and the few existing conservation-only plantings in Vichada). Its reliance on long-term financing instruments (trust-fund mechanisms, carbon credits) and binding legal safeguards (conservation easements, post-project forest classification) further illustrates why this approach cannot be considered common practice in the region, and also the use of cloned *E. pellita* material

¹⁵¹ Within the additionality assessment, “region” refers to the entire Department of Vichada, and, where indicated, the broader Orinoquía biome. This expanded definition provides a comprehensive reference frame for evaluating prevailing forestry and agricultural practices under similar socio-economic and ecological conditions.

is especially uncommon; clonal propagation is a niche, research-level practice in Vichada, where most plantations still rely on seedling stock (Fedemaderas, 2024)¹⁵².

In conclusion, the Brújula Verde project surpasses regional practices by implementing a conservation-focused silvicultural system, establishing mixed stands of cloned *Eucalyptus pellita* and native species under rigorous management protocols, rather than rudimentary, small-scale monocultures or unmanaged trials previously seen in Vichada. Its financial model, anchored in long-term carbon revenue streams and trust-fund incentives, together with binding legal covenants and Colombian forest-classification statutes, ensures both operational viability and permanent protection of the plantation beyond the crediting period. By directly transforming degraded grasslands into sustainably managed forest ecosystems, and doing so only through voluntary, private-sector investment, the project demonstrates additionality and delivers lasting environmental and social benefits that would not occur under business-as-usual land use.

By addressing these elements, baseline scenario, key barriers, financial analysis, legal context, and local practice, the Brújula Verde project adheres to Gold Standard's additionality requirements, showing that it depends on carbon revenue to make the transition from degraded grasslands to a sustainably managed forest ecosystem.

Conclusion of the additionality assessment

The proposed project activity meets the requirements of Option 1 under Gold Standard (GS) guidelines, and is therefore considered to be additional. The project additionality assessed in is provided in the Support Information folder.

B.5.1 Prior Consideration

Although Brújula Verde follows a retroactive project cycle, the following evidence demonstrates that carbon credit revenues were a core component of the project's financial planning from its earliest stages. This ensures that the requirement for prior

¹⁵² Fedemaderas. (2024). Forest bulletin 2024. Federación Nacional de Industriales de la Madera. Available at: <https://fedemaderas.org.co/boletin-estadistico-forestal-marzo-de-2024/>

consideration applicable to non-CER retroactive projects and projects undergoing design changes has been met.

Evidence of Prior Consideration:

1. Early funding discussions and agreement (December 20, 2022):

- A service agreement¹⁵³ was commissioned by the project developer shortly after conceptualizing the reforestation initiative. This document provides evidence that the Brújula Verde project complies with the requirement for prior consideration applicable to non-CER retroactive projects and projects undergoing design changes, including the incorporation of new technologies or measures. Specifically, it confirms that:
 - The time of first submission is within the required timeline for AR retroactive projects¹⁵⁴, or
 - The request for Design Change approval is within one year of the Design Change start date

Supporting timeline and evidence:

- 1. Service Agreement details and execution:** A formal service agreement was executed on December 20, 2022, establishing the framework and commitment for project implementation, technical support, and preparation of documentation for carbon certification.
- 2. Project Start Date:** The official start date of the Brújula Verde project is May 15, 2023. Accordingly, the agreement outlines¹⁵⁵ that the initial submission to the relevant authority (all required documentation for the first submission to Gold Standard) will be completed within the standard's required timeline for AR retroactive projects.

¹⁵³ See supporting documentation at folder: [Supports\PDD\B.5.1]

¹⁵⁴ In line with the Gold Standard Core document "Land Use & Forests Activity Requirements v1.2.1" for Land-Use and Forestry (LUF) projects, the crediting period can begin up to three years prior to the date of Project Design Certification (Principle 4, section 3.1.11)

¹⁵⁵ The agreement requires full compliance with relevant Carbon Standards and Registries. Specifically, Section 14(d)(ii) states that Inverbosques "will take all actions necessary to enter or maintain all arrangements with relevant parties, including but not limited to any relevant Carbon Standards, Registries and Carbon Project Developers, necessary under the relevant Standard Rules and Registry Rules..." This provision demonstrates that the project was structured from the outset to follow the rules and timelines of the selected standard, in this case Gold Standard. Furthermore, the development of the Brújula Verde project follows the implementation framework and delivery obligations set out in the Agreement's schedules (1-9), notably Schedule 5 (Initial Project Phase and Project Milestones) These schedules establish the timeline and documentation requirements that underpin the project's adherence to the standard's eligibility rules for retroactive AR projects. See supporting agreement at folder: [Supports\PDD\B.5.1]

3. Submission timeline assurance and Design change considerations: The service agreement also outlines all necessary documentation and technical data required for the first submission, or for any future design change requests¹⁵⁶.

2. Initial feasibility (November, 2023):

Following the conceptualization of the Brújula Verde AR initiative, a preliminary feasibility assessment was commissioned in November 2023. This assessment highlighted the critical role of carbon finance in ensuring the project's viability, particularly in addressing the high upfront costs associated with tree planting, early maintenance, and long-term sustainability¹⁵⁷.

The feasibility effort was further reinforced by the capability building strategy, which outlines the technical and institutional groundwork necessary to ensure the successful implementation of native species reforestation.

Key elements include:

- Evaluation of native species performance under varying site conditions (e.g., survival rates, adaptability, and ecological functionality).
- Identification of capacity gaps and proposed measures for local technical teams and community stakeholders.
- Strategic planning for the propagation and management of native species, aligned with carbon project requirements.
- Explicit recognition that carbon finance is essential to sustain these early-stage investments and institutional strengthening.

It is important to highlight that although the Brújula Verde project had already initiated planting activities and officially commenced implementation, a comprehensive feasibility assessment was carried out in November 2023 to refine the afforestation strategy and guide the integration of native species. This initial feasibility assessment, provided a detailed analysis of forest modeling, species suitability, planting zones, nursery propagation strategies, and carbon sequestration

¹⁵⁶ The Service Agreement establishes that all necessary information and supporting documentation must be provided as required to evidence project milestones (Clause 14.1(a)(ii), and clause 14.2(a)(i-xii)). In addition, it specifies that the relevant technical data and documentation must be made available for monitoring and verification purposes (Clause 8.3(b)). These provisions ensure that the documentation and data required for the initial submission, as well as for any future design change requests, are contractually secured.

¹⁵⁷ See supporting documentation at folder: [Supports\PDD\B.5.1]

potential tailored to the Orinoquia region. Despite being developed after the project's initial planting phase, the report is considered a key component of the project's pre-investment design refinement, as it consolidated technical evidence and strategic planning necessary for effective large-scale native species implementation. It also confirmed the indispensable role of carbon finance in ensuring the viability and sustainability of early-stage investments. Therefore, this feasibility effort complements and strengthens the initial project conceptualization, aligning long-term reforestation activities with ecological, operational, and carbon market requirements.

Confidentiality Notice:

Please note that the information contained about the service agreement and its associated timelines is strictly confidential. It is intended only for entities that require access to this evidence for review or verification purposes. Any disclosure, sharing, or dissemination of this information without explicit authorization is prohibited.

Therefore, confidential documents such as trade agreements and other documents that are considered highly sensitive are presented as supporting documents.

Finally, carbon credits were a foundational element of the Brújula Verde project's business model. All evidence, ranging from the service agreement, confirms that carbon finance was seriously considered from the project's inception, and that the timeline from project start to first submission is within the Gold Standard's requirements for AR projects.

B.5.2 Ongoing Financial Need

According to Section 4.1.52 of the Gold Standard Core Document "Principles & Requirements V2.1" projects are only required to demonstrate ongoing financial need at the time of Design Certification Renewal. As the Brújula Verde project is not currently undergoing a renewal, this requirement does not apply at this stage. Nonetheless, should the project enter a renewal phase in the future, evidence will be provided to illustrate how revenues from the sale of carbon credits are critical to sustaining core activities, such as nursery operations, reforestation maintenance, fire and pest control measures, and local job creation, in an area otherwise dominated by low-input, extensive grazing with limited economic returns.

B.6. Sustainable Development Goals (SDG) outcomes

The project identified the contribution to six Sustainable Development Goals (SDG), and more details are presented in Table 37 below.

Table 37 – SDGs contribution

SUSTAINABLE DEVELOPMENT GOALS TARGETED	MOST RELEVANT SDG TARGET	SDG IMPACT INDICATOR (PROPOSED OR SDG INDICATOR)
13 Climate Action (mandatory)	13.2 Integrate climate change measures into national policies, strategies, and planning	Reduction in GHGs emission: Amount of GHGs emissions avoided or sequestered (Emission removals): tCO₂e/year sequestered in the planted area.
5 Gender equality	5.1 End all forms of discrimination against all women and girls everywhere	Women empowerment and gender equality: Ratio of the average wage paid during the reporting period to female employees for a specified position, compared to the average wage paid to male employees of the organization for the same position.
8 Decent work and economic growth	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.	Enhanced opportunities for income Generation: % of employees earning above minimum wage
15 Life on land	15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and by 2020 protect and prevent the extinction of threatened species.	Enhanced biodiversity: Number of protected threatened species in the project area & conservation status of species: % increase/decrease in the number of individuals of endangered specie "x" spotted in the project area

SUSTAINABLE DEVELOPMENT GOALS TARGETED	MOST RELEVANT SDG TARGET	SDG IMPACT
INDICATOR (PROPOSED OR SDG INDICATOR)		
15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.		Enhanced biodiversity: • Total area of trees planted: Total area (ha) of trees planted with Native Species

(Source: Prepared by South Pole (2025), based on information from the initiative, and the Gold Standard requirements)

B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

SDG 13 Climate Action

The main activity of the project is restoring and conserving forest carbon and biodiversity through the establishment and maintenance of Brújula Verde project, which act as carbon sinks and sequester CO₂ from the atmosphere. To quantify the total GHGs emission reductions (ERs) sequestered, the project follows the Gold Standard methodology "Methodology for Afforestation/Reforestation (A/R) GHGs Emissions Reduction & Sequestration – Version 2.1". The methodology for estimating the CO₂ removal and sequestration involves the following steps:

1. CO₂ removal

The total number of CO₂ removal units is determined every year (t) of the crediting period for each modelling unit using the following formula:

$$CO_2\text{removal units } MU, t = (CO_2\text{removal } MU, t - \text{Baseline } MU, t - \text{Leakage } MU, t - \text{Other Emissions } MU, t) \times \text{Eligible planting area } MU$$

With the applicability conditions, the methodology assumes no significant increase in the baseline, so the baseline is only deducted in year 1 (t=1). Any potential leakage is as well deducted in the first year.

$$CO_2\text{removal project area, } t = \sum_{MU=1}^{MUs} \sum_{t=1}^{CP} CO_2\text{removal } MU, t$$

Where:

$CO_2\text{removal project area, } t$ = CO₂-removal units of a project area in year t (tCO₂)

$CO_2\text{removal } MU, t$ = CO₂-removal units of a MU in year t (tCO₂)

<i>MUs</i>	=Monitoring units of a project area (1, 2, 3, ...)
<i>t</i>	=Years of the crediting period (1, 2, 3, ...)
<i>CP</i>	=Year of the crediting period ends (1, 2, 3, ...)

The carbon pools considered are shown in Table 38 below.

Table 38 – Carbon pools accounted for in the project

Carbon pools		Includes	CO ₂ removal	Baseline	Leakage
Tree biomass	Aboveground (AGB)	Stem, branches, bark	Yes	Yes	Yes
	Belowground (BGB)	Tree roots	Yes	Yes	Yes
Non-tree biomass	Aboveground (AGB)	Grass, herbs, etc.	No	Yes	No
	Belowground (BGB)	Roots of grass, herbs, etc.	No	Yes	No
Soil (SOC)		Organic material	Yes	Yes	No
Harvested wood (timber & energy wood)		Furniture, construction material, etc.	No	No	No
Litter and lying deadwood		Leaves, small fallen branches, lying dead wood	No	No	No

(Source: Prepared by South Pole (2025), based on information from the initiative, and the Gold Standard requirements)

The silvicultural method applied is conservation forest, hence the long-term CO₂ removal is determined by the “tree biomass” when an MU reaches its equilibrium.

The tree biomass is estimated as following:

$$CO_2\text{removal} = (AGB + BGB) \times CF \times C \text{ to } CO_2\text{factor} + (SOC \times C \text{ to } CO_2\text{factor})$$

Where:

<i>CO_{2removal}</i>	=CO ₂ -removal units of a project area in year t (tCO ₂)
<i>ABG</i>	=Aboveground tree biomass
<i>BGB</i>	=Belowground tree biomass
<i>CF</i>	= Carbon fraction (tC/tdm)
<i>C to CO₂factor</i>	= Conversion factor from C to CO ₂ eq (tCO ₂ e/tC)

SOC = Soil organic carbon

The yearly CO₂ removals estimates are based on the Modelling Units (MU) during the crediting period. The MUs are selected based on the plantation years and planting scheme (*Eucalyptus Pellita* with enrichment or native species), as follows:

Table 39 – Projected monitoring of Modelling Units

MU*	Project phase	Year of the plantation	Area (ha)*	planting scheme
1	1	2023	5,039.0	<i>Eucalyptus Pellita</i> with Native species enrichment
2	1	2024	4,935.2	<i>Eucalyptus Pellita</i> with Native species enrichment
3	2	2024	285.8	Native species
4	2	2025	5,000.0	<i>Eucalyptus Pellita</i> with Native species enrichment
5	2	2025	1,250.0	Native species
6	2	2026	2,000.0	Native species
7	2	2027	1,500.0	Native species
Total			20,010.0	

*Note: Following the Project's internal procedures and technical input, the current planting schedule has been conservatively designed to prioritize pre-identified, high-priority areas and to align precisely with the secured usufruct zones, ensuring full compliance with the project's legal and operational framework.

Further degradation analyses are currently being conducted, including the application of complementary methodologies, to quantitatively assess the status of additional areas. The results of these studies will be integrated into the project at the verification stage, allowing for adjustments to the planting plan based on the final classification of degraded areas, and will provide greater clarity on the total area eligible for planting in future years, once the necessary data is available and validated.

(Source: Prepared by South Pole (2025), based on information from the initiative, and the Gold Standard requirements)

In developing the ex-ante estimation for the project's crediting period, Monitoring Units (MUs) are defined across the entire period. It is important to note that only part of the MUs have been planted and the remaining MUs are projected based on Inverbosques' annual planting capacity and are inherently dynamic, subject to adjustment as new data become available.

As of now, the 10,260.0 hectares planted during the 2023–2024 period (MU1, MU2 and MU3) will be included as Project Area at validation. Looking ahead, the project

anticipates expanding the plantation area to reach a goal of around 20,010.0 hectares by 2027.¹⁵⁸

The ex-ante estimation is based on a reasonable scale-up scenario that reflects both the current planted area and the projected annual planting capacity. It is important to note that these estimates will be revised as Inverbosques engages with additional land owners interested in joining the Brújula Verde Project and secures further land rights. This dynamic approach ensures that the project's crediting period is continuously aligned with actual field performance and legal frameworks, thereby reinforcing the project's commitment to sustainable expansion and robust environmental impact.

Aboveground tree biomass

The ex-ante estimation of the above ground tree biomass growth is based on secondary data. More information can be found on the calculation sheet provided as an additional document¹⁵⁹.

The ex-post estimation of the above ground tree biomass will be based on forest inventories that will be carried out each verification. Dendrologic measurements will be taken which will be converted to above ground biomass estimates with a volume or allometric equation method. Wood densities will be based on secondary data from peer-reviewed literature depending on the available data.

Belowground tree biomass

¹⁵⁸ Clarification notes on Project Area phasing and planting model: The 10,260.0 ha included in the current validation correspond to the areas that are already planted in Modelling Unit 1 (Phase 1), Modelling Unit 2 (Phase 1), and Modelling Unit 3 (Phase 1 and 2). By the end of 2027, the project aims to reach approximately 20,010.0 ha of total planted area through the establishment of additional areas under Modelling Units 4 to 7, as part of Phase 2, which are planned based on the established forest plantation model and form the remainder of Phase 2. These areas are scheduled for planting between 2025 and 2027 and are considered part of the project's confirmed expansion plan.

Considering that the total eligible area within the Prioritized Area, at the time of the submission, is 39,118.7 ha, the project envisages further expansion over this area, of mixed-species plantations beyond Phase 2. Specifically, the project plans to establish an additional 10,000.0 ha over the next five years (beyond 2027), which would correspond to a potential Phase 3. However, since these areas represent a future and currently undefined planting phase, this phase remains contingent and will be designed according to evolving restoration needs and opportunities and will not be included in the current ex-ante estimations.

The design and composition of the planting model for this potential Phase 3 will be defined in future verification cycles, as applicable, through the Monitoring Report. As such, the additional 10,000.0 ha shall be considered a potential planting area and once the planting design is finalized and the sites are confirmed, the area will be formally integrated into the project's scope and associated projections. This approach ensures transparency, consistency with Gold Standard requirements and methodologies, and alignment with the project's phased implementation strategy.

¹⁵⁹ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The results are attached in the project's information management folder at folder: [Supports\LUF_AR-Methodology]

The belowground tree biomass is calculated with the following formula:

$$BGB = AGB \times R$$

Where:

<i>BGB</i>	=Belowground tree biomass
<i>ABG</i>	=Aboveground tree biomass
<i>R</i>	= Root to shoot ratio

Soil organic Carbon

To determine the increment in Soil Organic Carbon (SOC) for the project area the A/R Soil Carbon Tool will be applied and added to the ER project estimates. To estimate the change in SOC stock in the project scenario, the Project Area was stratified according to the approach set out in the CDM A/R Methodological tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" – version 01.1.0¹⁶⁰, which identifies following criteria:

Climate region and soil types¹⁶¹

Pre-Project management activities on croplands

Pre-Project management activities on grasslands

The Gold Standard tool was only used to stratify the project areas accordingly to later estimate soil organic carbon changes. The ex-ante estimations have been incorporated into the ER estimation model sheet.

¹⁶⁰ See supporting Excel file .xlsx "403_V1.0_0.7_LUF_AR Methodology_Soil Carbon Tool" The results are attached in the project's information management folder at folder: [Supports\LUF_AR-Methodology]

¹⁶¹ The project uses the soil carbon accounting tool to identify default values for the baseline scenario. This process involved matching the biophysical characteristics of the project region with the tool's predefined categories. Specifically:

1. Climatic Region: "Tropical, Wet": The project area exhibits high annual rainfall and consistently warm temperatures typical of tropical climates. Monthly precipitation records and climate classification data confirm that the region falls under the "tropical wet" category, with a pronounced rainy season and limited seasonal temperature variation. Using the "tropical, wet" classification ensures that soil carbon accumulation rates reflect the high levels of moisture availability, biological activity, and organic matter turnover expected in such environments.
2. Soil Type: "High Activity Clay Soils": The project area contains clay minerals with relatively high cation exchange capacity (CEC). Such soils, often classified as high activity clays, have enhanced nutrient-holding capacity and can sustain higher rates of organic matter retention compared to sandy or low activity clay soils. Selecting "High Activity Clay Soils" aligns the default soil carbon estimates with the region's observed soil chemistry and structure, thereby improving the accuracy of baseline carbon calculations.

Once the climatic zone and soil type were identified, the tool provided a default rate of 2.42 tCO₂e/ha/yer for soil carbon accumulation or baseline stock. By adopting this default value, the project ensures that soil carbon estimates are consistent with internationally recognized standards and that the baseline scenario remains conservative. Any potential increase in soil carbon beyond this rate due to project interventions can be robustly attributed to project activities rather than overstated default assumptions.

2. Baseline

a. Non-Tree Biomass

The baseline situation was grassland (as specified in the eligibility assessment section). Baseline estimation is determined on modelling unit level by applying a default non-tree biomass value from 7.25 tCO₂e for biomass stock of grassland after conversion from other land use was chosen since no other local values were present at the time of the analysis.

b. Tree Biomass

For estimating the baseline, an analysis using satellite imagery was conducted, to identify the tree biomass present before the start of the project activities. Although a small number of pre-existing trees were identified as present in the project area at the outset, these individuals have been mapped and excluded from the carbon quantification model. No baseline biomass from these existing trees is credited or included in the project's calculations, as the project does not anticipate removing or altering their carbon stocks. Consequently, no baseline biomass value is accounted and available, and therefore, the baseline is zero. All additional tree biomass recorded will result only from new plantings and regeneration activities initiated under the project.

Tree biomass will be measured periodically as new growth develops, and any changes, such as losses from mortality, will be tracked and deducted from the total CO₂ removals credited to the project once those losses occur. This approach ensures that any carbon gains attributed to new growth are clearly distinguished from pre-existing trees, which remain outside the scope of credited emission removals while still being preserved in the project.

3. Leakage

Leakage comprises emissions that occur due to a shift of activities from inside of a project area to the outside of a project area.

Leakage refers to unintended emissions that occur when activities shift from within the project area to external locations. The different types of leakage acknowledged by the methodology are listed below. In the context of the Brújula Verde project, an assessment has been carried out across multiple categories to ensure that no such leakage compromises the project's environmental integrity.

- a. Collection of wood (for firewood, charcoal, etc.): In the Brújula Verde project, no wood collection for firewood, charcoal, or any other purpose is carried out. The project area originally contains minimal woody biomass, ensuring that the potential for displaced wood collection activities is negligible. Moreover, the project is explicitly designed to conserve the plantation intact, with strict prohibition on any form of wood extraction or exploitation. This approach reinforces the project's commitment to maintaining the plantation as a preserved ecosystem, free from the pressures of resource utilization and associated leakage.
- b. Timber Harvesting: Due to the frequent burning regime in the region, larger trees that could be harvested for timber are largely absent. Consequently, the project area lacks significant timber resources, making timber harvesting leakage virtually nonexistent. Additionally, the project's sustainable forest management practices ensure that any removal of woody biomass is conducted responsibly and is not driven by commercial timber extraction.

Pictures of the project area before planting are provided below, in order to detail the arguments for the collection of wood and timber harvesting.

- c. Agriculture (crop cultivation, shrimp cultivation, etc.): Before the project's implementation, the baseline land use in the area consisted in low-input extensive grazing systems with no tree regeneration, considering this baseline no leakage from agriculture is accounted.
- d. Livestock: Within the project area, no livestock activities are conducted, as the project does not involve families engaged in animal husbandry. Livestock practices occur exclusively in the surrounding region limited to small-scale, free-roaming animals such as cows and chickens in the Bitá River Basin, ensuring that there is no displacement of grazing or livestock management activities from within the project area to neighboring lands. This clear separation guarantees that any potential leakage associated with livestock is effectively zero. By focusing on the conservation and sustainable management of the plantation, the project is able to fully achieve its soil ecosystem restoration and reforestation objectives without interference from external livestock practices. This deliberate design reinforces the project's commitment to preserving the integrity of the

plantation and supporting long-term environmental sustainability. This strategy ensures that there is no significant displacement of grazing activities, thereby keeping livestock-related leakage at zero.

The leakage is calculated with the following formula under the “c” category:

$$\text{Leakage Project area [tCO}_2\text{]} = \text{Area [ha]} \times \% \text{ of activity shift [\%]} \times \text{CO}_2 - \text{stock [tCO}_2\text{/ha]}$$

Where:

Area	= Land within the project area where the activity is taking place (ha)
% of activity shif	= Percentage of the activity that: • will be displaced during the crediting period, AND • will have impact on the tree biomass outside the project area
CO ₂ – stock	= Average stock of tree biomass on the area where the activity will be displaced to

The assessment of leakage confirms that the percentage of activity shift is 0%, as determined in the evaluation process. The determination of leakage was conducted through a comprehensive survey of former landowners and neighboring communities. This survey was carried out by qualified representative acting on behalf of the project developer in collaboration with a technical expert from a third party, such as a member of a governmental environmental institution. As a result, the project demonstrates that no displacement of activities has occurred, suggesting that the leakage factor remains at zero and ensuring the full environmental integrity of the Brújula Verde project.

The Brújula Verde project does not generate significant leakage across key categories, including wood collection, timber harvesting, agriculture, and livestock activities. The project area was originally characterized by minimal woody biomass, the absence of significant timber resources, and low-intensity grazing, all of which contribute to a negligible risk of displaced activities. Additionally, strict conservation measures and sustainable management practices ensure that no resource extraction or land-use shifts occur due to the project’s implementation. As a result, the project maintains a leakage value of zero, ensuring that all carbon sequestration benefits remain fully attributable to the project’s reforestation and soil ecosystem restoration efforts.

4. Other emissions

According to the Sections 3.8.1 to 3.8.3 of the Gold Standard Afforestation/Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology (version 2.1), additional emissions may arise from site preparation involving biomass burning, fossil fuel combustion, and the use of nitrogen-fixing trees.

Site preparation

In the Brújula Verde project, no biomass burning takes place during the land preparation, land is not cleared by burning practices before sowing and the project has several mechanisms in place to discourage the use of fire. Therefore, this is assumed to be zero.

Fertilizer

The only relevant source of emissions for the project is fertilizer application, used on the young trees. In accordance, the project accounts for fertilizer use by deducting 0.005 tCO₂ per kilogram of nitrogen (N) as required in the methodology. To determine the total nitrogen applied, the nitrogen content in each fertilizer or herbicide (e.g., glyphosate, calculated based on its molecular composition) is multiplied by the total mass of product applied per hectare. An average fertilization rate is then conservatively applied to all Management Units (MUs) for the first five years.

This approach ensures that any emissions resulting from fertilizer use are robustly captured in the carbon model, consistent with the methodology's guidelines and accounting for fertilizer-related GHG emissions.

Combustion of fossil fuel

Fossil fuel use is negligible. The project does not rely on flights or large-scale machinery that would consume significant amounts of fuel. Any minor consumption that does occur is insufficient to be considered a notable source of emissions.

N-fixing trees

No nitrogen-fixing species are planted, meaning no additional emissions arise from this category. The Brújula Verde project relies primarily on *Eucalyptus pellita* for reforestation, complemented by enrichment plantings model and natural regeneration to enhance biodiversity and ecosystem resilience. The enrichment planting includes native species such as Aceite (*Copaifera pubiflora/officinalis*), Congrio (*Acosmium nitens*), Macano (*Terminalia amazonia*), Simaruba (*Simarouba amara*), Yopo (*Anadenanthera peregrina*), Nauno (*Albizia guachapele*), Cedro (*Cedrela odorata*), Casia (*Cassia moschata*), Jacarandá (*Jacaranda copaia*), Saladillo Blanco (*Vochysia lehmannii*), and Carbonero (*Calliandra pittieri*), among others. Additionally, the project

promotes the natural regeneration of native vegetation, fostering ecosystem recovery and enhancing biodiversity. This integrated approach strengthens ecological resilience and contributes to long-term forest sustainability. These native species were selected to enhance biodiversity, ecological resilience, and habitat quality within the project area. While certain native trees can exhibit minor nitrogen-fixing capabilities, their contribution is not significant enough to warrant consideration as a substantial source of emissions. Consequently, no additional accounting is required under the methodology for nitrogen-fixing species. This approach ensures that the project's goals of reforestation and ecosystem restoration are met without introducing notable nitrogen-related greenhouse gas emissions.

No other emissions should be taken into account.

SDG 5 Gender equality

The project evaluates SDG Target 5.1 to monitor and promote gender equality and women's empowerment within its operations.

The project evaluates gender wage equity. Although no standardized Gold Standard Impact Methodology exists for this indicator, the project employs a tailored approach to calculate both baseline and project outcomes. By tracking this indicator, the project not only aligns with its safeguarding measures and equity commitments but also ensures that gender equality is systematically integrated and transparently reported as a key impact outcome.

For SDG 5, the baseline is set considering the wages in 2023 and assuming that without the project there would be no improvement in working conditions including crucial advancements in gender equality and women's empowerment. In the absence of the project's interventions, existing challenges in these areas would remain unchanged, underscoring the project's role in driving meaningful progress and establishing a new benchmark for inclusive and equitable development.

SDG 8 Decent work and economic growth

Under SDG 8, which focuses on decent work and economic growth, the project evaluates its impact on enhancing income generation. Specifically, the project measures the percentage of employees earning above the minimum wage, which serves as an indicator of improved job quality and better economic prospects for individuals.

For SDGs 8, the baseline is set according to the labor conditions in place at the start of the plantation for the Brújula Verde Project. However, without the project, there would be no assurance of improved working conditions, effectively making the baseline zero. The outcome of SDG 8 will be quantified as the number of employees with fulfillment of labor rights, independent of the employment type (temporary, full-time or part-time).

SDG 15 Life on land

In line with SDG 15 "Life on Land," the project rigorously evaluates multiple indicators to measure progress in sustainable forest management, biodiversity enhancement, and the protection of threatened species. Regarding the indicator "Number of Protected Threatened Species in the Project Area & Conservation Status," the baseline ideally should reflect the number of individuals observed per species as part of the baseline study conducted between 2024 and 2025. For the monitoring indicator "Total Area of Trees Planted with Native Species" the baseline is set at zero because, without the project, no afforestation or reforestation would occur.

The net benefit for SDG 15 will be quantified by the difference between target outcomes and these baseline conditions, measured both in terms of hectares reforested and the increase in fauna abundance and the number of threatened species. Comprehensive biodiversity reports will be generated with each performance certification, underscoring the project's commitment to restoring degraded forests and protecting biodiversity across its operational landscape.

The baseline scenario is:

1. Hectares of pastureland reforestation, protection of natural areas and sustainably managed forests
2. ha of pastureland.
3. Enhance biodiversity. Increment on the number of individuos of fauna present in the project area, and the number of threatened species.

For each verification period, at least one biodiversity report will be generated assessing the progress in the indicators.

B.6.2 Data and parameters fixed ex ante

SDG13

Data/parameter	Eligible project area
Unit	Ha
Description	Eligible project area as per Gold Standard Requirements.
Source of data	Data from remote sensors and multispectral satellite images and GIS software.
Value(s) applied	10,260.0 ha planted ("Project Area" at validation)
Choice of data or Measurement methods and procedures	Eligibility analysis, see section A.1.1 for more details of the procedure.
Purpose of data	Calculation of GHG baseline scenario Calculation of project scenario.
Additional comment	During the project's eligibility assessment, 59 properties were considered ("Prioritized Area") with a total of 55,619.7 ha evaluated, out of which 39,118.7 ha were classified as eligible (see Table 27). The value of 39,118.7 ha forms part of the current Design Certification framework but is included for contextual and planning purposes only. It represents the total current Eligible Area within the "Prioritized Area" that could be included in the Project. The area is not included in the current carbon accounting and does not generate removals at this stage. Any future inclusion will be subject to effective planting, monitoring, and verification in accordance with Gold Standard requirements.

Data/parameter	Total non-tree biomass stock emission removals (BT) in tCO ₂ e – Baseline
Unit	Tonnes of CO ₂ e/ha

Description	Total aboveground and belowground of the non-tree vegetation in the baseline scenario (including grassland, shrubs, herbaceous vegetation and roots). The Baseline Scenario is defined as the land use scenario that would exist in the absence of the project.
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Source of data	Ruegg, 2017 ¹⁶² ; Etter et al, 2011 ¹⁶³ ; San Jose et al, 1988 ¹⁶⁴
Value(s) applied	Non-tree biomass: BT Baseline = AGB Baseline + BGB Baseline BT Baseline: 7.25 tCO ₂ /ha ¹⁶⁵
Choice of data or Measurement methods and procedures	Biomass stock of baseline scenario was identified from literature. It is defined for the project design certification and revised every project renewal design certification.
Purpose of data	Calculation of GHG baseline scenario
Additional comment	The baseline non-tree biomass stock is multiplied by 0.4 (biomass to carbon conversion factor for non-tree biomass) and 44/12 (carbon to CO₂ conversion factor).

Data/parameter	Above-ground biomass (AGB) Baseline in tCO ₂ e
Unit	Tonnes of CO ₂ e/ha
Description	The AGB Baseline Scenario is defined as the AGB of the land use scenario that would exist in the absence of the project.

¹⁶² Rüegg, J. O. H. A. N. N. A. (2017). Oil palm plantations in savannas: impact on biomass carbon stocks and soil organic carbon (SOC) dynamics (Doctoral dissertation, Master Thesis in Environmental Sciences at ETH Zürich. Ecole Polytechnique Fédérale de Lausanne, p 64).

¹⁶³ Etter, A., Sarmiento, A., & Romero, M. H. (2010). Land use changes (1970–2020) and carbon emissions in the Colombian Llanos. Ecosystem Function in Savannas: measurement and modeling at landscape to global scales, 383–402.

¹⁶⁴ San Jose, J. J., Montes, R. A., & Farinas, M. R. (1998). Carbon stocks and fluxes in a temporal scaling from a savanna to a semi-deciduous forest. Forest Ecology and Management, 105(1-3), 251-262.

¹⁶⁵ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The values used can be found on the sheet "3. Parameters". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology] and the calculation step y step process is explained on the supporting Excel file .xlsx "Baseline Non-tree Biomass (AGB+BGB) Value". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology\B6. Data and parameters fixed ex ante\Baseline non-tree biomass]

Source of data	Ruegg, 2017 ¹⁶⁶ ; Etter et al, 2011 ¹⁶⁷ ; San Jose et al, 1988 ¹⁶⁸
Value(s) applied	AGB Baseline: 5.01 tCO ₂ /ha ¹⁶⁹
Choice of data or Measurement methods and procedures	Biomass stock of baseline scenario was identified from literature. It is defined for the project design certification and revised every project renewal design certification.
Purpose of data	Calculation of GHG baseline scenario.
Additional comment	N/A

Data/parameter	Below-ground biomass (BGB) Baseline in tCO ₂ e
Unit	Tonnes of CO ₂ e/ha
Description	The Baseline Scenario is defined as the BGB land use scenario that would exist in the absence of the project.
Source of data	Ruegg, 2017 ¹⁷⁰ ; Etter et al, 2011 ¹⁷¹ ; San Jose et al, 1988 ¹⁷²
Value(s) applied	BGB Baseline: 2.24 tCO ₂ /ha ¹⁷³

¹⁶⁶ Ruegg, J. O. H. A. N. N. A. (2017). Oil palm plantations in savannas: impact on biomass carbon stocks and soil organic carbon (SOC) dynamics (Doctoral dissertation, Master Thesis in Environmental Sciences at ETH Zürich. Ecole Polytechnique Fédérale de Lausanne, p 64).

¹⁶⁷ Etter, A., Sarmiento, A., & Romero, M. H. (2010). Land use changes (1970–2020) and carbon emissions in the Colombian Llanos. Ecosystem Function in Savannas: measurement and modeling at landscape to global scales, 383–402.

¹⁶⁸ San Jose, J. J., Montes, R. A., & Farinas, M. R. (1998). Carbon stocks and fluxes in a temporal scaling from a savanna to a semi-deciduous forest. Forest Ecology and Management, 105(1-3), 251–262.

¹⁶⁹ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The values used can be found on the sheet "3. Parameters". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology] and the calculation step y step process is explained on the supporting Excel file .xlsx "Baseline Non-tree Biomass (AGB+BGB) Value". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology\B6. Data and parameters fixed ex ante\Baseline non-tree biomass]

¹⁷⁰ Ruegg, J. O. H. A. N. N. A. (2017). Oil palm plantations in savannas: impact on biomass carbon stocks and soil organic carbon (SOC) dynamics (Doctoral dissertation, Master Thesis in Environmental Sciences at ETH Zürich. Ecole Polytechnique Fédérale de Lausanne, p 64).

¹⁷¹ Etter, A., Sarmiento, A., & Romero, M. H. (2010). Land use changes (1970–2020) and carbon emissions in the Colombian Llanos. Ecosystem Function in Savannas: measurement and modeling at landscape to global scales, 383–402.

¹⁷² San Jose, J. J., Montes, R. A., & Farinas, M. R. (1998). Carbon stocks and fluxes in a temporal scaling from a savanna to a semi-deciduous forest. Forest Ecology and Management, 105(1-3), 251–262.

¹⁷³ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The values used can be found on the sheet "3. Parameters". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology] and the calculation step y step process is explained on the supporting Excel file .xlsx "Baseline Non-tree

Choice of data or Measurement methods and procedures	Biomass stock of baseline scenario was identified from literature. It is defined for the project design certification and revised every project renewal design certification.
Purpose of data	Calculation of GHG baseline scenario.
Additional comment	N/A

Data/parameter	Baseline tree biomass stock (existing trees)
Unit	Tonnes of CO ₂ e/ha
Description	Total aboveground biomass and belowground biomass of the pre-project trees
Source of data	N/A
Value(s) applied	0
Choice of data or Measurement methods and procedures	Gold Standard Afforestation/Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology, Version 2.1, and Project measurements.
Purpose of data	Calculation of GHG baseline scenario.
Additional comment	For estimating the baseline, an analysis using satellite imagery was conducted, to identify the tree biomass present before the start of the project activities. Although a small number of pre-existing trees were identified as present in the project area at the outset, these individuals have been excluded from the carbon quantification model. No baseline biomass from these existing trees is credited or included in the project's calculations, as the project does not anticipate removing or altering their carbon stocks. Consequently, no baseline biomass value is accounted and available, and therefore, the baseline is zero. All additional

Biomass (AGB+BGB) Value". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology\B6. Data and parameters fixed ex ante\Baseline non-tree biomass]

	tree biomass recorded will result only from new plantings and regeneration activities initiated under the project.
Data/parameter	Baseline tree biomass stock (regeneration)
Unit	Tonnes of CO ₂ e/ha
Description	Total aboveground biomass and belowground biomass of trees not existing at the beginning of the plantations that are not planted (expected regeneration). Trees and non-tree woody vegetation (< 2 m) that were not planted and were absent at the initial plantation, to be added in the monitoring once natural regeneration has occurred.
Source of data	Baseline biomass assessment. <i>To be added</i>
Value(s) applied	To be defined after the first inventory, as natural regeneration has not yet established measurable biomass.
Choice of data or Measurement methods and procedures	Gold Standard Afforestation/Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology, Version 2.1, and Project measurements.
Purpose of data	Calculation of GHG baseline (ex-ante), and ex-post scenarios; to capture additional carbon stocks from natural regeneration and enrichment planting over time.
Additional comment	The baseline tree biomass values for natural regeneration per Stratum ID are currently marked as To Be Determined (TBD). This is because reliable baseline biomass data depend on detailed field assessments and site-specific measurements, which are planned for future monitoring stages. For the ex-ante scenario, annual biomass projections will be applied based on scientifically supported growth rates and ecological conditions for each stratum, expressed in [m³/ha] or [t.d.m/ha], but empirical data from future monitoring periods are required to verify and update these estimates in the ex-post scenario, in accordance with carbon accounting best practices. These projections serve as preliminary estimates and are not intended to replace empirical field data. During the first

	monitoring period, accurate biomass values will be obtained through forest inventories using standardized sampling methodologies. This will ensure robust and verifiable data that reflect actual biomass levels and align with carbon accounting and reporting best practices.
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Data/parameter	Emission removals in tCO ₂ e – Leakage
Unit	Tonnes of CO ₂ e/ha
Description	Leakage is emissions that occur due to a shift of activities from the inside of a project area to the outside of a project area.
Source of data	Leakage assessment The determination of leakage was done with the performance of a survey to the ex owners and also neighbors. The survey was done by a qualified representative acting on behalf of the project developer together with a technical expert member from a third party, such as a member from a governmental environmental institution
Value(s) applied	– Leakage: 0 tCO ₂ /ha
Choice of data or Measurement methods and procedures	Gold Standard Afforestation/Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology, Version 2.1.
Purpose of data	Calculation of leakage.
Additional comment	% of activity-shift: A value of 0% for the increase in emissions in the leakage due to the implementation of AR activities is applied by default.

SData/parameter	Emission removals in tCO ₂ e – Soil Carbon
Unit	Tonnes of CO ₂ e/ha
Description	The soil organic carbon is not sampled during inventory activities.
Source of data	Soil Carbon is estimated based on the GS Tool for A/R Projects.

Value(s) applied	Default data used was selected from the tool. It includes: Climatic region: Tropical, wet Soil type: High Activity Clay Soils Soil Carbon (tCO ₂ e/ha/yr) = 2.42 ¹⁷⁴
Choice of data or Measurement methods and procedures	A/R Soil Carbon Tool of the Gold Standard.
Purpose of data	Calculation of soil organic carbon project scenario.
Additional comment	Although soil organic carbon is not sampled during inventory activities, the areas will be subject to periodic monitoring to track soil carbon removals, even though the methodology does not require it. This additional effort will help assess the project's contribution to soil carbon sequestration

Data/parameter	Emission removals in tCO ₂ e - Biomass Expansion Factor (BEF)
Unit	Dimensionless
Description	BEF is the ratio of the total above-ground tree biomass to the biomass of the merchantable timber (defined by a merchantable measure or a minimum DBH). BEF is commonly used in converting standing volumes of timber into total carbon stocks. BEF is calculated from the ratio of aboveground biomass and stem biomass BEF = Aboveground tree biomass/Stem biomass. (Source: GS A/R GHG Emissions Reduction & Sequestration Methodology, version 2.1).

¹⁷⁴ See supporting Excel file .xlsx "403_V1.0_0.7_LUF_AR Methodology_Soil Carbon Tool" The values used can be found on the sheet "Calculator". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology\Soil Carbon]

Source of data	Values for BEF for different species ¹⁷⁵ .																												
Value(s) applied	<table> <tr> <th>Specie</th><th>BEF</th></tr> <tr> <td><i>Eucalyptus pellita</i></td><td>1.50</td></tr> <tr> <td><i>Acosmium nitens</i></td><td>1.54</td></tr> <tr> <td><i>Cassia moschata</i></td><td>1.43</td></tr> <tr> <td><i>Copaifera pubiflora/officinalis</i></td><td>1.54</td></tr> <tr> <td><i>Anadenanthera peregrina</i></td><td>1.43</td></tr> <tr> <td><i>Simarouba amara</i></td><td>1.43</td></tr> <tr> <td><i>Cedrela odorata</i></td><td>1.39</td></tr> <tr> <td><i>Jacaranda copaia</i></td><td>1.39</td></tr> <tr> <td><i>Terminalia amazonia</i></td><td>1.30</td></tr> <tr> <td><i>Albizia guachapele</i></td><td>1.84</td></tr> <tr> <td><i>Vochysia lehmannii</i></td><td>1.30</td></tr> <tr> <td><i>Calliandra pittieri</i></td><td>1.10</td></tr> <tr> <td><i>Bowdichia virgilioides</i></td><td>1.30</td></tr> </table>	Specie	BEF	<i>Eucalyptus pellita</i>	1.50	<i>Acosmium nitens</i>	1.54	<i>Cassia moschata</i>	1.43	<i>Copaifera pubiflora/officinalis</i>	1.54	<i>Anadenanthera peregrina</i>	1.43	<i>Simarouba amara</i>	1.43	<i>Cedrela odorata</i>	1.39	<i>Jacaranda copaia</i>	1.39	<i>Terminalia amazonia</i>	1.30	<i>Albizia guachapele</i>	1.84	<i>Vochysia lehmannii</i>	1.30	<i>Calliandra pittieri</i>	1.10	<i>Bowdichia virgilioides</i>	1.30
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Choice of data or Measurement methods and procedures	BEF values were selected based on various sources of specific information for each species, ensuring accuracy and representativeness in biomass estimation. These sources include IPCC data, scientific literature, regional forestry databases, and field studies relevant to the species' ecological and geographical context.																												
Purpose of data	Calculation of project scenario																												
Additional comment	N/A																												

Data/parameter	Wood density (Emission removals in tCO ₂ e)
Unit	Ton/m ³
Description	Wood density is the dry mass for a given volume of wood: ratio of oven-dry weight of wood over its green volume
Source of data	Values for Wood density for different species ¹⁷⁶ .

¹⁷⁵ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The values used for each species can be found on the sheet "2. Sources". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology]

¹⁷⁶ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The values used for each species can be found on the sheet "2. Sources". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology]

Value(s) applied	<table> <tr> <th>Specie</th><th>Wood density</th></tr> <tr> <td><i>Eucalyptus pellita</i></td><td>0.707</td></tr> <tr> <td><i>Acosmium nitens</i></td><td>0.820</td></tr> <tr> <td><i>Cassia moschata</i></td><td>0.690</td></tr> <tr> <td><i>Copaifera pubiflora/officinalis</i></td><td>0.686</td></tr> <tr> <td><i>Anadenanthera peregrina</i></td><td>0.872</td></tr> <tr> <td><i>Simarouba amara</i></td><td>0.437</td></tr> <tr> <td><i>Cedrela odorata</i></td><td>0.640</td></tr> <tr> <td><i>Jacaranda copaia</i></td><td>0.542</td></tr> <tr> <td><i>Terminalia amazonia</i></td><td>0.660</td></tr> <tr> <td><i>Albizia guachapele</i></td><td>0.666</td></tr> <tr> <td><i>Vochysia lehmannii</i></td><td>0.430</td></tr> <tr> <td><i>Calliandra pittieri</i></td><td>0.300</td></tr> <tr> <td><i>Bowdichia virgilioides</i></td><td>0.765</td></tr> </table>	Specie	Wood density	<i>Eucalyptus pellita</i>	0.707	<i>Acosmium nitens</i>	0.820	<i>Cassia moschata</i>	0.690	<i>Copaifera pubiflora/officinalis</i>	0.686	<i>Anadenanthera peregrina</i>	0.872	<i>Simarouba amara</i>	0.437	<i>Cedrela odorata</i>	0.640	<i>Jacaranda copaia</i>	0.542	<i>Terminalia amazonia</i>	0.660	<i>Albizia guachapele</i>	0.666	<i>Vochysia lehmannii</i>	0.430	<i>Calliandra pittieri</i>	0.300	<i>Bowdichia virgilioides</i>	0.765
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Choice of data or Measurement methods and procedures	Wood density values were selected based on various sources of specific information for each species, ensuring accuracy and representativeness in biomass estimation. These sources include IPCC data, scientific literature, regional forestry databases, and field studies relevant to the species' ecological and geographical context. Values were selected at species or genus level from literature about species carbon sequestration performance in the project region. Wood density is usually estimated based on secondary data as measurement is expensive. The ex-ante will be based on literature.																												
Purpose of data	Calculation of project scenario																												
Additional comment	N/A																												

Data/parameter	Root-to-shoot ratio (R) for trees
Unit	Dimensionless
Description	Ratio of the weight of the roots to the weight of the top of the tree. Used for belowground tree biomass estimation.

Source of data	Values for Root-to-shoot ratio (R) for different species ¹⁷⁷ .																												
Value(s) applied	<table> <tr> <th>Specie</th><th>Root-to-shoot</th></tr> <tr> <td><i>Eucalyptus pellita</i></td><td>0.28</td></tr> <tr> <td><i>Acosmium nitens</i></td><td>0.32</td></tr> <tr> <td><i>Cassia moschata</i></td><td>0.32</td></tr> <tr> <td><i>Copaifera pubiflora/officinalis</i></td><td>0.32</td></tr> <tr> <td><i>Anadenanthera peregrina</i></td><td>0.32</td></tr> <tr> <td><i>Simarouba amara</i></td><td>0.32</td></tr> <tr> <td><i>Cedrela odorata</i></td><td>0.25</td></tr> <tr> <td><i>Jacaranda copaia</i></td><td>0.21</td></tr> <tr> <td><i>Terminalia amazonia</i></td><td>0.17</td></tr> <tr> <td><i>Albizia guachapele</i></td><td>0.30</td></tr> <tr> <td><i>Vochysia lehmannii</i></td><td>0.17</td></tr> <tr> <td><i>Calliandra pittieri</i></td><td>0.20</td></tr> <tr> <td><i>Bowdichia virgilioides</i></td><td>0.17</td></tr> </table>	Specie	Root-to-shoot	<i>Eucalyptus pellita</i>	0.28	<i>Acosmium nitens</i>	0.32	<i>Cassia moschata</i>	0.32	<i>Copaifera pubiflora/officinalis</i>	0.32	<i>Anadenanthera peregrina</i>	0.32	<i>Simarouba amara</i>	0.32	<i>Cedrela odorata</i>	0.25	<i>Jacaranda copaia</i>	0.21	<i>Terminalia amazonia</i>	0.17	<i>Albizia guachapele</i>	0.30	<i>Vochysia lehmannii</i>	0.17	<i>Calliandra pittieri</i>	0.20	<i>Bowdichia virgilioides</i>	0.17
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Choice of data or Measurement methods and procedures	R values were selected based on various sources of specific information for each species, ensuring accuracy and representativeness in biomass estimation. These sources include IPCC data, scientific literature, regional forestry databases, and field studies relevant to the species' ecological and geographical context. Belowground is usually estimated with a default factor as sampling is destructive and expensive																												
Purpose of data	Calculation of project scenario																												
Additional comment	N/A																												

Data/parameter	Root-to-shoot ratio (R) for non-trees
Unit	Dimensionless
Description	Ratio of the dry weight of the roots to the dry weight of the aboveground parts (shoots, including stems, leaves, and any other aerial structures). It is a critical parameter for estimating belowground biomass in ecosystems dominated by non-forest species, providing insights into

¹⁷⁷ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" The values used for each species can be found on the sheet "2. Sources". This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology]

	resource allocation, carbon storage, and overall ecosystem functioning.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 6 Grassland. Table 6.1
Value(s) applied	1.60
Choice of data or Measurement methods and procedures	Belowground is usually estimated with a default factor as sampling is destructive and expensive R values were selected based on IPCC data.
Purpose of data	Calculation of baseline and project scenario
Additional comment	N/A

Data/parameter	Carbon fraction (CF) for tree biomass
Unit	tC/t.d.m: Tonne Carbon/Tonnes dry matter (t.d.m.)
Description	Percentage of the biomass of the tree that is carbon
Source of data	Gold Standard Afforestation / Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology Version 2.1
Value(s) applied	0.47
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline and project scenario
Additional comment	N/A

Data/parameter	Carbon fraction (CF) for non-tree biomass
Unit	tC/t.d.m: Tonne Carbon/Tonnes dry matter (t.d.m.)
Description	Percentage of the biomass of non-tree that is carbon

Source of data	Gold Standard Afforestation / Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology Version 2.1
Value(s) applied	0.4
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline and project scenario
Additional comment	N/A

Data/parameter	Conversion factor from C to CO ₂ e factor
Unit	tCO ₂ /tC
Description	Factor applied to convert tree carbon sequestered to tree CO ₂ e sequestered
Source of data	Gold Standard Afforestation/Reforestation (A/R) GHG Emission Reduction & Sequestration Methodology, Version 2.1
Value(s) applied	3.6667 (44/12)
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline and project scenario
Additional comment	N/A

Data/parameter	Total Volume- or Biomass-based Equation
Unit	Dimensionless
Description	Equation used to estimate either standing volume (m ³) or aboveground biomass (tonnes) from tree measurements such as DBH and height.

	Linear regression models developed specifically to estimate volume for <i>Eucalyptus Pellita</i> (clone TQ274), documented in the demonstration plot study,¹⁷⁸ and volume or the total aboveground biomass for native species based on empirical field data. For native species, volume or allometric models will be selected and validated progressively based on monitoring data and forest inventory results. These may rely on volume- or biomass-based approaches, depending on data quality and species characteristics.
Source of data	<i>Eucalyptus Pellita</i> (clone TQ274): Field measurements from the demonstrative plot of the TQ274 clone (Ingeobosque, 2024). Scientifically published, peer-reviewed allometric equations, applicable to the project area (ecological conditions, species/ genus) and used by other project entities in the region or national authorities. In the case of native species, data from forest inventories and relevant national or regional references will be incorporated as monitoring advances.
Value(s) applied	See the "Forest Growth Models and Carbon Capture for Clone TQ271 of <i>Eucalyptus Pellita</i>" report and the "Informe_Cubicación_CLONES_IB_2024"¹⁷⁹ Values for native species will be progressively defined and incorporated as the project collects sufficient empirical data.
Choice of data or Measurement methods and procedures	Equations are derived via regression analysis using measured variables such as DBH and tree height. For TQ274, a volume-based equation is applied and updated with new cubage data is available. For native species, the choice between volume- or biomass-based equations will depend on the quality and

¹⁷⁸ See supporting document of demonstration-plot study "Final_Report_TQ274_Demonstration_plot_20240528_V3.pdf" attached in the project's information management folder: [Supports\LUF_AR-Methodology \Forest inventory_FCG-BV-INV-2025-01\Volumetric measurement]

¹⁷⁹ See supporting documents attached in the project's information management folder: [Supports\LUF_AR-Methodology]

	availability of measured data. MAI and carbon removals will be derived accordingly, applying recognized conversion factors (e.g., wood density, BEF, root factors).
Purpose of data	Quantification of volume or aboveground biomass for reliable carbon stock estimation and GS-VERs calculation. Calculation of ex-ante project scenario.
Additional comment	TQ274 is a high-performing clone, critical for the project's carbon mitigation objectives. The TQ274 clone is a specifically selected clone of <i>Eucalyptus Pellita</i> known for its superior growth performance and high carbon capture potential. This clone has been evaluated in demonstration plots and the inventory, where its growth characteristics, such as diameter, height, and volume increments, have been rigorously measured and modelled. The project utilizes the TQ274 clone because its robust performance translates into more efficient biomass accumulation and, consequently, enhanced carbon sequestration. In addition, its adaptability to local environmental conditions and resilience contribute to sustainable forestry practices, making it an ideal choice to support the project's objectives of climate change mitigation and sustainable land management. For native species, specific volume or biomass equations will be introduced and validated during project implementation, based on inventory results and ongoing monitoring. Note: Although the parameter is treated as fixed for ex-ante purposes, it may be refined and updated during verification events if new or improved volume or allometric equations become available. For native species, the appropriate approach (volume- or biomass-based) will be determined based on future field measurements and monitoring outcomes, and, where appropriate, supplemented with scientifically published, peer-reviewed studies that are validated for the project's ecological conditions and recognized by regional authorities. This flexibility ensures continuous refinement of carbon estimation methods aligned with field realities.

No parameter related to *biomass burning* was included to monitor SDG 13 outcomes, nor was it added to the Monitoring Plan (section B.7. Monitoring plan), as such activity does not take place within the project's operational context. The Brújula Verde Project has completed the establishment of forest plantations for the first planned verification period, and Inverbosques, which continues to expand its planting areas annually, does not use biomass burning during land preparation. Consequently, monitoring this parameter is not applicable for the current or any subsequent verification periods following validation.

SDG 5

There are no fixed ex-ante parameters for the indicators chosen for this SDG, refers to ER calculation.

SDG 8

There are no fixed ex-ante parameters for the indicator chosen for this SDG, refers to ER calculation.

SDG 15

There are no fixed ex-ante parameters for the indicators chosen for this SDG, refers to ER calculation.

B.6.3 Ex ante estimation of SDG Impact

SDG 13: Amount of GHGs emissions avoided or sequestered

The ex-ante calculations of the sequestered GHG emissions can be found in the ER ex-ante calculation spreadsheet¹⁸⁰.

There are a minimum number of solitary trees within the eligible areas that are not, and will be not, considered for any carbon calculation; they are clearly differentiated in the field and they will never be accounted as part of the project carbon sequestration.

- **Estimation of baseline carbon pool changes**

- **Carbon stocks and emission factors**

The total baseline Non-tree biomass was estimated from the sum of the Above-ground biomass and the Below-ground biomass per hectare, of the baseline grassland and shrubs (Non-tree woody and herbaceous vegetation), the carbon content of the total biomass was determined as the product of the total biomass and the carbon fraction of the dry matter

¹⁸⁰ See supporting Excel file .xlsx "ER Estimations_AR MethodologyV2.1" This document is attached in the project's information management folder: [Supports\LUF_AR-Methodology]

suggested by the Gold Standard Afforestation/Reforestation (A/R) GHG Emission Reduction & Sequestration Methodology, Version 2.1. To estimate the emission from the soil deposit, the project applies the LUF_AR Methodology_Soil Carbon Tool

The formula for the baseline scenario calculation for the "Non-tree biomass" is estimated as following:

$$Non - tree CO_2removal = (AGB + BGB) \times CF \times C \text{ to } CO_2factor$$

Where:

$CO_{2removal}$	=CO ₂ -removal units of a project area in year t (tCO ₂)
AGB	=Aboveground non-tree biomass
BGB	=Belowground non-tree biomass
CF	= Carbon fraction for non-tree biomass (tC/tdm)
$C \text{ to } CO_2factor$	= Conversion factor from C to CO ₂ eq (tCO ₂ e/tC)

The project does not consider the carbon content in litter and dead wood debris. The Project assumes that all the carbon contained in the above and below-ground biomass deposit is emitted in the same year that the logging event occurs. Since the AR project does not involve deforestation or timber extraction, carbon emissions from above- and below-ground biomasses are not considered, and for Soil Organic carbon (SOC), emissions are generally estimated to be released in equal proportions over a 20-year period.

Finally, the net benefit of the project is determined by calculating the difference between the quantified CO₂ sequestration in the project scenario (as described on section B.6.1), and the sequestration that would have occurred under the baseline situation. This approach ensures that only the additional carbon removals directly attributable to the project's activities are considered, providing a clear measure of its impact on climate mitigation.

Other SDGs

Other SDG estimations are calculated in the SDG tool¹⁸¹. The explanation of their calculations is given in the “Comments/ Further details” section, with references to other tabs with more detailed calculations.

B.6.4 Summary of ex ante estimates of each SDG Impact

SDG 13 Climate Action

Amount of GHGs emissions avoided or sequestered:

Reduction in GHGs emissions

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE ¹⁸²	NET BENEFIT ¹⁸³
Year 1 ¹⁸⁴	2023	0	0.00	0.00
Year 2	2024	0	191,762.28	191,762.28
Year 3	2025	0	836,034.65	836,034.65
Year 4	2026	0	1,328,440.33	1,328,440.33
Year 5	2027	0	1,571,226.26	1,571,226.26
Year 6	2028	0	1,064,447.03	1,064,447.03
Year 7	2029	0	673,332.28	673,332.28
Year 8	2030	0	1,100,329.82	1,100,329.82
Year 9	2031	0	954,031.56	954,031.56
Year 10	2032	0	425,502.49	425,502.49
Year 11	2033	0	179,480.10	179,480.10
Year 12	2034	0	520,826.40	520,826.40

¹⁸¹ For more details, go to the attached Gold Standard (GS) SDG Impact Tool excel file “430_V1.3_IQ_SDG-Impact-tool_BV”, and the Gold Standard Digital SDG Impact tool Report, quantify, and verify the impact of projects. This document is attached in the project's information management folder: [Supports\SDGs] and can be evidenced and corroborated on the GS Standard page. For further details, go to the following Web Platform. Available at: <https://sdg-tool.goldstandard.org/>

¹⁸² Value calculated using the Project Area at validation

¹⁸³ The Net Climate Benefit presented in this column reflects the total net GHG emissions avoided or sequestered by the project, after accounting for project emissions, baseline emissions, and leakage. However, in accordance with the Gold Standard GHG Emissions Reduction and Sequestration Product Requirements V3.0 (Section 11 – Land Use & Forest Specific Requirements, sub-section 11.1 Compliance Buffer), *for projects applying the Land Use & Forests (LUF) Requirements, 20% of the issued Project Emission Reductions (PERs) and Gold Standard Verified Emissions Reduction (GS-VERs) associated with carbon sequestration must be transferred into the Gold Standard Buffer*. This contribution serves to manage the risk of non-permanence (reversal risk) linked to sequestration activities. Accordingly, while the Net Climate Benefit quantifies the full mitigation impact of the project, the number of GS-VERs available for issuance (80% of that net benefit), will exclude the buffer-apportioned volume for the sequestration component (remaining 20% allocated to the Gold Standard buffer pool).

¹⁸⁴ From May 15 to December 31, 2023

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE ¹⁸²	NET BENEFIT ¹⁸³
Year 13	2035	0	430,513.81	430,513.81
Year 14	2036	0	358,440.79	358,440.79
Year 15	2037	0	0.00	0.00
Year 16	2038	0	0.00	0.00
Year 17	2039	0	0.00	0.00
Year 18	2040	0	0.00	0.00
Year 19	2041	0	46,495.98	46,495.98
Year 20	2042	0	0.00	0.00
Year 21	2043	0	0.00	0.00
Year 22	2044	0	0.00	0.00
Year 23	2045	0	0.00	0.00
Year 24	2046	0	0.00	0.00
Year 25	2047	0	0.00	0.00
Year 26	2048	0	0.00	0.00
Year 27	2049	0	0.00	0.00
Year 28	2050	0	0.00	0.00
Year 29	2051	0	0.00	0.00
Year 30	2052	0	0.00	0.00
Year 31 ¹⁸⁵	2053	0	-379,102.08	-379,102.08
Total		0	9,301,761.70	9,301,761.70
Total number of crediting years		30	30	30
Annual average over the crediting period		0	310,058.72	310,058.72

In addition to climate action (SDG 13), the Brújula Verde Project's Sustainable Development Goals (SDGs) framework builds upon the existing operations of the project developer, which were originally established under the GS4221 project¹⁸⁶. Since both

¹⁸⁵ From January 01 to May 14, 2053

¹⁸⁶ <https://registry.goldstandard.org/projects/details/1806>

initiatives share operational structure, many of the SDG benefits observed under GS4221 are also present in the Brújula Verde Project.

However, although both projects share operational and management structures, the labor effort and implementation scope of each initiative have been distinctly weighed up to ensure separate attribution of benefits. Therefore, the baseline indicators for the Brújula Verde Project have been established at zero, except for SDG 15 (Life on Land) indicator 15.5.1, where the baseline reflects the presence of pre-existing species within the project area.

This differentiation ensures that only the new activities and outcomes directly attributable to Brújula Verde are accounted for in its impact assessment. The details of this approach and the corresponding baseline justifications are further explained in the following sections.

This approach allows the Brújula Verde Project to maximize the impact of prior investments and operational foundations, ensuring a strong and integrated contribution to multiple SDGs beyond climate action (SDG 13). The project prioritizes the maintenance of these co-benefits while selectively increasing them when deemed logical and viable by the project developer.

SDG 5 Gender equality

Women empowerment and gender equality:

Ratio of the average wage paid during the reporting period to female employees for a specified position, compared to the average wage paid to male employees of the organization for the same position.

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	2023	0	1	1
Year 2	2024	0	1	1
Year 3	2025	0	1	1
Year 4	2026	0	1	1
Year 5	2027	0	1	1
Year 6	2028	0	1	1
Year 7	2029	0	1	1
Year 8	2030	0	1	1
Year 9	2031	0	1	1
Year 10	2032	0	1	1
Year 11	2033	0	1	1
Year 12	2034	0	1	1
Year 13	2035	0	1	1

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 14	2036	0	1	1
Year 15	2037	0	1	1
Year 16	2038	0	1	1
Year 17	2039	0	1	1
Year 18	2040	0	1	1
Year 19	2041	0	1	1
Year 20	2042	0	1	1
Year 21	2043	0	1	1
Year 22	2044	0	1	1
Year 23	2045	0	1	1
Year 24	2046	0	1	1
Year 25	2047	0	1	1
Year 26	2048	0	1	1
Year 27	2049	0	1	1
Year 28	2050	0	1	1
Year 29	2051	0	1	1
Year 30	2052	0	1	1
Year 31	2053	0	1	1
Total		0	1	1
Total number of crediting years		30	30	30
Annual average over the crediting period		0	1	1

SDG 8 Decent work and economic growth

Enhanced opportunities for income generation

% of employees earning above minimum wage

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	2023	0	100%	100%
Year 2	2024	0	100%	100%

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 3	2025	0	100%	100%
Year 4	2026	0	100%	100%
Year 5	2027	0	100%	100%
Year 6	2028	0	100%	100%
Year 7	2029	0	100%	100%
Year 8	2030	0	100%	100%
Year 9	2031	0	100%	100%
Year 10	2032	0	100%	100%
Year 11	2033	0	100%	100%
Year 12	2034	0	100%	100%
Year 13	2035	0	100%	100%
Year 14	2036	0	100%	100%
Year 15	2037	0	100%	100%
Year 16	2038	0	100%	100%
Year 17	2039	0	100%	100%
Year 18	2040	0	100%	100%
Year 19	2041	0	100%	100%
Year 20	2042	0	100%	100%
Year 21	2043	0	100%	100%
Year 22	2044	0	100%	100%
Year 23	2045	0	100%	100%
Year 24	2046	0	100%	100%
Year 25	2047	0	100%	100%
Year 26	2048	0	100%	100%
Year 27	2049	0	100%	100%
Year 28	2050	0	100%	100%
Year 29	2051	0	100%	100%
Year 30	2052	0	100%	100%
Year 31	2053	0	100%	100%
Total		0%	100%	100%
Total number of crediting years		30	30	30

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Annual average over the crediting period	0%	100%	100%

SDG 15 Life on land

Enhanced biodiversity

Number of protected threatened species in the project area & conservation status of species: % increase/decrease in the number of individuals of endangered specie "x" spotted in the project area

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	2023	42	42	42
Year 2	2024	42	42	42
Year 3	2025	42	42	42
Year 4	2026	42	42	42
Year 5	2027	42	42	42
Year 6	2028	42	42	42
Year 7	2029	42	42	42
Year 8	2030	42	42	42
Year 9	2031	42	42	42
Year 10	2032	42	42	42
Year 11	2033	42	42	42
Year 12	2034	42	42	42
Year 13	2035	42	42	42
Year 14	2036	42	42	42
Year 15	2037	42	42	42
Year 16	2038	42	42	42
Year 17	2039	42	42	42
Year 18	2040	42	42	42
Year 19	2041	42	42	42
Year 20	2042	42	42	42
Year 21	2043	42	42	42
Year 22	2044	42	42	42

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 23	2045	42	42	42
Year 24	2046	42	42	42
Year 25	2047	42	42	42
Year 26	2048	42	42	42
Year 27	2049	42	42	42
Year 28	2050	42	42	42
Year 29	2051	42	42	42
Year 30	2052	42	42	42
Year 31	2053	42	42	42
Total		42	42	42
Total number of crediting years		30	30	30
Annual average over the crediting period		42	42	42

Table 40 – List of protected threatened species in the project area & conservation status of species

Category	Family	Species	CITES	IUCN
Flora	Bignoniaceae	<i>Handroanthus barbatus</i>	AP. II	NT
Birds	Accipitridae	<i>Buteogallus meridionalis</i>	AP. II	LC
Birds	Accipitridae	<i>Geranoaetus albicaudatus</i>	AP. II	LC
Birds	Accipitridae	<i>Ictinia plumbea</i>	AP. II	LC
Birds	Accipitridae	<i>Rupornis magnirostris</i>	AP. II	LC
Birds	Accipitridae	<i>Spizaetus ornatus</i>	AP. II	NT
Birds	Anatidae	<i>Oressochen jubatus</i>	Not listed	NT
Birds	Cathartidae	<i>Sarcoramphus papa</i>	AP. III	LC
Birds	Falconidae	<i>Caracara plancus</i>	AP. II	LC
Birds	Falconidae	<i>Falco sparverius</i>	AP. II	LC
Birds	Falconidae	<i>Herpetotheres cachinnans</i>	AP. II	LC
Birds	Falconidae	<i>Milvago chimachima</i>	AP. II	LC
Birds	Icteridae	<i>Sturnella magna</i>	Not listed	NT
Birds	Psittacidae	<i>Amazona amazonica</i>	AP. II	LC
Birds	Psittacidae	<i>Amazona farinosa</i>	AP. II	LC
Birds	Psittacidae	<i>Amazona festiva</i>	AP. II	LC
Birds	Psittacidae	<i>Amazona ochrocephala</i>	AP. II	LC
Birds	Psittacidae	<i>Ara chloropterus</i>	AP. II	LC
Birds	Psittacidae	<i>Eupsittula pertinax</i>	AP. II	LC

Category	Family	Species	CITES	IUCN
Birds	Ramphastidae	<i>Ramphastos vitellinus</i>	AP. II	LC
Birds	Strigidae	<i>Glaucidium brasilianum</i>	AP. II	LC
Birds	Trochilidae	<i>Anthracothorax nigricollis</i>	AP. II	LC
Birds	Trochilidae	<i>Chlorestes cyaneus</i>	AP. II	LC
Birds	Trochilidae	<i>Chlorostilbon mellisugus</i>	AP. II	LC
Birds	Trochilidae	<i>Chrysuronia versicolor</i>	AP. II	LC
Birds	Trochilidae	<i>Phaethornis hispidus</i>	AP. II	LC
Herpeto	Iguanidae	<i>Iguana iguana</i>	AP. II	LC
Herpeto	Testudinidae	<i>Chelonoidis carbonarius</i>	AP. II	NE
Herpeto	Podocnemididae	<i>Podocnemis sp.</i>	AP. II	NE
Herpeto	Podocnemididae	<i>Podocnemis vogli</i>	AP. II	NE
Herpeto	Alligatoridae	<i>Caiman crocodilus</i>	AP. II	LC
Herpeto	Boidae	<i>Corallus sp.</i>	AP. II	NE
Mammals	Atelidae	<i>Alouatta seniculus</i>	AP. II	LC
Mammals	Canidae	<i>Cerdocyon thous</i>	AP. II	LC
Mammals	Cebidae	<i>Cebus albifrons</i>	AP. II	LC
Mammals	Chlamyphoridae	<i>Priodontes maximus</i>	AP. I	VU
Mammals	Felidae	<i>Leopardus pardalis</i>	AP. I	LC
Mammals	Felidae	<i>Puma concolor</i>	AP. II	LC
Mammals	Myrmecophagidae	<i>Myrmecophaga tridactyla</i>	AP. II	VU
Mammals	Tapiridae	<i>Tapirus terrestris</i>	AP. II	VU
Mammals	Tayassuidae	<i>Tayassu pecari</i>	AP. II	VU

CITES: AP: Appendix

IUCN: LC: Least Concern, NT: Near Threatened, VU: Vulnerable, NE: Not Evaluated

Source: Ingeobosque (2025)

Total area (ha) of trees planted with Native Species

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	2023	0	0.0	0.0
Year 2	2024	0	285.8	285.8
Year 3	2025	0	1,535.8	1,535.8
Year 4	2026	0	3, 35.8	3, 35.8
Year 5	2027	0	5,035.8	5,035.8
Year 6	2028	0	5,035.8	5,035.8
Year 7	2029	0	5,035.8	5,035.8
Year 8	2030	0	5,035.8	5,035.8
Year 9	2031	0	5,035.8	5,035.8
Year 10	2032	0	5,035.8	5,035.8
Year 11	2033	0	5,035.8	5,035.8

YEAR		BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 12	2034	0	5,035.8	5,035.8
Year 13	2035	0	5,035.8	5,035.8
Year 14	2036	0	5,035.8	5,035.8
Year 15	2037	0	5,035.8	5,035.8
Year 16	2038	0	5,035.8	5,035.8
Year 17	2039	0	5,035.8	5,035.8
Year 18	2040	0	5,035.8	5,035.8
Year 19	2041	0	5,035.8	5,035.8
Year 20	2042	0	5,035.8	5,035.8
Year 21	2043	0	5,035.8	5,035.8
Year 22	2044	0	5,035.8	5,035.8
Year 23	2045	0	5,035.8	5,035.8
Year 24	2046	0	5,035.8	5,035.8
Year 25	2047	0	5,035.8	5,035.8
Year 26	2048	0	5,035.8	5,035.8
Year 27	2049	0	5,035.8	5,035.8
Year 28	2050	0	5,035.8	5,035.8
Year 29	2051	0	5,035.8	5,035.8
Year 30	2052	0	5,035.8	5,035.8
Year 31	2053	0	5,035.8	5,035.8
Total		0	5,035.8	5,035.8
Total number of crediting years		30	30	30
Annual average over the crediting period		0.0	167.9	167.9

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 13

Data / Parameter	Ai (project area)
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Unit	Hectares (ha)
Description	Area of stratum (i) based on planting year. The project area is considered as the eligible area where tree planting (or related actions) activities take place and that meets the applicability conditions of the applied Gold Standard Methodology
Source of data	Data from remote sensors and multispectral satellite images and GIS software. Field measurement, and Project GIS shapefiles.
Value(s) applied	10,260.0 ha Updated in every performance review event
Measurement methods and procedures	Remote sensing tools to trace project area and planted areas. Boundaries of planted areas are registered with GPS and imported into GIS software together with additional attributes (e.g. planting year). The area is calculated with GIS.
Monitoring frequency	Every performance certification.
QA/QC procedures	Internal evaluation, procedures and Forest Inventory for the Certification Project Design. Data collection QA/QC procedure.
Purpose of data	To update the area of the project. Calculation of project scenario
Additional comment	N/A

Data / Parameter	Diameter at Breast Heigh (DBH) ¹⁸⁷
Unit	Centimetres (cm)
Description	Tree diameter at breast-height (1.30 m) The DBH is used to calculate tCO ₂ sequestration in planted areas

¹⁸⁷ The DBH data was selected because it is a key indicator that reliably correlates with tree biomass and overall forest health. This measure is universally recognized in forestry and carbon assessments, ensuring that the project's estimates of aboveground biomass and carbon sequestration are both robust and comparable to other studies.

Source of data	Field measurement: Forest inventory
Value(s) applied	Updated in every performance review event
Measurement methods and procedures	A sampling approach is designed and conducted by experts to measure tree's allometric variables. Sample plots are measurement units where variables, such as Diameter at Breast Height (DBH) are measured. The DBH will be measured, using standard inventory instruments such as diameter tapes. The amount of sample plots, their shape and location are determined per project participant depending on the characteristics and variability in planted areas.
Monitoring frequency	Every performance certification
QA/QC procedures	Internal evaluation, procedures and Forest Inventory for the Certification Project Design: External foresters are hired to conduct forest inventories to monitor forest plantations growth. Data collection QA/QC procedure
Purpose of data	Calculation of project scenario- to be used in volume or allometric equations for the calculation of aboveground biomass Calculation of project scenario
Additional comment	N/A

Data / Parameter	Height (H) ¹⁸⁸
Unit	Meters (m)
Description	Total tree height
Source of data	Field measurement – Forest inventory
Value(s) applied	N/A

¹⁸⁸ Height measurements were chosen because they are a critical component for accurate biomass estimation and carbon stock calculations. Tree height, when combined with DBH, enhances the precision of volume and/or allometric models, providing a robust basis for assessing forest growth and carbon sequestration potential.

Measurement methods and procedures	A sampling approach is designed and conducted by experts to measure tree's allometric variables. Sample plots are measurement units where variables, such as Height (H) are measured. The height will be measured using standard inventory instruments such as a Hagl6f Vertex hypsometer.
Monitoring frequency	Every performance certification
QA/QC procedures	Internal evaluation, procedures and Forest Inventory for the Certification Project Design: External foresters are hired to conduct forest inventories to monitor forest plantations growth. Data collection QA/QC procedure. Data is recorded using standardized forms and periodically reviewed to ensure consistency and accuracy against established protocols.
Purpose of data	Calculation of project scenario To calculate the project scenario for aboveground biomass estimation using volume or allometric equations, which is critical for assessing the project's carbon stock and overall forest productivity.
Additional comment	N/A

Data/parameter	Volume of standing trees
Unit	m ³ /ha
Description	Total standing volume per hectare estimated through forest inventories using tree-level measurements and allometric equations. Mean annual volume increment in terms of tree growth, calculated per year
Source of data	Data is derived from forest inventories using the Diameter at Breast Height (DBH) and total height (H), processed through allometric equations calibrated by the project participants for the planted species and site conditions.
Value(s) applied	Updated in every performance review event, based on the latest forest inventory results.

Measurement methods and procedures	Brújula Verde project applies species- and site-specific allometric equations to estimate tree volume based on DBH and height measurements. These per-tree volumes are extrapolated to plot and hectare levels. From these data, the Mean Annual Increment (MAI) may also be derived by dividing the total standing volume by plantation age.
Monitoring frequency	At each performance certification event
QA/QC procedures	Independent forestry professionals are contracted to carry out periodic forest inventories to monitor forest plantations' growth. Data is verified and cross-checked to ensure consistency and quality forest inventories.
Purpose of data	Calculation of ex-ante and project scenario Used as the basis for estimating carbon stock changes and calculating verified emission removals (VERs).
Additional comment	The standing volume (m ³) is the key parameter used to calculate carbon removals. A project-specific allometric equation for the TQ274 clone has been developed and is continuously refined with new field data. In the case of native species, an appropriate volume equation has not yet been fully defined. As monitoring progresses, results will inform whether volume- or biomass-based methodologies will be applied for the calculation of Verified Emission Reductions (VERs) in future verification periods.

Data/parameter	Mean Annual Increment (MAI) biomass
Unit	m ³ /ha/year
Description	Mean annual volume increment in terms of tree growth, calculated per year
Source of data	Inventory with local plantations
Value(s) applied	N/A
Measurement methods and procedures	The MAI estimation for the TQ274 clone will be based on rigorous field measurements that will be collected from demonstrative plots over several years. Key parameters, including DBH, tree height, and volume, will be measured using standardized methods (e.g., a Lufkin diameter tape

	for DBH and a Hagl�f Vertex hypsometer for height), ensuring both accuracy and consistency. The resulting MAI will represent the average annual increase in aboveground biomass, serving as a critical input for ex-ante carbon stock estimations.
Monitoring frequency	At each performance certification event
QA/QC procedures	Independent forestry professionals are contracted to carry out periodic forest inventories to monitor forest plantations' growth. Data is verified and cross-checked to ensure consistency and quality forest inventories.
Purpose of data	Calculation of ex-ante and project scenario
Additional comment	N/A

Data/parameter	Total Volume- or Biomass-based Equation
Unit	Dimensionless
Description	Equation used to estimate either standing volume (m³) or aboveground biomass (tonnes) from tree measurements such as DBH and height. A regression model calibrated for <i>Eucalyptus pellita</i> (clone TQ274) will be applied. The model will be recalibrated when necessary, in subsequent forest inventories to ensure that it accurately represents site-specific growth conditions. For native species, specific allometric or volume equations will be progressively selected and validated as monitoring data become available. These may follow volume- or biomass-based approaches depending on species characteristics and data quality.
Source of data	<i>Eucalyptus pellita</i> (clone TQ274): Data derived from field measurements collected in demonstration plots and successive inventories conducted in the project. Native species: Data will be drawn from forest inventories and scientifically published, peer-reviewed allometric equations applicable to the project's ecological conditions,

	complemented by national or regional references recognized by relevant authorities.
Value(s) applied	<i>Eucalyptus pellita</i> (clone TQ274): Initial values are based on the calibration study “<i>Forest Growth Models and Carbon Capture for Clone TQ271 of Eucalyptus Pellita</i>” report¹⁸⁹ Native species: baseline values will be defined and refined progressively as empirical data become available.
Measurement methods and procedures	Equations will be developed and refined through regression analyses using field measurements (DBH, height). - For TQ274, a volume-based model will be applied and recalibrated when new growing information data are collected. - For native species, the selected method (volume- or biomass-based) will depend on available data. MAI and carbon removals will be derived using standard conversion factors (e.g., wood density, BEF, root-shoot ratios).
Monitoring frequency	Recalibration and validation will occur at each forest inventory cycle (approximately every 1–3 years) or when new data are generated. Internal checks of model performance will be conducted annually to ensure consistency and accuracy.
QA/QC procedures	All data and regression updates will be reviewed by the project’s technical team prior to inclusion in the Monitoring Report. Data consistency will be cross-checked against previous inventories. Model recalibration and changes will be documented under Inverbosques’ Standard Operating Procedures (SOPs) for data quality and forest inventory control.
Purpose of data	Quantification of volume or aboveground biomass for reliable carbon stock estimation and GS-VERs calculation. Calculation of ex-post project scenario.

¹⁸⁹ See supporting document of demonstration-plot study “Final_Report_TQ274_Demonstration_plot_20240528_V3.pdf” attached in the project’s information management folder: [Supports\LUF_AR-Methodology \Forest inventory_FCG-BV-INV-2025-01\Volumetric measurement]

Additional comment	TQ274 is a high-performing clone, critical for the project's carbon mitigation objectives. The TQ274 clone is a high-performing clone of <i>Eucalyptus pellita</i> variety selected for its superior growth and carbon sequestration capacity. Its adaptability to local conditions and resilience supports sustainable forestry practices aligned with the project's mitigation and restoration goals. For native species, volume or biomass equations will be incorporated and validated as data availability increases Note: Although this parameter was fixed for ex-ante estimates, it will remain dynamic for monitoring purposes. The regression equation will be recalibrated and refined in future monitoring cycles during verification events whenever improved volume or allometric equations become available. For native species, the chosen approach (volume- or biomass-based) will depend on future field measurements and may incorporate scientifically validated, peer-reviewed studies recognized by regional or national authorities. This adaptive process ensures continuous improvement and methodological accuracy in carbon stock estimation.
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Data/parameter	Above-ground tree biomass (AGB)
Unit	Tonnes of CO ₂ e/ha
Description	Above-ground tree biomass will be calculated using the stem volume, the Biomass Expansion Factor (BEF), the wood density, the carbon fraction, and the C to CO ₂ factor. This parameter represents the total mass of living above-ground tree components per hectare and is essential for determining carbon stocks and removals under the Gold Standard A/R methodology.
Source of data	Forest inventory measurements of the project plantation.
Value(s) applied	Values will be defined for each Modelling Unit (MU) at every verification period based on measured field data. These values will be updated and refined as new empirical data are obtained from successive forest inventories.

Measurement methods and procedures	Above-ground biomass (AGB) will be quantified in each forest inventory using field measurements of DBH and total height. The most suitable allometric or volume-based equations will be applied for each species or clone, converting results to biomass with wood density and BEF when applicable. Biomass will then be expressed in CO ₂ equivalents using the carbon fraction and 44/12 factor. Results will be aggregated by plot and extrapolated per hectare to generate Modelling Unit (MU)-specific estimates, updated in each verification period.
Monitoring frequency	At each performance certification event
QA/QC procedures	Field measurements and calculations will be reviewed by the project's technical forestry team prior to inclusion in the Monitoring Report. Data quality control will include cross-checks between inventories, verification of regression model performance, and internal reviews for forest inventory and data management.
Purpose of data	Calculation of project scenario
Additional comment	N/A

Data/parameter	Below-ground tree biomass (BGB)
Unit	Tonnes of CO ₂ e/ha
Description	Below-ground biomass will be estimated based on the root-to-shoot ratio of trees relative to above-ground biomass.
Source of data	Forest inventory measurements of the project plantations and above-ground biomass (AGB) estimates obtained during each monitoring period.
Value(s) applied	Values will be determined for each Modelling unit (MU) during each verification period and updated as new inventory data and scientific references become available.
Measurement methods and procedures	Below-ground biomass (BGB) will be estimated in each forest inventory by applying species-specific or literature-based root-to-shoot ratios to the corresponding AGB values obtained for each plot. Ratios will be selected according to the species or clone characteristics (e.g., <i>Eucalyptus pellita</i> or native species) and updated as new

	data become available. Per-plot results will be aggregated and extrapolated to a per-hectare basis to generate MU-specific estimates, ensuring methodological consistency with the Gold Standard A/R Methodology v2.1.
Monitoring frequency	At each performance certification event.
QA/QC procedures	Field data and calculated ratios will be reviewed and validated by the technical team prior to integration into the Monitoring Report. Data consistency will be checked across inventory cycles, and any model or ratio updates will be documented and verified through internal QA/QC procedures.
Purpose of data	Calculation of project scenario
Additional comment	N/A

Data/parameter	Total tree Biomass (BT)
Unit	Tonnes of CO ₂ e/ha
Description	Total tree biomass (BT) represents the sum of above-ground and below-ground biomass of all trees measured on permanent plots, expressed as tonnes of CO ₂ equivalents per hectare. It will be calculated as: BT = AGB + BGB.
Source of data	Derived from above-ground biomass (AGB) and below-ground biomass (BGB) estimates based on field inventory data (DBH, height), project-specific volume or biomass equations, species-specific root-to-shoot ratios, and carbon conversion factors.
Value(s) applied	Values will be defined for each Modelling Unit (MU) in every verification period and updated as new inventory data and refined models become available.
Measurement methods and procedures	- AGB: will be calculated using per-tree volumes or biomass, applying parameters such as wood density, BEF, and carbon fraction, and aggregated at the hectare level. - BGB: Will be estimated by applying root-to-shoot ratios to AGB, with ratios determined by species or clone characteristics. .
Monitoring frequency	At each performance certification event.

QA/QC procedures	Field data and biomass estimates will be reviewed and validated by the technical team prior to inclusion in the Monitoring Report. Data consistency and accuracy will be verified across inventory cycles through Inverbosques' internal QA/QC protocols and cross-checked against previous results.
Purpose of data	Calculation of project scenario (ex-post carbon accounting)
Additional comment	BT values will be recalculated and updated during each monitoring cycle based on the latest available field data, refined allometric or volume equations, and validated ratios. This iterative process ensures continuous improvement in the precision of biomass and carbon stock estimation throughout the project's lifetime.

Data/parameter	Other Emissions
Unit	Tonnes of CO ₂ e/ha
Description	Emissions resulting from the application of nitrogenous fertilizers under the forest management plan. These emissions will be monitored to account for minor operational GHG sources within the project boundary.
Source of data	Fertilizer application records will be provided by Inverbosques S.A. during each monitoring period
Value(s) applied	Values will be determined for the project, based on actual fertilizer use reported during each inventory cycle.
Measurement methods and procedures	- Calculate N applied (kg N/ha): multiplying fertilizer mass (kg/ha) by percent N content. - Apply default emission factor of 0.005 tCO₂ / kg N to derive tCO₂e/ha.
Monitoring frequency	At each performance certification event
QA/QC procedures	Fertilizer data will be verified through invoice checks, field application logs, and GIS-mapped treatment areas. Consistency will be cross-checked under the project's QA/QC system and with FSC Principles & Criteria compliance records.
Purpose of data	Calculation of project scenario (ex-post carbon accounting)

Additional comment	Only emissions from fertilizer application will be accounted for under this parameter. Other potential emission sources (such as land preparation, energy use, or nitrogen-fixing species) are excluded from the monitoring scope, as they are outside the defined operational boundaries of the project.
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SDG 5

Data/parameter	Ratio of the average wage paid during the reporting period to female employees for a specified position, compared to the average wage paid to male employees of the organization for the same position.
Unit	Ratio
Description	This indicator measures the gender balance within the project's workforce by calculating the ratio of the average wage paid during the reporting period to female employees for a specified position, compared to the average wage paid to male employees of the organization for the same position. It serves as a key metric for assessing progress toward gender equality and women's empowerment, in line with SDG Target 5.1
Source of data	Project human resources records, payroll systems, and employee demographic information
Value(s) applied	Ex-ante: Baseline value is set at 0 based on information at the start of the plantation. It is important to highlight that without the project, there would be no guaranteed contribution to this SDG, as no improvements in working conditions or quality employment opportunities for women would occur. Project: Project targets aim to maintain this proportion (ratio) at 1 over time, based on continuous monitoring of employment data and gender equity indicators within the Human Resources system.
Measurement methods and procedures	Ratio (Average wage of female employees / (Average wage of male employees).

	Data are collected through regular HR reporting and verified payroll records. The measurement involves calculating the ratio of the average wage paid during the reporting period to female employees for a specified position, compared to the average wage paid to male employees of the organization for the same position. This approach is aligned with standard methodologies for tracking gender equality impacts and supports routine monitoring.
Monitoring frequency	Annual
QA/QC procedures	N/A
Purpose of data	To monitor and evaluate the project's impact on gender equality by ensuring equitable representation of women in employment. This indicator informs recruitment strategies, supports decision-making for targeted capacity-building, and demonstrates compliance with international gender equity standards. This indicator is essential for assessing improvements in working conditions for women and advancing gender empowerment within the project. It also provides a benchmark for continuous improvement in HR policies and practices, ensuring that the project's employment opportunities contribute positively to SDG 5 objectives The purpose of this indicator is not to for the project Emission Removals (ER) calculation, either for stabilising the baseline scenario or for the monitor carbon component of the project scenario itself. There are no fixed calculation ex-ante parameters for the indicators chosen under this SDG; instead, it serves as a dynamic component in the project.
Additional comment	N/A

SDG 8

Data/parameter	Percentage of employees earning above minimum wage
Unit	Percentage (%)
Description	This indicator measures the proportion of employees within the project who receive wages exceeding the

	national minimum wage. It reflects the project's commitment to creating quality employment opportunities and enhancing income generation, ensuring that job creation leads to improved economic well-being.
Source of data	Project activity: Payroll records, HR databases, and employment reports
Value(s) applied	Ex-ante: Baseline is set at 0% improvement. The baseline value is set based on employees' conditions at the start of the plantation Without the project, working conditions and wage levels would remain unchanged). Project: Project targets aim to maintain this result for a high percentage, ideally approaching 100% of new jobs offering wages above the minimum wage, as verified through continuous HR monitoring and payroll records.
Measurement methods and procedures	Head count: Employee wage data is recorded and aggregated annually, with cross-verification through internal evaluations and payroll reviews to ensure data integrity. Data is collected from standardized payroll systems and HR records, with periodic internal evaluations to verify accuracy. The calculation is performed by dividing the number of employees earning above the minimum wage by the total number of project employees and multiplying by 100. This method ensures consistency and reliability in monitoring wage quality over time.
Monitoring frequency	Annual
QA/QC procedures	Internal reviews and periodic cross-verification with HR records and payroll systems are conducted, following the project's established quality assurance protocols.
Purpose of data	To evaluate the project's impact on improving job quality and income generation, thereby contributing to full and productive employment under SDG 8.5. It serves as a key metric for ensuring that the economic growth generated by the project is inclusive and supports decent work for all. This indicator is vital for demonstrating that the project not only increases employment opportunities but also ensures that these jobs provide equitable and sufficient

	wages, fostering economic resilience and reducing income inequality among project beneficiaries. The purpose of this indicator is not to for the project Emission Removals (ER) calculation, either for stabilising the baseline scenario or for the monitor carbon component of the project scenario itself. There are no fixed calculation ex-ante parameters for the indicators chosen under this SDG; instead, it serves as a dynamic component in the project.
Additional comment	N/A

SDG 15

Data/parameter	Number of protected threatened species in the project area & conservation status of these species
Unit	Number (count) % increase/decrease in the number of individuals of endangered species "x" spotted in the project area
Description	This refers to the number of threatened species present within the project area and their conservation status during the reporting period. Threatened species include any organisms, such as animals, plants, and fungi, that are at risk of becoming endangered in the foreseeable future across all or a significant portion of their range. The term "threatened" serves as an umbrella category encompassing different levels of risk, including vulnerable, endangered, and critically endangered species. For classification definitions and further guidance, the project may refer to the following sources: • International Union for Conservation of Nature (IUCN) • Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) This indicator tracks the number of species classified as threatened that are found within the project area, along

	with their current conservation status based on recognized criteria (e.g., IUCN Red List). It provides insight into the biodiversity trends and the effectiveness of protection measures.
Source of data	Project Activity: Species monitoring, field biodiversity surveys, expert assessments, and conservation monitoring reports
Value(s) applied	Ex-ante: 42 Project: 42 Baseline values are determined from initial field surveys conducted between 2024 and 2025.
Measurement methods and procedures	Data is collected through standardized biodiversity assessment protocols (e.g., transect surveys, point counts) and cross-checked with IUCN classifications. Expert review ensures accurate species identification and status verification. This indicator was selected because it offers a direct and dynamic measure of the project's impact on biodiversity, reflecting both the presence of threatened species and the effectiveness of conservation strategies. Its adaptability allows for timely adjustments in conservation management based on evolving species data.
Monitoring frequency	Annual
QA/QC procedures	Quality assurance is maintained through regular internal evaluations of survey protocols, calibration of measurement instruments, and periodic external validation of species identification to ensure data consistency and reliability.
Purpose of data	To monitor changes in species diversity and assess the impact of conservation efforts, ensuring that threatened species are effectively protected over time, and to demonstrate Inverbosques' commitment to contribute on the target 15.5 "Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and by 2020 protect and prevent the extinction of threatened species." This indicator is critical for adaptive management, as it informs adjustments to conservation strategies to better safeguard biodiversity.

	The purpose of this indicator is not to for the project Emission Removals (ER) calculation, either for stabilising the baseline scenario or for the monitor carbon component of the project scenario itself. There are no fixed calculation ex-ante parameters for the indicators chosen under this SDG; instead, it serves as a dynamic component in the project.
Additional comment	N/A

Data/parameter	Total area of trees planted with native species
Unit	Hectares (Ha)
Description	This indicator quantifies the area that has been afforested or reforested using native species, a key factor in restoring degraded ecosystems, enhancing biodiversity, and supporting ecological resilience.
Source of data	Field records, plantation management databases, and remote sensing imagery
Value(s) applied	Ex-ante: Baseline 0 ha (indicating that, without the project, no such native species planting would occur); Project: 5,035.8 ha Targets are set based on project expansion.
Measurement methods and procedures	Data is gathered through on-the-ground measurements and verified with remote sensing and GIS mapping. GPS tools are used to accurately delineate planted areas, with annual updates provided to reflect new plantings. The selection of these data is based on their ability to provide clear, quantifiable metrics that accurately reflect the project's impact on biodiversity conservation and ecosystem restoration. This indicator, of native tree planting, was choose because it directly measure key aspects of habitat protection, species preservation, and ecological recovery, which are critical for assessing progress toward SDG 15 targets. Data is gathered via on-the-ground measurements and verified with remote sensing and GIS mapping. GPS tools

	are used to delineate planted areas accurately, and annual updates are provided to reflect new plantings.
Monitoring frequency	Annual
QA/QC procedures	Regular field evaluations and cross-verification with remote sensing and GIS mapping data, along with internal reviews of plantation management records, ensure the accuracy and consistency of the data.
Purpose of data	To demonstrate the project's contribution to ecosystem restoration and biodiversity enhancement by quantifying the extent of native species afforestation, and to demonstrate Inverbosques' commitment to contribute on the target 15.8 "By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species." The purpose of this indicator is not to for the project Emission Removals (ER) calculation, either for stabilising the baseline scenario or for the monitor carbon component of the project scenario itself. There are no fixed calculation ex-ante parameters for the indicators chosen under this SDG; instead, it serves as a dynamic component in the project. Using native species is crucial to ensuring ecological compatibility, promoting habitat quality, and preventing the proliferation of invasive species.
Additional comment	N/A

B.7.2 Sampling plan

SDG 13

The Brújula Verde project has developed a comprehensive forest inventory plan to accurately assess and monitor carbon stocks in *Eucalyptus pellita* (TQ274 clone) and native species plantations. This plan aligns with the requirements of the Gold Standard Afforestation/Reforestation (A/R) GHG Emissions Reduction & Sequestration Methodology. The approach balances scientific rigor with practical field considerations, ensuring representative sampling across the planted area. The project determined the use of permanent circular plots (each 500 m²) to achieve a robust yet cost-effective sampling intensity complying with the methodological requirements of a 90% confidence interval and $\pm 20\%$ sampling error. Below is a step-by-step summary of the

design, emphasizing how stratification, random plot selection, and standardized field procedures contribute to consistent and verifiable carbon stock estimates.

Table 41 – Project’s sampling plan

Step	Phase	Sampling plan
1	Stratification	Defining Modelling Units: Each Modelling Unit (MU) corresponds to a coherent area planted in a specific year and with a specific species (or species mix). This stratification accounts for variations in growth patterns due to planting year, species, and site conditions. In total, the first phase includes 10,010 ha divided into MU1, MU2 and a portion of the MU3 that reflect the temporal and species composition of the stands. Planted areas were stratified to cover trees growth variability based on the establishment year and species, see Table 39.
2	Forest inventory design	Randomly stratified sampling: The sampling plan follows a random allocation of permanent plots across each MU. A GIS-based random point generation tool ensures unbiased spatial distribution of plots, requiring at least a 15 m buffer from roads and edges to avoid border effects. This design aligns with Pearson et al. (2005) guidelines, ensuring that variability within each MU is captured efficiently.
3	Sampling size/Number of sampling plots	Establishing permanent plots: The total sampling intensity for this phase is approximately 0.22% (227 permanent plots across 10,010 ha), which balances statistical reliability and logistical feasibility. Each MU receives a proportional number of plots based on its area. In the event of future expansion, additional plots may be added to maintain a representative sampling intensity. All plots remain permanent, facilitating long-term monitoring of forest growth and carbon accumulation.
4	Plot's location	Systematic placement with random starting points: Plots are permanent, the reason why they were systematically located once. When needed, additional plots are located at each forest inventory. Once the number of plots per MU is determined, plot locations are generated in GIS using a random stratified approach,

		ensuring coverage of each MU’s spatial extent. Coordinates are loaded into GPS devices for precise field navigation. Any unforeseen need to adjust a plot location is documented and reviewed by the technical team. The permanent nature of these plots allows repeated measurements over multiple years, improving the accuracy of growth trend estimates.
5	Plot type and size	Circular plots: Each permanent plot is circular with a radius of 12.62 m, yielding an area of 500 m². Plot centers are marked with a PVC tube for easy relocation, and plot perimeters are measured using a digital hypsometer or similar instrument. This standardized size strikes a balance between capturing sufficient tree data and minimizing edge effects or excessive variability within each plot.
6	Tree measurements	DBH, Height, and Qualitative Variables: All trees with a height equal or greater than 1.3 m are enumerated, assigned a unique number, and measured using a diameter tape, clockwise starting to the north, with the closest tree to the plot center. Special cases (e.g., bifurcations below DBH) are recorded according to standard operating procedures. Height is measured on 20–25% of trees in each plot (e.g., every fifth tree) using digital hypsometers. Regression models then estimate missing heights for non-measured trees. Additional data (species, health status, damage codes) are collected to support biomass calculations and forest health assessments.

(Source: Prepared by South Pole (2025), based on information from the initiative, and the Gold Standard requirements)

SDG 5, SDG 8, SDG 15,

No sampling plan is required because it will be based on verifiable project records and established monitoring sub-processes. Evidence will include training reports, attendance lists, contracts, payment slips, employee list, and employee registries, or other available to check on the positive contribution under SDG 5 and 8.

For SDG 15, monitoring will be carried out through biodiversity surveys, species inventory records, and photographic documentation, complemented by spatial monitoring of the planted and restored area using the project’s GIS-based area

monitoring system. This integrated approach ensures that biodiversity gains and native-species coverage are consistently measured and traceable.

B.7.3 Other elements of monitoring plan

Operational and management structure for monitoring and institutional arrangements

The Brújula Verde project employs a structured operational and management framework to ensure that all monitoring activities are carried out consistently and transparently. This framework involves multiple specialized entities, each contributing to data collection, analysis, and archiving.

Responsibilities for data collection and archiving

As explained above, the operational and management structure for monitoring relies in multiple entities, therefore, below is a list of the main roles and responsibilities of each for data collection and archiving:

- **Project Developer:**

Inverbosques as the project developer, oversees the overall implementation of the project, field data collection, verifies adherence to Standard Operating Procedures (SOPs), and maintains clear lines of communication with team leaders responsible for specific tasks such as plot establishment, tree measurement, and data entry.

- **External Inspector (Interventor)**

In the Brújula Verde project, Ingeobosque acts as an independent external inspector (interventor), and technical verifier of forestry operation. This role is responsible for verifying and auditing forestry processes and practices carried out by Inverbosques. Conducts field data collection, and biodiversity baseline studies establishment through advanced methodologies, including environmental DNA (eDNA) analysis¹⁹⁰, in collaboration with entities such as Nature Metrics¹⁹¹ and/or others, to ensure a

¹⁹⁰ eDNA refers to genetic material obtained directly from environmental samples such as soil, water, or air, without necessarily isolating any target organisms. This method, in collaboration with Nature Metrics, provides a sensitive and non-invasive means to assess biodiversity, particularly soil microbial and fungal communities, in the project area.

¹⁹¹ NatureMetrics is a global natural intelligence technology company that provides a comprehensive solution for nature monitoring and impact reporting. Its Nature Intelligence platform, powered by eDNA, enables companies to manage

comprehensive evaluation of soil and ecosystem biodiversity; and evaluation of forest management activities, ensuring that operations align with sustainable management guidelines. They also provide technical research inputs and verify that data collection follows standardized methodologies and that all forestry practices meet best-practice criteria.

- **Remote Sensing and Geospatial Analysis Provider:**

A geospatial and environmental data analysis firm that specializes in remote sensing, GIS mapping, and satellite imagery interpretation. Supports the monitoring efforts by providing spatial analysis and land-use change assessments to track project impacts and ensure compliance with reforestation objectives. This role, also, conducts high-resolution Digital Measurement, Reporting, and Verification (DMRV) process using technologies such as LiDAR and RGB imagery. This DMRV process provides robust spatial analysis that further validates and enhance the overall accuracy of land cover assessment in the project area, and the forest inventory.

- **Social and Environmental Impact Assessment Specialist:**

Responsible of gathering and analyzing qualitative and quantitative social data to assess community impact. Conducts surveys and community engagement activities to evaluate the Local Stakeholder consultation, and assess its effectiveness, measuring social co-benefits generation and local development, ensuring alignment with Sustainable Development Goals (SDGs).

- **Carbon Certification and Technical Oversight Advisor:**

Sustainability consultancy that provides technical oversight for carbon quantification, reporting, and verification processes. This role ensures that the emissions removals are accurately measured, and that project documentation adheres and complies with relevant international carbon certification standards.

their biodiversity impacts and dependencies at scale by converting the complexities of nature into simple, actionable insights for better decision-making for both nature and business.

This collaborative approach allows for a comprehensive and reliable monitoring system that ensures data integrity and transparency across all aspects of the Brújula Verde project

Field measurements and required equipment

Field measurements are central to this monitoring plan, as they provide the empirical basis for estimating forest biomass and carbon stocks. To ensure accurate and consistent measurements across the project's *Eucalyptus pellita* and Native species stands, the project uses a variety of equipment to ensure accurate data collection. For example, GPS devices and detailed maps are used for precise plot navigation, while fiberglass meter tapes, tree measuring tapes, and a Haglöf Vertex hypsometer are essential for measuring variables like the diameter at breast height (DBH) and total tree height. These measurements feed into volume equations to estimate biomass and, ultimately, the carbon sequestration capacity of the plantation. In addition, practical tools such as PVC tubes or poles (marked with 10 cm bands), metal poles, chalk or spray for marking trees, and cameras for documentation are used to further enhance data accuracy and traceability. Standardized data collection forms and protocols ensure that the team, comprising trained field personnel, consistently records all measurements, providing a reliable basis for long-term monitoring.

This combination of specialized equipment supports the project's primary variables of interest, DBH, tree height, and additional forest health indicators, while also allowing for uniform application of measurement protocols across all sampling plots. Through systematic sampling and standardized measurement practices, the project ensures that any changes in forest carbon stocks are tracked with a high level of precision. This integrated approach not only supports the immediate objectives of quantifying forest growth and carbon sequestration but also establishes a robust framework for adaptive management, ensuring the Brújula Verde project meets its sustainability and conservation goals over time.

Once collected, field data undergo a multi-tier quality assurance (QA) and quality control (QC) process. Designated data managers review the forms and digital entries for completeness and accuracy, cross-referencing plot coordinates and tree IDs to detect any inconsistencies. The data are then archived in the project's central database, where they remain available for periodic internal reviews and external verifications throughout the crediting period. This arrangement allows for efficient oversight and prompt resolution of any issues that arise in the field or during data analysis.

Provisions for data archiving

All collected data, ranging from field measurements to digital inventory records, are systematically archived in a secure, cloud-based database. Access rights are strictly regulated to protect data integrity, with designated staff members authorized to perform data uploads, quality checks, and revisions. In parallel, the project's institutional arrangements delineate clear responsibilities for recordkeeping and periodic reviews, ensuring that the inventory data remain verifiable over the entire crediting period.

Uncertainty Assessment

In accordance with Annex A, Uncertainty of LUF parameters of the Gold Standard LUF Requirements, the project developer conducts an uncertainty assessment for key parameters such as biomass estimates and carbon stock measurements. Depending on the outcome of this assessment, the project will apply the procedures stipulated in section 1.1.6 of the same annex, including potential adjustments to reported emission removals to maintain conservative estimates. This approach ensures that any residual uncertainty is handled in a transparent and methodologically consistent manner, thereby upholding the reliability and environmental integrity of the project's monitoring results.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

Start Date (DD/MM/YYYY): 15/05/2023

Justification: In accordance with GS4GG Principle 4 and the "Terms and Definitions" of the Land-Use & Forest Activity Requirements (version 1.2.1), the start date of a project is the earliest date on which the Project Developer commits to expenditures or initiates physical actions toward implementation. For the Brújula Verde project, this date corresponds to 15/05/2023, when the first trees were planted in the project area.¹⁹² As

¹⁹² The detailed justification and supporting evidence for the selection of the start date can be found in the supporting documentation folder: [Supports\PDD\C.1\Start date]

the project commenced planting activities prior to undergoing its first certification, it is deemed retroactive under the Land-Use & Forest Activity Requirements.

C.1.2 Expected operational lifetime of project

Duration: 30 years

Justification: The project is planned to operate over a 30-year period¹⁹³, starting from the date of the initial planting. This timeframe covers the full reforestation cycle, from the establishment and maintenance of young trees through long-term forest management activities, under a sustainable conservation forestry approach. Beyond the crediting period, the project developer intends to maintain forestry operations in the region, thereby promoting the natural or assisted succession of the forest into a more diverse ecosystem dominated by native species.

C.2. Crediting period of project

C.2.1 Start date of crediting period

Start Date (DD/MM/YYYY): 15/05/2023

Justification: In line with the Gold Standard Core document "Land Use & Forests Activity Requirements v1.2.1" for Land-Use and Forestry (LUF) projects, the crediting period can begin up to three years prior to the date of Project Design Certification (Principle 4, section 3.1.11). Since the project is retroactive and commenced planting on 15/05/2023, this date is used as the official start of the crediting period. Relevant documentation (e.g., planting records) confirms that this date aligns with the earliest eligible timeframe for crediting under the applicable Gold Standard rules.

C.2.2 Total length of crediting period

Duration: 30 years

Justification: Pursuant to GS4GG Principle 4 and the Land-Use & Forests (LUF) Activity Requirements, large-scale afforestation/reforestation projects may opt for a crediting period of up to 30 years, subject to periodic renewals every five years. The Brújula

¹⁹³ Although the current formal crediting period of the project is 30 years (per signed landowner usufruct agreements, securing carbon rights for that term; see Section A.1.2), the Project Developer intends to extend this to up to 50 years under the Gold Standard for the Global Goals (GS4GG) rules and requirements. The project's silvicultural and monitoring activities have been designed to operate over a full 50-year cycle from initial planting. To align legal tenure with this design, the Project Developer is working with the owners to extend the legal commitment to a 50-year period extended usufruct agreements. All usufruct contracts will be updated and submitted at the next verification periods to enable the design-change request for a 50-year term crediting period.

Verde project has selected a 30-year¹⁹⁴ term to reflect the full lifecycle of reforestation activities and ensure the long-term management of planted forests. This timeframe also aligns with national forestry regulations and the project’s conservation objectives, while adhering to Gold Standard’s maximum permissible crediting period for LUF projects.

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1 Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in Appendix 1, ongoing monitoring is summarised below.

The Brújula Verde project is designed to uphold international safeguarding standards. The project not only generates beneficial outcomes but also actively identifies and mitigates any adverse impacts. The following is a summary of the identified potential economic, social, and environmental positive and negative impacts as per the Safeguarding Principles & Requirements, and how they are addressed. In this section, in cases where safeguarding principles consist of multiple sub-principles, only those for which additional details were specifically requested have been included here; they are not numbered in order one by one as in the full safeguarding analysis but rather presented as the key components for the impact analysis.

PRINCIPLES	MITIGATION MEASURES ADDED TO THE MONITORING PLAN
Principle 1. Human rights.	1.1.1 Non-discrimination The project complies with the Universal Declaration of Human Rights, local regulations and other related national and international requirements. Likewise, the project does not discriminate and promotes inclusion by setting engagement criteria which foster the integration of disadvantaged people such as poor families and women.

¹⁹⁴ Although the current formal crediting period of the project is 30 years (per signed landowner usufruct agreements, securing carbon rights for thar term; see Section A.1.2), the Project Developer intends to extend this to up to 50 years indr the Gold Standard for the Global Goals (GS4GG) rules and requirements. The project’s silvicultural and monitoring activities have been designed to operate over a full 50-year cycle from initial planting. To align legal tenure with this design, the Project Developer is working with the owners to extend the legal commitment to a 50-year period extended usufruct agreements. All usufruct contracts will be updated and submitted at the next verification periods to enable the design-change request for a 50-year term crediting period.

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All project activities have been developed in close consultation with local communities, ensuring that no human rights are compromised. Concerning the stakeholders, they do not perceive any affectation or violation of human rights by the project, according to the feedback received during the local consultation.

Positive Impacts:

- Inclusive community engagement: Extensive consultations have affirmed that local populations feel respected and fully engaged.
- Empowerment: Training sessions and capacity-building workshops enhance community agency, ensuring informed participation in project activities.

Potential Risks & Mitigation:

Risk of inadvertent exclusion: Despite efforts to include all, there is a risk that marginalized groups might be overlooked.

Mitigation: Regular feedback mechanisms with the participation of community members are in place to adjust participation strategies continuously.

2.1.2 – 2.1.3 Gender Equality and Women's Empowerment (participation).

Gender equality is embedded in the project's human resources strategy. Recruitment, training, and leadership opportunities are structured to ensure equal participation across genders. The project contemplates the promotion of gender equality, equal treatment and equal pay for equal work and aim to prevent discrimination. Accordingly, the project equally encourages the participation of women and men in project activities. The stakeholders' perception of gender equality in the project is positive.

Principle 2. Gender equality

Positive Impacts:

- Empowerment of women: Women are engaged in key roles, providing them with direct income
- Diverse workforce: A multicultural team environment fosters creativity, inclusion, and equal opportunity.

Potential Risks & Mitigation:

Risk of unequal participation: Cultural biases or pre-existing social norms may hinder full gender parity.

Mitigation: Continuous sensitization workshops and regular reviews of gender participation metrics help ensure equity in project roles.

Principle 3. Community health, safety and working conditions

3.1.2 workers' safety and health and transport, storage, and use and/or disposal of hazardous or dangerous materials

The project enforces rigorous health and safety standards that comply with national occupational health and safety laws as well as ILO conventions. The project implements measures to ensure the health and safety of the community members and the workers through the implementation of strategies that are adapted to the risks identified for each activity which are described in its Forest Management Plan. Overall, the project's

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impact is expected to reduce health risks, thanks to ecosystem services provided by the forests.

Positive Impacts:

- Safety training and protocols: Continuous capacity building includes training on safe field practices, proper use of equipment, and emergency preparedness.
- Enhanced local health: The project's ecosystem restoration indirectly supports community health by improving local environmental conditions.

Potential Risks & Mitigation:

- Risk of work-related accidents: Field activities expose workers to hazards such as contact with wild fauna and equipment mishaps.

Mitigation: As a general safety measure, the project applies comprehensive management plans that incorporate strict safety protocols for all field operations. These plans emphasize the use of certified safe elements and equipment, supported by regular safety checks and continuous training sessions to ensure that all personnel are fully equipped and updated on best practices for field safety.

- Risk of overexertion: Intensive labour during reforestation phases might lead to physical strain.

Mitigation: Work rotations, rest periods, and health check-ups are systematically incorporated into the project schedule.

6.1 Labour Rights and Working Conditions.

The project implements measures such as agreements, equipment, and training to ensure the following:

- Compliance of all employment with national labour occupational health and safety laws and with the ILO fundamental conventions.
- Freedom for employees to establish and join labour organisations, and compliance of working agreements with the minimum requirements.
- Implementation of measures that are adapted to the risks identified for each activity, including the use of appropriate equipment, training of workers, reporting of accidents and incidents, and emergency preparedness and response measures.

Principle 6. Economic Impacts.

The project complies with labour practices conform to national laws and international standards. All workers receive fair compensation, safe working conditions, and opportunities for skill development.

Positive Impacts:

- Fair working conditions: The project provides safety equipment, structured work schedules, and fair wages, all of which are monitored.
- Employee development: Continuous training programs ensure that workers are up to date on best practices, reducing the likelihood of accidents and enhancing productivity.

PRINCIPLES	MITIGATION MEASURES ADDED TO THE MONITORING PLAN
Principle 7. Climate and Energy	Potential Risks & Mitigation: - Risk of inadequate safety measures: Field work carries inherent risks of injury. Mitigation: In addition to safety plans, periodic refresher courses and a responsive incident-reporting system are in place. A hierarchy of needs is established so that safety equipment is distributed based on urgency and risk assessment. - Risk of labor exploitation: Even with fair policies, there is always a risk of mismanagement. Mitigation: Regular stakeholder feedback ensure compliance with labour rights, and any deviations are addressed immediately.
	<u>7.1 GHG Emissions</u> The project’s core objective is soil ecosystem restoration without engaging in extractive activities. Sustainable practices are deployed to protect soil, water, and overall ecosystem health. The Brújula Verde project is fundamentally designed to mitigate greenhouse gas (GHG) emissions and contribute to climate change mitigation through afforestation/reforestation activities. Extensive analysis over four working days has ensured that the project’s design and operational practices do not lead to a net increase in GHG emissions compared to the Baseline Scenario. The following outlines the positive impacts, potential risks, and mitigation measures regarding GHG emissions:
	Positive Impacts: - Net Emission Removals: The project employs sustainable land management and reforestation practices that actively sequester CO₂, thereby reducing the overall GHG emissions relative to the baseline. - Enhanced carbon sequestration: By planting native species and implementing soil ecosystem restoration, the project contributes to long-term carbon storage and enhances ecosystem resilience against climate change. - Adherence to best practices: All activities are aligned with internationally recognized methodologies, ensuring that the project delivers robust emission removals while supporting sustainable development. - Ecosystem restoration: Reforestation and restoration activities improve water retention, prevent soil erosion, and enhance soil fertility. - Climate change mitigation: By sequestering CO₂, the project contributes to broader climate change mitigation efforts. - Biodiversity conservation: Restoration efforts are designed to support native flora and fauna, creating corridors that enhance biodiversity. Potential Risks & Mitigation: - Emission sources during implementation: While the primary objective is emission mitigation, certain necessary activities, such as land preparation,

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fertilizer application, and the consumption of fossil fuels for management practices, can generate GHG emissions.

Mitigation:

- Integrated emission assessment: The potential emission sources from land preparation, fertilizer use, and fossil fuel consumption have been thoroughly assessed. These figures are fully integrated into the project planning and accounted.
 - Adoption of low-emission practices: The project employs best practices that include efficient land preparation techniques, sustainable fertilizer management, and the minimization of fossil fuel use. These practices ensure that any emissions are kept to a minimum.
- Relative increase over baseline: If these emissions are not adequately managed, they could lead to a slight increase over the baseline scenario, despite the project's overall design being focused on achieving net emission removals.

Mitigation:

- Continuous monitoring and reporting: A rigorous monitoring system is in place to track GHG emissions throughout the project lifecycle. Periodic reports and adaptive management strategies ensure that any deviations from planned emission levels are promptly addressed.
 - Adaptive management framework: The project's framework allows for iterative adjustments based on monitoring outcomes, ensuring that mitigation strategies remain effective and responsive to any emerging risks.
- Risk of soil disturbance: Land preparation might temporarily disrupt native habitats.

Mitigation: Best management practices are employed during soil preparation to minimize disturbance, and the impact is continuously monitored with soil quality tests.

- Risk from agrochemical inputs: Although agrochemicals are used sparingly, there is a risk of minor contamination.

Mitigation: Strict protocols for chemical use, regular environmental monitoring, and a shift toward organic inputs, when possible, reduce these risks.

Principle 8. Water

8.1 Impact on Natural Water Patterns/Flows

Although the project is intended to preserve the natural flow and structure of local watercourses, the region's marked seasonal rainfall fluctuations may affect water availability during the dry season. To mitigate this, the project includes continuous monitoring to ensure that variations in flow, potential flooding, or disruptions to connectivity remain within acceptable thresholds and that project activities do not contribute to water scarcity.

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No negative risk has been identified under Principle 8: Water, and specifically not in the subcategory 8.1, as the project effectively conserves and manages water resources while maintaining the natural hydrology and flow patterns of the area. However, this aspect will be continuously monitored throughout project implementation to ensure that no emerging risks arise and that water-related safeguards remain effectively managed. The project's water management practices, including efficient use, conservation, and continuous monitoring, ensure that both water quality and availability are maintained at optimal levels, thereby safeguarding this vital resource. Consequently, the project does not pose any adverse impacts related to water resources. The project's robust management plan, including best practices in soil preparation, reforestation, and ecological restoration, ensures that the risk of disruption to natural water bodies is minimized.

Based on a comprehensive hydrological assessment conducted as part of the project's Sustainable Forest Management Plan (PMFS for its acronym in Spanish)¹⁹⁵ and detailed in the document Environmental and Hydrological Impact Assessment under IFC PS1 and PS6¹⁹⁶ it is confirmed that natural watercourse patterns are maintained and remain unaffected by project activities. These studies validate that project interventions align with best environmental practices by preserving hydrological integrity while mitigating potential risks associated with erosion or sediment transport. The project has been carefully designed to avoid any negative impacts on the catchment area, and this has been substantiated thorough hydrological modeling and sediment balance analyses included in the referenced documentation demonstrating that the project activities align with best environmental management practices, effectively protecting local water resources. Moreover, the Sustainable Forest Management Plan includes provisions for ongoing monitoring and assessment of water quality and quantity, ensuring that any potential risks to the catchment are identified and addressed proactively.

Continuous monitoring and adaptive management further safeguard against any potential instability, allowing the project not only to avoid negative impacts but also to contribute positively to the preservation of these critical environmental features.

Principle 9. Environment,

9.2 Vulnerability to natural disaster.

¹⁹⁵ See the Sustainable Forest Management Plan (PMFS) in the supporting documentation folder: [Supports\PDD\D.1\P.8]

¹⁹⁶ See the Environmental and Hydrological Impact Assessment under IFC PS1 and PS6 on English and Spanish "Resultados Evaluación Impactos Componente Hidrológico IFC Proyecto Brújula" in the supporting documentation folder: [Supports\PDD\D.1\P.8]

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ecology and land use

The project has been subjected to a rigorous hazard analysis (using the Think Hazard tool and Excel-based risk mapping), identifying high wildfire risk and medium risks for floods and extreme heat.

According to the Think Hazard tool, the project is classified as high hazard for wildfire, and for river flood, and medium for extreme heat. Risks are identified at the project area level and are described and addressed in the Forest Management Plan, which includes mitigation measures such as building firebreaks around the reforested areas, an emergency preparedness plan and response strategies to address these events, if they occur.

Likewise, the project implements mitigation measures, when possible, to mitigate the identified risks of impacts caused by natural or man-made hazards such as fire, erosion and extreme heat. For example, firebreaks are implemented for fire prevention, measures to minimise impact on soil during land preparation and planting are implemented for erosion prevention, and species that are locally adapted are planted to prevent potential risks linked to heat and drought.

Positive Impacts:

- Resilience building: The selection of drought-resistant, locally adapted species and the creation of firebreaks contribute to increased resilience against natural disasters.
- Emergency preparedness: Detailed emergency response strategies are developed and integrated into the project management plan.

Potential Risks & Mitigation:

- Risk of wildfires: High wildfire risk is noted in the assessment.
Mitigation: Implementation of firebreaks, regular monitoring during high-risk periods, and engagement with local community for early fire detection. Specialized fire brigades are deployed to provide rapid response and effective suppression of any emerging wildfire incidents.
- Risk of flooding and heat extremes: Climate variability poses risks to the health of the new plantations.
Mitigation: Adaptive management practices include the development of contingency plans and water management strategies to ensure plant survival during extreme events.

9.5 Hazardous and non-hazardous waste.

The project does not promote or require the use of hazardous chemicals and materials for the development of activities. All waste generated during project activities is managed according to strict environmental guidelines within the framework of the Forest Management Plan, establishing guidelines for waste management (non-hazardous).

Positive Impacts:

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- Minimized chemical footprint: By eschewing hazardous chemicals, the project reduces potential environmental contamination.
- Sustainable waste practices: Clear protocols for the handling, storage, and disposal of non-hazardous waste are established and regularly reviewed.

Potential Risks & Mitigation:

- Risk of improper waste disposal: Even non-hazardous waste can accumulate and negatively impact local ecosystems.
Mitigation: Routine waste monitoring and assessment, community training on waste management, and partnerships with local waste management services ensure compliance with environmental standards.

9.6 Pesticides & Fertilisers.

The Brújula Verde project is committed to minimizing the use of pesticides and fertilisers while ensuring healthy tree development during the early growth stages. This is achieved through a science-based, site-specific approach aligned with both national legislation and internationally recognized environmental and forestry standards. Specifically, the project adheres to:

- National legislation and regulations on agrochemical use
- the Forest Stewardship Council (FSC) principles and criteria, including the FSC pesticide policy (FSCPOL30-001 V3-0 (FSC Pesticides Policy) and FSC-POL-30-001a V1-1 (FSC Highly Hazardous Pesticides List))¹⁹⁷,
- Aligns with the International Code of Conduct on Sustainable Use and Management of Fertilisers (FAO, 2019) ¹⁹⁸.

Additionally, the project's fertilisation and weed control practices are in line with FSC standards and national legal frameworks. All agrochemical applications are below the thresholds permitted by the European Union for sustainable agriculture. This commitment reflects the project's alignment with best practices for sustainable forestry management. This ensures that the overall impact remains environmentally sustainable and socially acceptable and that all applications meet stringent environmental and safety criteria.

Detailed agrochemical management

1. Weed control and Glyphosate application:
 - a. Optimized application strategy: The project applies glyphosate in a strictly controlled manner, using an optimized low-dose application of 1.2–1.7 L/ha (or 1.2–1.7 kg/ha) during land preparation. This is

¹⁹⁷ See the FSC pesticide policy in the supporting documentation folder: [Supports\PDD\D.1\P.9]

¹⁹⁸ See the International Code of Conduct on Sustainable Use and Management of Fertilisers_(FAO,2019) in the supporting documentation folder: [Supports\PDD\D.1\P.9]

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significantly lower than standard practices (which typically require 3.5–4.0 L/ha) and is designed to meet and even remain below the maximum allowable thresholds set under EU regulations and other international guidelines.

- i. Rationale: Using glyphosate only during the initial stage ensures that dominant weeds in degraded savannas are controlled efficiently, thereby securing adequate nutrient availability for young forest species. Once tree canopy cover develops and natural shading suppresses weed growth, further applications become unnecessary.
 - ii. Compliance & Safety: This strategy is in line with the Commission Implementing Regulation (EU) 2023/2660¹⁹⁹, which sets maximum doses for glyphosate based on its intended use, and it is supported by FSC certification that confirms adherence to stringent environmental and safety standards.
 - b. Integrated weed management: To further reduce chemical inputs, the project implements an integrated weed management approach that combines mechanical methods with selective chemical treatments. This minimizes environmental exposure and reduces the overall chemical load while ensuring effective weed control.
2. Fertilization application practices and nutrient management:
 - a. Controlled nutrient application: Fertilizers used in the project are primarily derived from natural mineral sources. The application rates are based on precise soil analyses to avoid over-fertilization and nutrient runoff:
 - i. Phosphorus: Applied at a rate of approximately 208 g per tree, delivered in encapsulated or granulated controlled-release formulations. This method promotes direct soil incorporation and maximizes nutrient uptake while minimizing the risk of dispersion outside the target area.
 - ii. Potassium and micronutrients: A carefully calibrated mixture is applied at around 150–190 kg/ha. The application is restricted to the early establishment phase (the first two years), with

¹⁹⁹ For more details, see the COMMISSION IMPLEMENTING REGULATION (EU) 2023/2660 of 28 November 2023. Available at: https://eur-lex.europa.eu/legal-content/ES/TXT/PDF/?uri=OJ:L_202302660 , and attached policy in the supporting documentation folder: [Supports\PDD\D.1\P.9]

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	potassium applied only once per year in a non-intensive manner. iii. Timing and conditions: Fertilizer applications are strategically scheduled during periods of light to moderate precipitation, typically coinciding with seasonal transitions, to enhance absorption efficiency and reduce the potential for runoff. b. Environmental and regulatory alignment: These fertilization practices comply with both national regulations and European Union directives, specifically Regulation (EU) 2019/1009 and Regulation (EU) 2024/2516, as well as ISO 14001 environmental management standards. This ensures that the inputs have low ecological impact (e.g., minimal sulfate and chloride residues) and that soil nutrition is managed in a sustainable, regenerative manner. c. Advanced technologies and certification²⁰⁰: The project incorporates innovative fertilization technologies (such as AVENTECH, NiproN, and NeoPhos), which are designed to reduce nutrient loss, minimize soil acidification, and lower the carbon footprint through biodegradable plant-based additives. Certification by relevant authorities (e.g., from Mezclas Integrales Programadas MiP SAS Colombia and IBD Certificaciones Ltda.) further validates the responsible use of these inputs. Integrated benefits and environmental safeguards Positive Impacts: - Targeted application: - Pesticides are used selectively only in areas where specific pest-related issues are identified, avoiding broad-spectrum or prophylactic use, and minimizing overall chemical input and reducing environmental exposure. - Fertilisers are applied in a controlled manner during the early stages of tree growth, tailored to verified soil nutrient deficits, enhancing root establishment and biomass accumulation, and to promote robust development and ensure effective nutrient uptake. - Enhanced plant health and growth: The strategic use of fertilisers supports early tree growth, which is crucial for establishing resilient forests and improving long-term carbon sequestration potential.

²⁰⁰ See Certificates in the supporting documentation folder: [Supports\PDD\D.1\P.9]

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- Adherence to best practices: Compliance with FSC pesticide policy and international fertiliser management guidelines ensures that both pesticides and fertilisers are used responsibly, safeguarding soil, water, and overall ecosystem health.

Potential Risks & Mitigation:

- Environmental contamination: Improper or excessive use of pesticides and fertilisers may lead to soil and water pollution, as well as issues such as ammonia volatilization and unintended greenhouse gas emissions.
- Nutrient runoff: There is a risk of nutrient losses to the environment if fertilisers are not applied judiciously, potentially disrupting local ecosystem services.
- Impact on non-target organisms: Even with selective application, there is a possibility of adverse effects on non-target flora and fauna if pesticides are not managed carefully.

Mitigation:

- Integrated Pest Management (IPM): The project employs IPM approaches to ensure that pesticide use is kept to a minimum, using non-chemical alternatives wherever possible. This strategy not only protects non-target species but also reduces the overall chemical load on the environment.
- Selective and controlled application:
Pesticides are applied only in areas with specific, identified pest issues, while fertilisers are used selectively based on precise growth needs. This targeted approach minimizes the risk of over-application and reduces potential nutrient runoff.
- Strict adherence to guidelines and legislation: All applications of pesticides and fertilisers comply with national regulations and FSC guidelines, and standards established by the European Union, ensuring that the methods used are aligned with best practices for environmental protection.
- Continuous monitoring and adaptive management:
Regular monitoring of soil and water quality is conducted to detect any early signs of contamination or nutrient loss. The project's management team is prepared to adapt practices based on monitoring outcomes to mitigate any emerging risks promptly.
- Training and capacity building:
Ongoing training for field personnel on best practices for chemical application ensures that all operators are well-versed in safe handling, application techniques, and environmental safeguards.

9.10 High Conservation Value Areas and critical habitats.

Although the project operates in productive and agroforestry areas, its proximity to identified High Conservation Value (HCV) areas and critical habitats within the Bitá River Basin necessitates meticulous planning and management. These areas, including

PRINCIPLES	MITIGATION MEASURES ADDED TO THE MONITORING PLAN
	HCV categories HCV1, HCV2, and HCV5, are recognized for their significant biodiversity and ecological importance. The project’s design and implementation incorporate strategies to ensure that these sensitive ecosystems are protected, even as sustainable development is pursued in adjacent areas. In line with the comprehensive biodiversity impact assessment documented in the PS6-aligned risk screening report (May 2024)²⁰¹ and the dry season baseline biodiversity survey (Feb 2025)²⁰², the project has integrated adaptive management measures to monitor and mitigate potential impacts on these areas. For its part, conservation of biodiversity is a cornerstone of Brújula Verde. In alignment with the PS6-aligned risk screening report,²⁰³ the project designates the 100% of its area as a conservation zone, with additional protective buffers around key water bodies, to mitigate potential impacts on biodiversity, as supported by the findings of the biodiversity impact assessment. Positive Impacts: • Focused impact area: The project targets productive and agroforestry zones that are distinct from designated HCV ecosystems, ensuring that intact forests and critical habitats remain unaffected. • Conservation collaboration: Active engagement with local conservation initiatives and stakeholders ensures ongoing assessment and protection of the nearby HCV areas. This collaborative approach is reinforced by the Biodiversity Impact Assessment and supports regular ecosystem monitoring and adaptive management. • Preservation of existing forests: All existing forested areas within the project boundaries are maintained in their natural state, contributing to the overall resilience of regional biodiversity. • Informed planning: Detailed spatial planning and environmental assessments ensure that project activities are carefully demarcated, thereby minimizing any potential overlap with HCV areas. These measures are informed by the extensive documentation provided in the risk screening and field activity reports. • Biodiversity corridors: The creation of ecological corridors enhances native species connectivity and supports the resilience of local ecosystems.

²⁰¹ See the INFORME PRELIMINAR CAMPAÑA LLUVIAS PROYECTO BRUJULA in the supporting documentation folder: [Supports\PDD\D.1\P.9]

²⁰² See the INFORME ACTIVIDADES EPOCA SECA LINEA BASE BIODIVERSIDAD in the supporting documentation folder: [Supports\PDD\D.1\P.9]

²⁰³ See the PS6-aligned risk screening for Brujula Project in the supporting documentation folder: [Supports\PDD\D.1\P.9]

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- Endangered species Protection: Informed by critical habitat qualifying features outlined in the PS6 report, ²⁰⁴ targeted reforestation using native species improves habitats for potentially endangered fauna, with ongoing collaboration with conservation experts such as IUCN and Biotope.

Potential Risks & Mitigation:

- Proximity-related impacts: Given the project's location near HCV areas within the Bitá River Basin, there is a potential risk of inadvertent impacts, such as disturbance to critical habitats, if project boundaries are not strictly maintained.

Mitigation:

- Clear demarcation and spatial planning: Detailed mapping and strict delineation of project boundaries ensure that all activities are confined to designated productive and agroforestry zones, keeping intact HCV ecosystems undisturbed.
 - Robust monitoring: Continuous environmental monitoring and regular biodiversity impact assessments, as detailed in the supporting documents, are implemented to promptly detect and address any encroachments or unintended impacts on nearby HCV areas.

- Management complexity: The close proximity to sensitive ecosystems (HCV1, HCV2, and HCV5) requires constant vigilance and may pose challenges in managing ecological interfaces, especially during periods of intensified project activities.

Mitigation:

- Stakeholder engagement and collaborative oversight: Active collaboration with local conservation groups and stakeholders brings external expertise into project management. The biodiversity impact assessment and this joint oversight facilitates the early identification of management challenges and ensures adaptive adjustments are made to safeguard HCV areas.
 - Adaptive management framework: An iterative management approach allows for ongoing refinement of operational practices based on monitoring data and stakeholder feedback, ensuring that complexity is effectively managed.
- Unforeseen ecological impacts: Changes in land use practices or unexpected environmental pressures could potentially lead to indirect impacts on nearby HCV areas.

²⁰⁴ See the PS6-aligned risk screening for Brujula Project in the supporting documentation folder: [Supports\PDD\D.1\P.9]

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- Risk of vegetation thinning: Thinning activities, while beneficial for tree growth, may temporarily affect understory biodiversity.
Mitigation: Adaptive management strategies include monitoring regrowth rates and adjusting thinning practices to minimize long-term ecological disruption.
- Risk of habitat disruption: Unintended impacts on critical habitats are closely monitored.
Mitigation: Continuous field surveys and biodiversity assessments ensure that conservation zones remain intact and that any negative trends are addressed promptly.

9.11 Endangered species.

The Brújula Verde project is committed to ensuring that there is no reduction or negative impact on any recognized Endangered, Vulnerable, or Critically Endangered species, as defined by the IUCN Red List. Although biodiversity monitoring within the project boundary has confirmed the presence of endangered mammals, the project is specifically designed to avoid any negative impacts, both within its boundaries and through transboundary effects. This commitment is reinforced by the biodiversity impact assessment findings documented in both the PS6-aligned risk screening report²⁰⁵ and the field surveys²⁰⁶, which highlight the conservation status and distribution of key species.

The project will restore the land with a species mix and is expected to have a positive impact on the ecosystem health and improve habitats for such species. The project includes the conservation of 100% of the project area that is identified and managed to protect (and potentially enhance) the biological diversity of native ecosystems as corroborated by the biodiversity impact assessment.

Positive Impacts:

- Enhanced habitat quality: The project employs a forest enrichment approach in designated conservation areas. This strategy not only preserves but also improves habitat quality, providing enhanced living conditions for endangered species.
- Proactive conservation management: Through adherence to the High Conservation Value (HCV) approach and collaboration with entities such as the Alexander von Humboldt Research Institute, the Omacha Foundation, and the Vichada Government, the project reinforces its commitment to biodiversity

²⁰⁵ See the PS6-aligned risk screening for Brujula Project in the supporting documentation folder: [Supports\PDD\D.1\P.9]

²⁰⁶ See the INFORME PRELIMINAR CAMPAÑA LLUVIAS PROYECTO BRUJULA and the INFORME ACTIVIDADES EPOCA SECA LINEA BASE BIODIVERSIDAD in the supporting documentation folder: [Supports\PDD\D.1\P.9]

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protection. These actions are supported by detailed monitoring and assessment protocols described in the biodiversity impact documentation.

- Robust monitoring and data collection: The continuous monitoring of fauna, recording casual sightings and maintaining a comprehensive database, ensures that any changes in species presence or habitat quality are promptly detected and addressed. This process is a central component of the project's biodiversity impact assessment.
- Strict prohibition on hunting: An absolute ban on hunting native fauna further safeguards vulnerable species, ensuring that human activities do not contribute to a decline in endangered populations.

Potential Risks & Mitigation:

- Unintended habitat disturbance during Project Activities: Even with careful planning, construction or management activities might inadvertently disturb the habitats of endangered species within or near the project boundary.

Mitigation:

- Strict operational boundaries & forest enrichment: The project adheres to a rigorous forest enrichment approach, ensuring that all activities are confined to designated productive and agroforestry areas without encroaching on sensitive habitats.
- Enhanced biodiversity monitoring: Regular and detailed environmental assessments are conducted to detect any disturbances early, allowing for immediate corrective actions.
- Indirect impacts through transboundary effects: There is a potential risk that activities within the project area might indirectly affect neighbouring ecosystems that also harbour endangered species.

Mitigation:

- Comprehensive environmental impact assessments: Prior to implementation, thorough impact assessments are carried out to ensure that project activities do not cause adverse transboundary effects.
- Collaborative management practices: Ongoing coordination with regional conservation authorities and stakeholders helps to monitor and mitigate any indirect impacts, ensuring that adjacent areas remain unaffected.
- Data gaps in biodiversity monitoring: Inadequate or infrequent monitoring may lead to data gaps, potentially masking early signs of negative impacts on endangered species.

Mitigation:

- Robust data collection and reporting systems: The project maintains a detailed database of fauna sightings and conducts regular biodiversity

PRINCIPLES	MITIGATION MEASURES ADDED TO THE MONITORING PLAN
	surveys. This continuous monitoring is integral to the project's biodiversity impact assessment and enables adaptive management and timely intervention if any trends indicate a potential threat to endangered species. Engagement with external experts: Collaboration with expert entities, such as the Alexander von Humboldt Research Institute, ensures that monitoring protocols remain comprehensive and scientifically robust.

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

	The Project takes into account gender roles and the abilities of women and men to participate in the decision/designs of the project activities. Women and men have equal access and rights in the project. Marital status is not relevant for employment and the salary is only depending on the respective role and experience. Women take over leading roles in the project. The number of field workers that are male (is clearly higher than female due to the physical work, but on the other hand, more women are employed in the administrative entities.
Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	

Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	The project fully aligns with existing country policies, strategies and best practices. The project was aligned with the 2018-2022 National Development Plan (NDP) and the new NDP for 2022-2026. It includes a commitment to strengthening government institutions that have specific mandates to address gender equality. This includes supporting the gender-sensitive design of public policies and budgets at the national and subnational levels. The main pillars of the agenda include increasing the educational and economic empowerment of women to eliminate gaps in labour markets; the political empowerment of women; the promotion of women's welfare and health (especially with regards to their sexual and reproductive rights); the promotion of the right to a life free of violence; the recognition of rural women as pillars of development; and, gender equity for peace building.
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	No expert is required for the Gender Safeguarding Principles & Requirements. Gender equality is not an issue in the project. Additionally, FSC certification also requires compliance with these principles.

Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?

No expert is required for the Stakeholder Consultation, however, The project has actively involved expert stakeholders (Corporación ADN socioambiental) in the design process to ensure that gender equality are effectively addressed. Engaging expert stakeholders is crucial for integrating diverse perspectives and expertise. Their input has been instrumental in shaping project strategies and ensuring alignment with best practices.

There are no and were never issues with women's participation in stakeholder consultations. Additionally, FSC certification also requires compliance with these principles.

TEMPLATE

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The below is a summary of the 2 step GS4GG Consultation for monitoring purposes. Please refer to the separate Stakeholder Consultation Report for a complete report on the initial consultation and stakeholder feedback round.

E.1 Summary of stakeholder mitigation measures

During the consultation process, attendees provided different; each of these comments received feedback, and those that contributed continuous improvement were considered, the details are available below in Table 42. The comments collected resulted from the joint activities conducted at each meeting, which naturally led to the participation and inclusion of both genders in some of these comments.

Table 42 – Evaluation of comments from the consultations

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation/ Justification (Why? How?)
Why does the company not contract for goods and services from the communities?	NO	The community is informed that these processes are outsourced to strategic allies and that the procedure is autonomous to choose their suppliers and in addition to this, they must comply with certain security requirements.
Is there a census of the inhabitants for information on each village?	YES	There is a characterization of the Inspección La Esmeralda; the proposal to extend this exercise to the other villages in the area of influence will be taken into account.
How is the process of selling the land acquired by InverBosques for the	NO	InverBosques is a company dedicated to the management and administration of forestry projects; therefore, the company does not purchase land.

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation/ Justification (Why? How?)
Brújula Verde project?		
How do I manage a firebreak?	YES	Firebreaks are the company's own preventive activities to protect the property. If a neighboring neighbor wishes to send a request, he/ she should do so in writing to 321 465 5684 – WhatsApp and it will be evaluated according to its viability.
There is a need for more spaces to disseminate information about the Brújula Verde project developed by InverBosques	YES	We constantly promote the socialization of project activities and permanent monitoring, ensuring the active participation of the communities. Given the agreements with stakeholders, monthly meetings will be held in each village, and mechanisms will be provided for receiving comments.
Implement different communication channels for the dissemination of the different activities with the communities	YES	From the social area, different local stakeholders are approached, with whom these diffusions are made, however, at each meeting the database is updated.
How can those who do not have a cell phone communicate with the company and/or through which person?	YES	Suggestion boxes will be installed in strategic locations in each of the villages and in the Puerto Carreño urban area.
How can I get involved with Brújula	YES	The selection processes are carried out according to the project's demand, which is why we are

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation/ Justification (Why? How?)
Verde developed by InverBosques? If I have already submitted my resume, where can I find out?		constantly receiving resumes and contacting people according to their profile and needs. In case additional information is required, people may contact us by calling 310 8455064 or at the Puerto Carreño office.
They should manage telecommunication antennas with the different communications companies in the country	NO	This type of management is not part of the scope of the project, since this depends on other factors that may be linked to commercial aspects of the telecommunications company present in the area.
The Brújula Verde Project should provide subsidies to farmers who have farms near the project	NO	The Brújula Verde Project developed by InverBosques through its social process, carries out social projects in coordination with the leaders who so wish, however, our scope is not welfare or paternalistic, that is why we do not seek to replace the role of the State and we do not provide subsidies of any kind. Instead of financial subsidies disbursement to farmers, the Project delivers and provides tangible benefits, namely, local employment opportunities, infrastructure improvements (e.g., road upgrades and water-management systems), and targeted social programs such as training, health services, and educational workshops)

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation/ Justification (Why? How?)
Contribution to the generation of employment in the region and to the economic development of the region	YES	The community reflects the positive impact generated by the project's possibilities of accessing employment and economic growth opportunities.
Actions for the intervention of the roadway in coordination with the community	YES	In the same way that there is concern about the deterioration, the community also perceives that the project has carried out actions to intervene in the same areas.
Limited socialization of the forest management plan	YES	The socio-environmental team clarifies to the participants that the Brújula Verde Project does not make use of the wood in the plantations and that the objective is clearly the capture of carbon dioxide and the conservation of the ecosystems.
Climate change mitigation	YES	After explaining the objective and methodology of the Brújula Verde Project, the participants of the stakeholder consultation agree that one of the main positive impacts is the capture of carbon from the atmosphere, mitigating climate change and global warming.
Actions for fire control and mitigation	YES	Some neighbors emphasize the fire control actions generated by the project, such as the construction of firebreaks.
Application of agrochemicals	YES	There is concern about the application of agrochemicals and the possible contamination that

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation/ Justification (Why? How?)
		this could generate through run-off into water sources and dispersion into the air quality.
Biodiversity protection	YES	Some of the comments received reflect a positive impact on the increase in biodiversity of flora and fauna species.
Increased presence of wild species in the project's plantations	YES	Some neighbors say that plantations do protect biodiversity, but that they increase the number of predators such as pumas and jaguars on their farms that attack pigs and cattle, and that some species are replaced by others, such as bees.
Low planting of native species	YES	Community leaders ask why there is a low plantation of native species and suggest that more native species be planted. The Forestry area and the socio-environmental team explain that research and development of different native species is being carried out for their gradual introduction until reaching the objective of the Brújula Verde Project of 5,000.0 hectares in the second phase.
High vehicle speed	YES	Community representatives recommend drivers to establish a maximum speed limit when driving on the roads, as it represents a risk for domestic animals and children, as well as raising dust to homes.
Employment generation and economic opportunities	YES	Although the impact is categorized as positive, within the same impact commentary it is stated that the community of the village has little or no

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation/ Justification (Why? How?)
		hiring within the project and would like to be involved in the hiring of personnel.
There is concern about the fire season in the summer	YES	President of the community action board and neighbors request support for the construction of a firebreak.
Contribution to social development	YES	The community recognizes the social projects carried out in La Esmeralda; however, they request that these projects reach the more distant communities to the same extent and not only focus on the village.

(Source: Prepared by South Pole (2025), based on information from the initiative holder, and the Gold Standard requirements)

E.2 Final continuous input / grievance mechanism

METHOD	INCLUDE ALL DETAILS OF CHOSEN METHOD (S) SO THAT THEY MAY BE UNDERSTOOD AND, WHERE RELEVANT, USED BY READERS.
Continuous Input / Grievance Expression Process Book (mandatory)	During the consultation process the participants proposed to implement the mailboxes as a constant mechanism that can be easily accessed by all and allows plantation neighbors to make comments and complaints anonymously or for those who do not have access to information technology. Based on that comment it is proposed to install mailboxes in strategic locations of the project, i.e. central forestry camps and community meeting places in each village. Once implemented, these mailboxes should be checked at least once a month and all comments received should be recorded in a follow-up matrix. The location of these mailboxes will be as follows: • Campamento Las Bonitas: 5°44'21.87"N 68°13'25.12"O • Campamento Gavan 5°44'37.7" N, 68°43'48.1" W • Campamento Catherine 6° 1'25.97"N 67°53'18.73"O • Campamento Trinidad 5°42'48.4" N, 67°43'25.6" W • Campamento los Alpes 5°44'58.3"N 68°31'37.0"W • Oficina de InverBosques Puerto Carreño Cr 6 #19-29 Barrio santa Teresita • Tienda la Y 6° 2'40.80"N 68° 9'49.75"O • Inversiones Zully Centro poblado de La Esmeralda 5°44'45.5"N 68°11'26.0"W • Junta de acción comunal Casuarito 5°40'54.84"N 67°38'26.53"O
GS Contact (mandatory)	help@goldstandard.org

METHOD	INCLUDE ALL DETAILS OF CHOSEN METHOD (S) SO THAT THEY MAY BE UNDERSTOOD AND, WHERE RELEVANT, USED BY READERS.
Telephone access	WhatsApp Line +57 3214655684 This is the main means implemented, as it allows direct and immediate communication with the project. This channel is already an implemented mechanism and is the one that allows the greatest communication with stakeholders. All comments received through this channel are recorded in a follow-up matrix.
Internet/email access	For those interested in contacting the organization via email, the following address is available: adn@inverbosques.com
Other - Periodic visits by the social team	This mechanism was proposed and voted on by the majority of those attending the consultations, as they express and request more presence in their villages. The parties express the need to have the presence of the social team in the villages on a constant or periodic basis, as this will facilitate dialogue and the reception of comments, the updating of information and the building of trust with the project's neighbors. Due to the distances between villages, it is proposed that these meetings be held on a monthly or bimonthly basis, in order to schedule meetings with the parties to monitor the actions carried out by the project.

METHOD	INCLUDE ALL DETAILS OF CHOSEN METHOD (S) SO THAT THEY MAY BE UNDERSTOOD AND, WHERE RELEVANT, USED BY READERS.
Other – Bulletin board	This mechanism is necessary for the constant updating of information related to the project and also functions as a mechanism for dissemination of information and consultation of the parties. These billboards will be installed in the strategic camps in each village, these camps are Las Bonitas, Alpes, Gavan, Catherine and Trinidad. This mechanism is considered because it allows the publication and updating of relevant information such as meetings, start of forestry activities, announcements, policies and other relevant content.

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.1 Human Rights		
P.1.1.1 	Does the project developer, its representatives and the Project disrespect internationally proclaimed human rights?	☐ YES ☒ NO
P.1.1.1 	Is the project involved or complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights?	☐ YES ☒ NO
P.1.1.2 	Have local communities or individuals raised human rights concerns regarding the project (e.g., during the stakeholder engagement process, grievance processes, public statements)?	☐ YES ☒ NO
P.1.1.3 	Is there a risk that rights-holders (e.g., Project-affected stakeholders) do not have the capacity to claim their rights?	☐ YES ☒ NO
P.1.1.3 	Does this project undermine national or regional measures for the realisation of the right to development?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project potentially involve or lead to:		
P.1.1.1 	adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalised groups?	☐ YES ☐ POTENTIALLY ☒ NO
P.1.1.2 	inequitable or discriminatory impacts on affected populations, particularly people living in poverty or marginalised or excluded individuals or groups, including persons with disabilities?	☐ YES ☐ POTENTIALLY ☒ NO
P.1.1.3 	restrictions in availability, quality of and/or access to resources or basic services, in particular to marginalised individuals or groups, including persons with disabilities?	☐ YES ☐ POTENTIALLY ☒ NO
P.1.1.3 	exacerbation of conflicts among and/or the risk of violence to project-affected communities and individuals?	☐ YES ☐ POTENTIALLY ☒ NO
Briefly describe below how the project incorporates a human rights-based approach.		
The Project complies with the Universal Declaration of Human Rights and other related national and international requirements.		

SOCIAL SAFEGUARDING PRINCIPLES

Reference requirement	Question	Response
	- Human rights analysis informed by UN mechanisms: The project developer has conducted stakeholder consultations and sought the opinions of the local community, ensuring that the project's design aligns with international human rights principles. The project adheres to the host country's commitment to human rights standards, including Colombia's ratification of the Universal Declaration of Human Rights (UDHR), the International Covenant on Economic, Social, and Cultural Rights, and other relevant international treaties. The developer actively considers recommendations from UN human rights mechanisms, including treaty bodies, the Universal Periodic Review (UPR), and special procedures, to ensure that the project is informed by the latest human rights analyses. - Assisting the government in realizing human rights: The project includes measures that support the Colombian government's efforts to respect, protect, and fulfill human rights obligations under international law. It works in alignment with both international human rights treaties and Colombia's national legal frameworks, ensuring that the higher standard of protection is always applied. By adhering to the country's Constitution, specifically Article 13, which prohibits discrimination based on sex, race, nationality, or religion, the project contributes to implementing human rights-related standards at the national level. - Enhancing benefits and inclusion groups: The project is committed to enhancing the availability, accessibility, and quality of benefits and services for all individuals and groups, ensuring their meaningful participation in decision-making processes. In line with the human rights principles of non-discrimination and equality, the project promotes the inclusion of historically marginalized groups, ensuring that their voices are heard and respected in the governance and operation of the project. - Reasonable accommodations for people with disabilities: The project provides reasonable accommodations to ensure that individuals with disabilities can fully access project benefits and services. This commitment to inclusivity ensures that all individuals, regardless of their physical or mental abilities, can participate in and benefit from the project's activities. The project contributes to the improvement of human rights by enhancing the availability, accessibility and quality of benefits and services for all individuals and groups in rural communities.	

P.2 | GENDER EQUALITY AND WOMEN'S EMPOWERMENT

P.2.1.1 	Have women's groups/leaders raised gender equality concerns regarding the project, (e.g., during the stakeholder engagement process, grievance processes, public statements)?	☐ YES ☒ NO
P.2.1.2 	Does the project undermine the principles of non-discrimination, equal treatment, and equal pay for equal work?	☐ YES ☒ NO
P.2.1.2 	Does the project prevent men and women from having equal opportunities to participate in identified tasks and activities, whether through paid work, volunteer work, or community contributions, as appropriate?	☐ YES ☒ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.2.1.2 	Does the project limit the participation of women or men based on pregnancy, maternity/paternity leave, or marital status?	☐ YES ☒ NO
P.2.1.2 	Is information about project objectives being communicated in a way that is inappropriate for the local context and not tailored to the methods of understanding of both women and men, which could hinder their participation?	☐ YES ☒ NO
P.2.1.3 	Has the project assessed gender risks without referencing the country's gender strategy or equivalent national commitment?	☐ YES ☒ NO
P.2.1.4 	Has expert stakeholder(s) been involved, and has their input been requested for the project design on gender equality and women's empowerment?	☒ YES ☐ NO
If the answer to any of the questions above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements. While all gender safeguard questions were marked as "No", indicating the project does not present risks related to gender discrimination or inequality, one key question was marked as "Yes": expert stakeholders were actively involved in the project design to address gender equality and women's empowerment. This reflects the project's proactive commitment to integrating gender perspectives from the outset. The project has consulted expert stakeholders, such as Corporación ADN Socio Ambiental, to ensure that strategies are inclusive and aligned with best practices for gender equity. Their recommendations were formally documented and incorporated into the design, especially in areas such as economic empowerment for women, health promotion, and equitable participation in project activities. Inverbosques has adopted internal mechanisms that promote non-discrimination, equal treatment, and equal pay for equal work. Gender-inclusive hiring and participation practices are reflected in employee records, which demonstrate a balanced gender distribution across tasks. The project does not impose any restrictions based on pregnancy, maternity/paternity leave, or marital status. Moreover, stakeholder engagement and communication processes are designed to be culturally relevant and accessible to both men and women, ensuring that all community members have the opportunity to understand and influence the project. The grievance mechanism is inclusive and confidential, allowing all voices to be heard and addressed effectively. Finally, the project is aligned with Colombia's National Development Plans (2022–2026), which reinforce commitments to gender equality and the empowerment of women. This alignment ensures that the project is not only compliant with national policies but also responsive to the real needs of women and vulnerable populations within the project area.		
Would the project potentially involve or lead to:		
P.2.1.1 	adverse impacts on gender equality and/or the situation of women and girls?	☐ YES ☐ POTENTIALLY

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
		☒ NO
P.2.1.1 	exacerbation of risks of gender-based violence? For example, through the influx of workers to a community, changes in community and household power dynamics, increased exposure to unsafe public places and/or transport, etc.	☐ YES ☐ POTENTIALLY ☒ NO
P.2.1.2 	reproducing discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	☐ YES ☐ POTENTIALLY ☒ NO
P.2.1.2 	limitations on women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well-being.	☐ YES ☐ POTENTIALLY ☒ NO

Briefly describe below how the project is addressing any identified risk to gender equality and women's empowerment.

The project proactively addresses risks to gender equality and women's empowerment by integrating a Gender Equality policy into the Management Plans of all project participants. This policy promotes equal opportunities for men and women in terms of employment, professional development, working conditions, training, and participation in decision-making processes. Additionally, the project enforces a strict zero-tolerance policy against discrimination, ensuring that it does not perpetuate or deepen gender-based inequalities. Wages and payments are uniform across all workers, regardless of gender, and consistently above the minimum wage.

Moreover, the project is aligned with the 2022-2026 National Development Plan (NDP)²⁰⁷, which includes commitments to strengthening government institutions focused on gender equality. The project supports the pillars of this agenda, including women's economic and educational empowerment, political participation, health and welfare (with attention to sexual and reproductive rights), protection from violence, the recognition of rural women as key drivers of development, and gender equity for peacebuilding.

[P.3 | COMMUNITY HEALTH AND SAFETY](#)

P.3.1.1 	Does the project involve potential risks to the health and safety of affected communities during its life cycle?	☐ YES ☒ NO
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²⁰⁷ <https://colaboracion.dnp.gov.co/CDT/Prensa/Publicaciones/plan-nacional-de-desarrollo-2022-2026-colombia-potencia-mundial-de-la-vida.pdf>

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.3.1.2 	Does the project involve any potential risks to the workers' safety and health?	☒ YES ☐ NO
If the answer to any of the questions above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements. Although the project does not pose risks to the health and safety of affected communities (P.3.1.1), it does acknowledge potential risks to workers' safety and health due to the nature of certain field activities (P.3.1.2). These include exposure to chemical inputs, use of specialized equipment, and interaction with wild fauna and natural elements. To address these risks, the project implements and operates under a robust Occupational Health and Safety Management System aligned with all applicable national regulations. This includes the use of certified protective equipment, regular safety training, work rotations, and continuous risk monitoring. The system effectively mitigates potential risks to workers, and regular health and safety training is conducted to prepare workers for any challenges they may face, ensuring that worker safety and health are prioritized. Additionally, the project supports the health and safety of community members through indirect benefits linked to ecosystem restoration. The recovery of degraded areas and reforestation efforts enhance ecosystem services, such as improved air and water quality, microclimate regulation, and soil stabilization, which contribute to reducing long-term health risks associated with pollution, waterborne diseases, and extreme environmental conditions. These environmental improvements further support the project's goal of promoting well-being for both workers and local communities. Overall, the project's impact is expected to reduce health risks, thanks to ecosystem services provided by the forests.		
Would the project potentially involve or lead to:		
P.3.1.1 	construction and/or infrastructure development (e.g., roads, buildings, dams)?	☐ YES ☒ NO
P.3.1.2 	air pollution, noise, vibration, traffic, injuries, physical hazards, poor surface water quality due to runoff, erosion, sanitation?	☐ YES ☐ POTENTIALLY ☒ NO
P.3.1.2 	harm or losses due to failure of structural elements of the project (e.g., collapse of buildings or infrastructure)?	☐ YES ☐ POTENTIALLY ☒ NO
P.3.1.2 	risks of water-borne or other vector-borne diseases (e.g., temporary breeding habitats), communicable and noncommunicable diseases, nutritional disorders, mental health?	☐ YES ☐ POTENTIALLY ☒ NO
P.3.1.2 	transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g., explosives, fuel and other chemicals during construction and operation)?	☒ YES ☐ POTENTIALLY ☐ NO
P.3.1.2 	adverse impacts on ecosystems and ecosystem services relevant to communities' health (e.g., food, surface water purification, natural buffers from flooding)?	☐ YES ☐ POTENTIALLY ☒ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
	Briefly describe below how the project is addressing any identified risk related to community health and safety.	
	The project addresses risks related to community health and safety by adhering to all relevant local and national laws, ensuring compliance with regulations that protect both human health and the environment. The project's activities do not pose any threat to the health of workers or the surrounding community. An Occupational Health and Safety Management System has been implemented and is strictly followed, as reflected in the project participants' Sustainable Management Plans. In addition, the project has established internal health and safety policies and provides regular training to workers on these topics to ensure a safe working environment	
<u>P.4 CULTURAL HERITAGE, INDIGENOUS PEOPLE, DISPLACEMENT AND RESETTLEMENT</u>		
<u>P.4.1 Sites of Cultural and Historical Heritage</u>		
<u>P.4.1.1 </u>	Does the project involve altering, damaging, or removing sites, objects, or structures of significant cultural heritage?	☐ YES ☒ NO
If the answer to question above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project potentially involve or lead to:		
<u>P.4.1.1 </u>	activities adjacent to or within a cultural heritage site?	☐ YES ☐ POTENTIALLY ☒ NO
<u>P.4.1.1 </u>	significant excavations, demolitions, movement of earth, flooding or other environmental changes?	☐ YES ☐ POTENTIALLY ☒ NO
<u>P.4.1.1 </u>	alterations to landscapes and natural features with cultural significance?	☐ YES ☐ POTENTIALLY ☒ NO
<u>P.4.1.1 </u>	adverse impacts to sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, practices)? (Note: projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	☐ YES ☐ POTENTIALLY ☒ NO
<u>P.4.1.2 </u>	utilisation of tangible and/or intangible forms (e.g., practices, traditional knowledge) of Cultural Heritage for commercial or other purposes?	☐ YES ☐ POTENTIALLY ☒ NO
<u>P.4.1.2 </u>	If answer to question above is "YES" or "POTENTIALLY" - are the communities made aware of their right under the	☐ YES ☐ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
	law, scope and nature of proposed development and its potential consequences?	☒ NA
P.4.1.3 	If answer to question above is "YES" - does the project provide equitable sharing of benefits from commercialisation of such knowledge, innovation, or practice, consistent with their customs and traditions?	☐ YES ☐ NO ☒ NA
P.4.1.4 	If answer to question above is "YES" - are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
P.4.1.4 	If answer to question above is "YES", has project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.4.2 Forced Eviction and Displacement		
P.4.2.1 	Does the project involve any risks related to involuntary relocation of people?	☐ YES ☒ NO
If the answer to question above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project potentially involve or lead to:		
P.4.2.1 	risk of forced evictions or involuntary relocation of people?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.2.2 	temporary or permanent and full or partial physical displacement (including people without legally recognisable claims to land)?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.2.2 	economic displacement (e.g., loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.2.2 	If answer to question above is "YES" or "POTENTIALLY", - has the project developed Resettlement Action Plan or Livelihood Action Plan in consultation and agreement with affected individual, group or community? - has the project integrated Resettlement Action Plan or Livelihood Action Plan into the Project design?	☐ YES ☐ NO ☒ NA

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.4.2.3 	If answer to question above is "YES" - are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
P.4.2.3 	If answer to question above is "YES", have project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.4.3 LAND TENURE AND OTHER RIGHTS		
P.4.3.1 	Does the project involve any risks related to identifying and managing legitimate tenure rights that may be affected by the project?	☐ YES ☒ NO
If the answer to question above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project potentially involve or lead to:		
P.4.3.1 	impacts on or changes to land tenure arrangements and/or community-based property rights/customary rights to land, territories and/or resources?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.3.1 	uncertainties with regards to land tenure, access rights, usage rights or land ownership? Examples include, but are not limited to water access rights, community-based property rights and customary rights.	☐ YES ☐ POTENTIALLY ☒ NO
P.4.3.2 	Changes in legal arrangements, if yes, are the changes done in line with relevant laws and regulations?	☐ YES ☐ NO ☒ NA
P.4.3.2 	Changes in legal arrangements, if yes, are these changes agree with free, prior and informed consent of the involved stakeholders?	☐ YES ☐ NO ☒ NA
P.4.3.3 	Does some other entity (other than the project developer) hold uncontested land title for the entire Project Boundary?	☐ YES ☐ NO ☒ NA
P.4.3.4 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
P.4.3.4 	If answer to question above is "YES", have project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
		☒ NA
P.4.3.5 	Have project developer in consultation with stakeholders established a functioning mechanism to receive, process, resolve, communicate and record grievances?	☒ YES ☐ NO ☐ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

The AR project "Brújula Verde" is designed to enhance environmental conservation while promoting sustainable development without engaging in resource extraction. The project has implemented a robust grievance mechanism that allows affected stakeholders to voice their concerns, developed in consultation with community members to ensure accessibility and transparency. This mechanism complies with GS4GG stakeholder consultation and engagement requirements, demonstrating a commitment to addressing grievances effectively. Documentation, including a detailed grievance mechanism outline and records of grievances received, illustrates the project's responsiveness to community concerns. Additionally, expert stakeholders have been engaged to provide input on project design, with their recommendations incorporated to enhance effectiveness and adherence to legal and environmental standards. Records of expert consultations, along with revised project design documents reflecting changes made, serve as evidence of this collaborative approach. The project has also secured all necessary land titles and legal documentation, ensuring that it respects existing land rights. Usufruct contracts with landowners are legally registered and unchallenged, as confirmed by land tenure certificates ("Certificados de Tradición y Libertad"). This comprehensive documentation ensures compliance with applicable laws and promotes trust and collaboration with local communities. The AR project systematically maintains this information and will include it in the Monitoring & Reporting Plan and future Monitoring Reports to ensure ongoing adherence and transparency throughout its lifecycle.

[P.4.4 | INDIGENOUS PEOPLES](#)

P.4.4.1 	Does the project involve Indigenous People within the Project area of influence who may be affected directly or indirectly by the Project?	☐ YES ☒ NO
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If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

N/A

Would the project potentially involve or lead to:

P.4.4.1 	affect areas where indigenous peoples are present (including project area of influence)	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.1 	affect areas, land and territory claimed by indigenous peoples?	☐ YES ☐ POTENTIALLY ☒ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.4.4.1	impacts (positive or negative) to the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.7	If answer to above questions is "YES" or "POTENTIALLY", - Is it determined that the proposed project may affect the rights, lands, resources, or territories of indigenous people? - Has an "Indigenous People Plan" (IPP) or "Indigenous People Plan Framework" been elaborated and included in the project documentation? - Was the plan developed in accordance with the effective and meaningful participation of indigenous peoples and in accordance with UNDP Guidelines?	☐ YES ☐ NO ☒ NA
P.4.4.3	risk of forcibly removing indigenous people from their lands and territories?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.4	utilisation and/or commercial development of natural resources on lands and territories claimed by indigenous peoples? Consider, and where appropriate ensure, consistency with the answers under Principle 4.1 above	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.5 P.4.4.6	If answer to question above is "YES" or "POTENTIALLY" - Did the project obtain free, prior and informed consent from indigenous people before taking their cultural, intellectual, religious, and/or spiritual property? - Does the project ensure that the indigenous people receive an equitable sharing of benefits resulting from the use of their traditional knowledge and practices? ? - Does the project ensure that the sharing of benefits resulting from the use of indigenous peoples' traditional knowledge and practices is culturally appropriate and inclusive? - Does the project ensure that the provision of equitable sharing of benefits does not impede land rights or equal access to basic services including health services, clean water, energy, education, safe and decent working conditions, and housing?	☐ YES ☐ NO ☒ NA

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.4.4.8 	Does the project lack appropriate feedback and grievance channels for Indigenous Peoples and their representatives?	☐ YES ☒ NO ☐ NA
P.4.4.8 	Has a grievance mechanism not been established at the beginning of programme or project implementation with due consideration given to customary dispute settlement mechanisms among the Indigenous Peoples concerned and will it remain operational throughout the project cycle?	☐ YES ☒ NO ☐ NA
P.4.4.9 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
P.4.4.9 	If answer to question above is "YES", have project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.5 CORRUPTION		
P.5.1.1 	Does the project involve, or is it complicit in, contributing to or reinforcing corruption or corrupt projects?	☐ YES ☒ NO
P.5.1.1 	Does the project have a risk of encouraging bribery, kickbacks, or other unethical behavior?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
ECONOMIC SAFEGUARDING PRINCIPLES		
P.6 ECONOMIC IMPACTS		
P.6.1 LABOUR RIGHTS AND WORKING CONDITIONS		
P.6.1.1 	Does the project involve, facilitate, or condone forced labor, or pose a potential risk of forced labor?	☐ YES ☒ NO
P.6.1.1 	Does the project violate any labor or health and safety laws, international obligations, or ILO conventions?	☐ YES ☒ NO
P.6.1.2 	Does the project violate the principles of equal opportunity and fair treatment in its employment decisions?	☐ YES ☒ NO
P.6.1.3 	Does the project violate national laws, if available regarding non-discrimination in employment?	☐ YES ☒ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.6.1.4 P.6.1.5 	Does the project allow child labor?	☐ YES ☒ NO
P.6.1.7 P.6.1.8 	Does the project have insufficient processes and measures in place to ensure the safety and health of project workers?	☐ YES ☒ NO
P.6.1.9 	Does the project have insufficient measures to safeguard and support vulnerable project workers, such as women, people with disabilities, migrant workers, and young workers, and to prevent any kind of harassment, abuse, bullying, or exploitation, including gender-based violence (GBV)?	☐ YES ☒ NO
P.6.1.10 	Does the project have no grievance mechanism available for workers to voice workplace concerns? Is information about this mechanism not provided to workers at the time of recruitment, or is it not easily accessible?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project potentially involve or lead to: (NOTE: APPLIES TO BOTH PROJECT AND CONTRACTOR WORKERS)		
P.6.1.1 	use of forced labour?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	working conditions that do not meet national labour laws and international commitments?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	working conditions that may deny freedom of association and collective bargaining?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	absence of documented working agreements with all individual workers <i>if such agreements do not exist, or do not address working conditions and terms of employment, the project developer shall provide reasonable working conditions and terms of employment.</i>	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	use of migrant workers? <i>if engaged, the developer shall ensure that they are engaged substantially equivalent terms and conditions to non-migrant workers carrying out similar work.</i>	☐ YES ☒ POTENTIALLY ☐ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.6.1.1 	having no arrangements for basic services ²⁰⁸ for workers? <i>the project developer shall put in place and implement policies on the quality and management of the accommodation and provision of basic services in a manner consistent with the principles of non-discrimination and equal opportunity. Workers' accommodation arrangements should not restrict workers' freedom of movement or of association</i>	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.2 	any form of discrimination or harassment based on factors unrelated to job requirements, such as gender, race, nationality, ethnicity, social or indigenous origin, religion or belief, disability, age, or sexual orientation?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.2 	any form of discrimination in any aspect of employment, such as recruitment, compensation, working conditions, training, job assignment, promotion, termination, or discipline?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.2 	harassment, intimidation, and/or exploitation, especially in regard to women?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.3 	discriminatory working conditions and/or lack of equal opportunity where national law provides provision to address non-discrimination in employment?	☐ YES ☐ POTENTIALLY ☐ NO
P.6.1.4 	use of child labour? (including third-party engaged workers)	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.4 	inadequate and verifiable mechanisms for age verification?	☐ YES ☒ NO
P.6.1.7 	no processes and measures in place for the safety and health of project workers?	☐ YES ☒ NO
P.6.1.7 	No provision of safety and health training provisions, including on the proper use and maintenance of personal protective equipment conducted by competent persons and the maintenance of training records?	☐ YES ☒ NO

²⁰⁸ Basic services requirements refer to minimum space, supply of water, adequate sewage and garbage disposal system, appropriate protection against heat, cold, damp, noise, fire, and disease-carrying animals, adequate sanitary and washing facilities, ventilation, cooking and storage facilities and natural and artificial lighting, and in some cases basic medical services.

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.6.1.7 	No provision to record and document accidents, diseases, incidents, and any resulting injuries, illnesses, or deaths?	☐ YES ☒ NO
P.6.1.8 	occupational health and safety risks due to physical, chemical, biological and psychosocial hazards (including violence and harassment) throughout the project life-cycle?	☐ YES ☒ NO
P.6.1.9 	No measures to protect vulnerable project workers from harassment, exploitation, and gender-based violence (GBV)? This includes women, people with disabilities, migrant workers, and young workers.	☐ YES ☒ NO
P.6.1.10 	No grievance mechanism available for workers to voice workplace concerns.	☐ YES ☒ NO
P.6.1.11 	No measures for due diligence and the establishment of policies and procedures to manage and monitor the performance of third-party employees in the project?	☐ YES ☒ NO
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements. Despite the potential risks identified concerning the project, such as the engagement of migrant workers and the current grievance mechanism's accessibility, these concerns are manageable and do not outweigh the project's overall commitment to upholding labor rights and ensuring safe working conditions. The project is designed to comply with national labor laws and international standards, and the developer is actively implementing measures to address these risks. By conducting regular evaluations, providing equitable terms for all workers, and establishing a comprehensive grievance mechanism, the project has established processes to ensure that every worker's rights are respected and upheld, with evidence already in place to demonstrate compliance with all applicable requirements. This includes documented policies, training records, and regular monitoring reports. Should any risks materialize, the project has mechanisms to control and mitigate their impacts effectively. With these proactive strategies already guaranteed, the project is well-positioned to fulfill all necessary requirements, fostering a supportive and inclusive work environment for all involved.		
P.6.2 NEGATIVE ECONOMIC CONSEQUENCES		
P.6.2.1 	Is there a risk of project failure during implementation or after project certification due to a lack of financial resources?	☐ YES ☒ NO
P.6.2.2 	Does the project have potential negative impacts or pose a risk to the local economy?	☐ YES ☒ NO
P.6.2.2 	Are there any potential risks or negative impacts this project may have on vulnerable or marginalised social groups, despite the benefits it may bring?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
Would the project involve or lead to:		
P.6.2.2 	economic impacts (negative/detrimental) to the local economy?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.2.2 	negative economic consequences during and after project implementation, e.g., for vulnerable and marginalised social groups in targeted communities?	☐ YES ☐ POTENTIALLY ☒ NO
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.7 CLIMATE AND ENERGY		
P.7.1 GHG EMISSIONS		
P.7.1.1 	Does the project have a risk of increasing greenhouse gas emissions over the Baseline Scenario?	☒ YES ☐ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
The project may result in additional greenhouse gas emissions from activities such as land preparation, fertilizer use, and the use of fossil fuels for management practices. However, all emission sources under the baseline scenario are accounted for in section 3.8 'Other Emissions' of the <i>Methodology for Afforestation/Reforestation (A/R) GHGs Emission Reduction & Sequestration, SDG 13, Version 2.1</i>. The project has been designed to minimize and mitigate these emissions while achieving overall carbon sequestration benefits.		
Would the project involve or lead to:		
P.7.1.1 	increase greenhouse gas emissions over the Baseline Scenario?	☐ YES ☒ POTENTIALLY ☐ NO
If the answer is "yes" or "potentially" to the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
The project could potentially increase greenhouse gas emissions due to activities such as land preparation, the application of fertilizers, and fossil fuel usage for management practices. However, all these emissions are accounted for in the baseline scenario, as outlined in section 3.8 'Other Emissions' of the <i>Methodology for Afforestation/Reforestation (A/R) GHGs Emission Reduction & Sequestration, SDG 13, Version 2.1</i>. While there may be some short-term emissions associated with the project, the overall goal is to enhance carbon sequestration and reduce net greenhouse gas emissions over time, contributing to long-term climate benefits		
P.7.2 ENERGY SUPPLY		

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.7.2.1 	Does the project pose a risk to the availability and reliability of energy supply to other users?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.7.2.1 	negative impact on the availability and reliability of energy supply to other users?	☐ YES ☐ POTENTIALLY ☒ NO
If the answer is "yes" or "potentially" to the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.8 WATER		
P.8.1 IMPACT ON NATURAL WATER PATTERNS/FLOWS		
P.8.1.1 	Does the project increase water usage to a level that will not allow for the maintenance of environmental flows?	☐ YES ☒ NO
P.8.1.1 	Does the project result in the discharge of wastewater that does not meet the required standard for beneficial reuse and could therefore negatively impact the environmental flow?	☐ YES ☒ NO
P.8.1.1 	Does the project have the potential risk to exceed the rate of recharge for the groundwater source?	☐ YES ☒ NO
P.8.1.1 	Does the project involve any processes or activities that could contaminate the groundwater and render it unsuitable for use?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.8.1.1 	affect the natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	☐ YES ☒ POTENTIALLY ☐ NO
P.8.1.1 	Wastewater discharge of quality that does not meet the required standard for beneficial reuse?	☐ YES ☐ POTENTIALLY ☒ NO
P.8.1.1 	significant extraction, diversion of ground water? For example, construction of dams, reservoirs, river basin developments, groundwater extraction	☐ YES ☐ POTENTIALLY

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
		☒ NO
P.8.1.2 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements. The project is situated in a region characterized by distinct dry and wet seasons, which may impact water availability during the dry season. However, all water resources in the project area are conserved, protected, and mapped. Groundwater is sustainably utilized through the natural root systems of mixed plantations without negatively affecting the existing patterns of watercourses, groundwater, or watersheds. The project has adopted the Sustainable Forest Management Plan (PMFS), in line with the Corporación Autónoma Regional de la Orinoquía (Corporinoquia) resolution 800.41.11.019 of October 14, 2011, which is currently in force. Furthermore, the project implements programs focused on water conservation and efficient usage, along with systems for monitoring and treating wastewater. Capacity-building initiatives for rational and efficient water use are also part of the Environmental Management efforts. An assessment using the Aqueduct 3.0 Country Rankings datasets indicates that Colombia, as a whole, ranks 118 in terms of water stress, with scores ranging from 1 (highest water stress) to 165 (lowest water stress). Specifically, the Vichada department is categorized as having low water stress (<10%). This analysis confirms that the project does not contribute to significant changes in water availability or patterns in the region. Moreover, conclusions from Ingeobosque's hydrological impact assessment for the Brújula Verde project confirm that the overall effects on the water balance are minimal. At the basin scale, modeling with the InVEST Seasonal Water Yield tool showed a negligible change in quickflow (-0.43%) and an extremely small increase in baseflow (+0.083%), ensuring that environmental flows remain stable. At the local (properties) level, although there is a notable reduction in quickflow (-62.22%), this is accompanied by a slight increase in baseflow (+7.38%), which may enhance groundwater recharge during dry periods while reducing surface runoff and associated sediment transport. The modeling results show only negligible changes in quickflow and a slight increase in baseflow at the basin level. This suggests that the project's land cover modifications do not compromise environmental flows. These findings reinforce that the project does not contribute to significant changes in water availability or hydrological patterns in the region.		
P.8.2 EROSION AND/OR WATER BODY INSTABILITY		
P.8.2.1 	Does the project have a risk of negatively impacting the catchment and has it been assessed and addressed?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements. N/A		
Would the project involve or lead to:		
P.8.2.2 	negatively impact on the catchment area?	☐ YES

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
- P.8.2.5	<i>If yes, Erosion prevention measures, including soil and slope protection measures, must be implemented before project commencement. These measures should involve natural terracing, infiltration strips, permanent ground cover, hedge and tree rows, and effective slope length assessment. Regular reassessment of these measures is necessary.</i>	☐ POTENTIALLY ☒ NO
P.8.2.6	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.9 ENVIRONMENT, ECOLOGY AND LAND USE		
P.9.1 LANDSCAPE MODIFICATION AND SOIL		
- P.9.1.1 P.9.1.3	Is there any risk of soil resource degradation or loss of ecosystem services provided by soils in the project? <i>If yes, the project shall maintain healthy soils by minimising negative impacts on soil health, productivity, structure, and water retention. Steps to minimise soil degradation include crop rotation, composting, using N-fixing plants, and reducing tillage and ecologically harmful substances.</i>	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.9.1.4	production, harvesting, and/or management of living natural resources by small-scale landholders and/or local communities?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.1.4	if answer to above question "yes" or "potentially", does project adopt appropriate and culturally sensitive sustainable resource management practices?	☐ YES ☐ NO ☒ NA

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.9.2 VULNERABILITY TO NATURAL DISASTER		
P.9.2.1 	Does the project have any risks associated with natural or man-made hazards that could result from land use changes due to the project?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.9.2.2 	any potential risks that require emergency preparedness and response planning?	☐ YES ☒ POTENTIALLY ☐ NO
P.9.2.2 	if answer to above question "yes" or "potentially", did the project developer disclose appropriate information about emergency preparedness and response to affected communities?	☒ YES ☐ NO ☐ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
The project does not involve or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought, or other extreme climatic conditions. All native forests and flood zones are protected, ensuring that the project maintains a robust environmental framework.		
However, there are potential risks associated with forest fires, which have been addressed through a comprehensive emergency preparedness and response plan. The fire management strategy consists of two main components: the establishment of fire brigades (or emergency brigades) and the implementation of firebreak barriers around the plantations. Individuals selected for these roles have undergone training and capacity-building courses to ensure they are well-prepared to respond effectively to fire incidents.		
Additionally, the FSC certification and all management plans include provisions for addressing and responding to natural disasters that are common in the local area. The entire Action Plan for each company comprises mitigation actions, monitoring plans, and capacity-building initiatives aimed at minimizing risks and enhancing community resilience.		
The project developer has disclosed appropriate information about emergency preparedness and response to the affected communities, ensuring that they are informed and equipped to handle potential fire-related risks.		
P.9.3 BIOSAFETY AND GENETIC RESOURCES		

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.9.3.1 	Does the project involve the transfer, handling, and use of genetically modified organisms/living modified organisms that may result in adverse effects on biological diversity?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.9.3.1 	the transfer, handling and use of genetically modified organisms/living modified organisms (GMOs/LMOs) that result from modern biotechnology	☐ YES ☐ POTENTIALLY ☒ NO
P.9.3.1 	If answer to above question is "yes" has a risk assessment by a competent Expert stakeholder been carried out in accordance with Annex iii of the Cartagena protocol on biosafety to the convention on biological diversity?	☐ YES ☐ NO ☒ NA
P.9.3.2 	If answer to above question is "yes" has any risks identified in the risk assessment?	☐ YES ☐ NO ☒ NA
P.9.3.3 	Forestry (for example Afforestation/Reforestation) involving GMO planting? <i>Note - Forestry projects (for example Afforestation/Reforestation) involving GMO planting are not eligible for Certification under Gold Standard for the Global Goals.</i>	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.9.4 RELEASE OF POLLUTANTS		
P.9.4.1 	Does the project have a risk of releasing pollutants to air, water, and land in routine, non-routine, or accidental circumstances?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.9.4.1 	any potential risk of pollutant release that cannot be avoided?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.4.3 	If answer to above question is "Yes" or "potentially", has the project identified all potential pollution sources that may degrade the quality of soil, air, surface, and groundwater in the project area?	☐ YES ☐ NO ☒ NA

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.9.4.2 	If answer to above question is "Yes" or "potentially", do the pollution prevention and control technologies and practices applied during the project life cycle align with national regulations or international best practices?	☐ YES ☐ NO ☒ NA
P.9.4.3 	If answer to above question is "Yes", is there a monitoring plan to ensure that mitigation measures are implemented, and resources are protected?	☐ YES ☐ NO ☒ NA
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements. N/A		
P.9.5 HAZARDOUS AND NON-HAZARDOUS WASTE		
P.9.5.1 	Does the project involve the generation of waste materials (both hazardous and non-hazardous)?	☒ YES ☐ NO
P.9.5.3 	Does the project involve risk of release of hazardous materials resulting from their production, transportation, handling, storage, or use?	☐ YES ☒ NO
P.9.5.5 	Does the project involve the use of any chemicals or materials subject to international bans or phase-outs?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements. The project involves the generation of a limited amount of hazardous and non-hazardous chemicals and materials. This includes substances used in the operation and maintenance of forest plantations, such as fertilizers, pesticides, and other agrochemicals that are necessary for promoting plant health and productivity. Additionally, non-hazardous materials may include packaging waste and residuals from forest management activities. To manage these waste materials effectively, standard procedures are followed on-site, as outlined in the management plans, along with adherence to FSC guidelines and regulations. Capacity-building initiatives are implemented for all participating companies, focusing on the proper handling and disposal of both hazardous and non-hazardous chemicals and materials. Mitigation measures addressing waste generation are incorporated into the Forest Management Plans, ensuring compliance with FSC certification standards. These measures are designed to minimize the environmental impact associated with waste generation while promoting responsible management practices throughout the project's lifecycle.		
Would the project involve or lead to:		
P.9.5.1 	the generation and management of waste materials?	☐ YES ☒ POTENTIALLY ☐ NO
P.9.5.1 	treatment, destruction, or disposal of waste material?	☒ YES ☐ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
		☐ NA
P.9.5.1 	If answer to above question is "Yes", does the project involve an environmentally friendly method that includes appropriate control of emissions and residues resulting from the handling and processing of waste material?	☒ YES ☐ NO ☐ NA
P.9.5.3 	risk of release of hazardous materials resulting from their production, transportation, handling, storage, or use?	☐ YES ☒ NO ☐ NA
P.9.5.3 	If answer to above question is "yes", does project has measures in place to address health risks?	☐ YES ☐ NO ☒ NA
P.9.5.4 	Involve manufacture, trade, and use of chemicals and hazardous materials subject to international bans or phase-outs due to their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer	☐ YES ☐ POTENTIALLY ☒ NO

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

The project involves activities that may lead to the potential generation and management of waste materials. While the project produces a limited amount of both hazardous and non-hazardous waste, it adheres to stringent standard procedures during operation and maintenance, as outlined in its management plans and in accordance with FSC guidelines and regulations. The project has established effective measures for the treatment, destruction, and disposal of waste materials, ensuring that these processes align with environmentally friendly practices. This includes controlling emissions and residues resulting from the handling and processing of waste materials to minimize environmental impact.

Additionally, the project has been assessed to ensure it does not present a risk of releasing hazardous materials during production, transportation, handling, storage, or use. As a result, there are no additional health risk measures required for the workforce or local communities. Importantly, the project does not engage in the manufacture, trade, or use of chemicals that are subject to international bans or phase-outs due to their high toxicity to living organisms, potential for environmental persistence, bioaccumulation, or depletion of the ozone layer. Capacity-building initiatives for all participating companies also address the handling of hazardous and non-hazardous materials, reinforcing the project's commitment to sustainable and responsible environmental practices.

[P.9.6 | PESTICIDES & FERTILISERS](#)

P.9.6.1 	Does the project involve the use of chemical pesticides?	☒ YES ☐ NO
P.9.6.5 	Does the project involve purchase, store, manufacture, trade or use products that fall in Classes IA (extremely hazardous) and IB (highly hazardous)	☐ YES ☒ NO

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.9.6.6	Does the project use fertilisers, and if so, are measures being taken to minimise their use and nutrient losses to the environment?	☒ YES ☐ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements. The project potentially involves the generation and management of waste materials, including both hazardous and non-hazardous chemicals. This includes substances used in forestry operations, such as fertilizers and pesticides, which are necessary for maintaining healthy forest plantations. Treatment, destruction, or disposal of waste material is a key aspect of the project. Appropriate procedures are in place to handle these materials responsibly, ensuring that waste is treated and disposed of in accordance with established environmental standards. Furthermore, the project employs environmentally friendly methods for managing waste, which include control measures for emissions and residues resulting from the handling and processing of waste materials. Compliance with FSC guidelines and regulations ensures that waste management practices meet environmental sustainability criteria. There is no risk of release of hazardous materials resulting from their production, transportation, handling, storage, or use. As such, there are no additional health risks that require specific measures to be implemented. Additionally, the project does not involve the manufacture, trade, or use of chemicals or hazardous materials that are subject to international bans or phase-outs due to their toxicity, environmental persistence, potential for bioaccumulation, or potential for ozone depletion. In conclusion, the project has comprehensive waste management practices in place that prioritize environmental protection and comply with applicable regulations and standards. Evidence of compliance can be found in the project's management plans.		
Would the project involve or lead to:		
P.9.6.1	chemical pesticides use for pest management?	☒ YES ☐ POTENTIALLY ☐ NO
P.9.6.4	If answer to question above is "yes" or "potentially", does project has documented Chemical Pesticides Policy in place?	☒ YES ☐ NO ☒ NA
P.9.6.5	purchase, store, use, manufacture, or trade in Class II (moderately hazardous) pesticides?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.6.5	If answer to question above is "yes" or "potentially", does project has appropriate controls on manufacture, procurement, or distribution and/or use of these chemicals?	☐ YES ☐ NO ☒ NA

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
The project involves the use of chemical pesticides for pest management, but their use is minimized and applied selectively in areas experiencing specific pest-related issues. This selective approach ensures that pesticides are not overused and helps to protect the surrounding environment and non-target species. Additionally, the project has a documented Chemical Pesticides Policy in place, which aligns with national legislation regarding pesticide use and adheres to the standards set by the Forest Stewardship Council (FSC). The project follows the FSC pesticide policy (FSCPOL30-001 V3-06), ensuring that all pesticide applications comply with environmental sustainability principles. The project does not purchase, store, use, manufacture, or trade in Class II (moderately hazardous) pesticides. Therefore, there are no additional controls necessary for the procurement or distribution of such chemicals. Furthermore, the project includes capacity building related to and monitoring of agro-chemical use, ensuring that all stakeholders are trained in the responsible use of pesticides. This training supports compliance with best practices and helps minimize any adverse impacts on the environment. To further mitigate any potential impacts, the project incorporates appropriate mitigation measures into its Forest Management Plans, which are subject to certified compliance with FSC standards. This commitment to responsible pesticide use and adherence to best practices demonstrates compliance with applicable requirements and supports the project's sustainability objectives.		
P.9.7 HARVESTING OF FORESTS		
P.9.7.1	Does the project have a risk of unsustainable forest management, including timber harvesting?	☐ YES ☒ NO
P.9.7.1	Does the project pose a risk of depleting biodiversity and ecosystem functionality in areas where improved forest management is undertaken?	☐ YES ☒ NO
P.9.7.1	Does the project risk not meeting requirements for environment-friendly, socially beneficial, and economically viable plantations using native species whenever possible?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
P.9.8 FOOD SECURITY		
P.9.8.1	Does the project involve the risk of negatively influencing access to and availability of food for people affected?	☐ YES ☒ NO
If the answer to the question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response

Would the project involve or lead to:

P.9.8.1 	modification of the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	☐ YES ☐ POTENTIALLY ☒ NO
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If the answer is "yes" or "potentially" to the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

N/A

[P.9.9 | ANIMAL WELFARE](#)

P.9.9.1 	Does the project involve any risks to animal welfare? Animal welfare shall be ensured by providing access to water and food, appropriate environment, humane treatment, and staff training. Evidence of mistreatment will be treated as an immediate non-conformity.	☐ YES ☒ NO
P.9.9.2 	Does the project involve any potential risk of excessive or inadequate use of veterinary medicines?	☐ YES ☒ NO
P.9.9.4 	Does the project involve the risk of administering synthetic growth promoters, including hormones?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

N/A

Would the project involve or lead to:

P.9.9.1 	animal husbandry or harvesting of fish populations or other aquatic species? ²⁰⁹	☐ YES ☐ NO ☒ NA
P.9.9.1 	limiting access for animals to basic needs like drinking water, adequate food, daylight, appropriate shelter etc.?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.9.3 	inadequate measures to isolate sick animals and control the spread of disease, especially zoonotic diseases?	☐ YES ☐ NO ☒ NA
P.9.9.5 	inadequate low-stress methods, equipment, and facilities that facilitate calm animal movement.	☐ YES ☐ NO

²⁰⁹ 'Involve' means if the project mechanism and/or impact(s) are achieved via changing animal husbandry practices in some way.

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
		☒ NA
P.9.9.6 	inadequate measures to ensure that animals are exposed to the least stress possible during transportation and slaughtering?	☐ YES ☐ NO ☒ NA
P.9.9.7 	inappropriate spacing per animal and stocking rates per land unit?	☐ YES ☐ NO ☒ NA
P.9.9.8 	inadequate measures to address the specific needs of aquatic animals?	☐ YES ☐ NO ☒ NA
P.9.9.9 P.9.9.10 	primary production of living natural resources such as animal husbandry, aquaculture, and fisheries? If the answer is yes, implement industry-standard sustainable management practices in line with to one or more relevant and credible standards and utilise available technologies.	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

N/A

[P.9.10 |HIGH CONSERVATION VALUE AREAS AND CRITICAL HABITATS](#)

P.9.10.1 	Does the project have the risk of negatively impacting HCV areas and/or critical habitats?	☐ YES ☒ NO
P.9.10.2 	Does the project in the project area or area of downstream impacts have risks to the following: native tree patches, individual native trees, freshwater resources (including rivers, lakes, swamps, temporary water bodies, and wells), habitats of rare, threatened, and endangered species, and biodiversity-enhancing areas?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

N/A

Would the project involve or lead to:

P.9.10.1 	identified habitats as HCV areas and or Critical habitats?	☒ YES ☐ POTENTIALLY ☐ NO
P.9.10.1 	If answer to above question is "yes", does the project have any risks that could negatively impact the catchment, project success, and surrounding HCV and ecological assets, as well as any measurable adverse impacts on the criteria or biodiversity values for which the critical habitat was	☐ YES ☒ NO ☐ NA

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
	designated, and on the ecological processes supporting that biodiversity?	
P.9.10.1 	If answer to above question is "yes", is a robust, appropriately designed, and long-term Habitats and Biodiversity Action Plan absent which will make the project unable to achieve net gains of those biodiversity values for which the critical habitat was designated?	☐ YES ☐ NO ☒ N/A
P.9.10.2 	Does the project area or area of downstream impacts have native tree patches, individual native trees, freshwater resources (including rivers, lakes, swamps, temporary water bodies, and wells), habitats of rare, threatened, and endangered species, and biodiversity-enhancing areas?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.10.2 	If the answer to the above question is "yes", will the project have any adverse effects on these areas?	☐ YES ☐ No ☒ NA
P.9.10.3 	If the answer to above question is "yes", does the project has opportunities to minimise unwarranted conversion or degradation of the habitat and to enhance the habitat as part of its development?	☐ YES ☐ No ☒ NA
P.9.10.4 	Is the project applying Land Use & Forest Activity Requirements and managing a minimum 10% of the project area to protect or enhance the biological diversity of native ecosystems following HCV approach as per the given requirements?	☐ YES ☐ No ☒ NA
P.9.10.5 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

The project does involve identified habitats as High Conservation Value (HCV) areas; however, it does not negatively impact these areas or alter largely intact ecosystems, critical habitats, landscapes, or key biodiversity areas. All existing forests are preserved, and protection areas are clearly identified and mapped. Project activities are conducted in productive and agroforestry zones within the Ramsar area, specifically avoiding protective areas.

Additionally, the Wetland Complex of the Bita River Basin has been selected by the Ministry of Environment and Sustainable Development for inclusion in the List of Wetlands of International Importance. The project actively participates in the development of the Bita River Basin Management Plan (POMCA). This includes working plans centered on the conservation and sustainable use of the basin's resources, reflecting institutional agreements for participatory management.

The specific objectives of these efforts include:

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
	- Establishing conservation agreements with stakeholders to protect key species such as dolphins, otters, turtles, and tapirs. - Mitigating conflicts between wildlife, particularly big cats, and livestock production in the basin. - Conducting capacity building initiatives to raise awareness among project participants and the community about the importance of protecting the Bitá River Basin. - Moreover, the project is committed to continuous improvement in raising awareness among staff and stakeholders regarding the sustainable use of natural resources. Although the project recognizes the potential existence of HCVs in categories HCV1, HCV2, and HCV5, the detailed delineation of these values is pending the approval of the Bitá River Management Plan. Until this plan is finalized, it is not feasible to establish the precise scope, affected areas, or necessary protection measures for maintaining these HCVs. To support conservation and reporting, the project utilizes information on species listed on the IUCN Red List, protected areas, and key biodiversity areas. In summary, while the project engages with identified HCV areas, it is designed to ensure the preservation and enhancement of biodiversity without imposing measurable adverse impacts on the ecological processes that support these critical habitats.	
P.9.11 ENDANGERED SPECIES		
P.9.11.1 	Does the project lead to the reduction or negative impact on any recognised Endangered, Vulnerable or Critically Endangered species?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.9.11.2 	distortion of habitats of endangered species?	☐ YES ☐ POTENTIALLY ☒ NA
P.9.11.2 	If answer to the above question is "yes", does the project plan to protect and enhance them?	☒ YES ☐ POTENTIALLY ☐ NO ☒ N/A
P.9.11.2 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☒ NO ☐ NA
If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		
P.9.12 INVASIVE ALIEN SPECIES		

SOCIAL SAFEGUARDING PRINCIPLES		
Reference requirement	Question	Response
P.9.12.1	Does project introduce any alien species (not currently established in the country or region of the project) into new environments?	☐ YES ☒ NO
If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
N/A		
Would the project involve or lead to:		
P.9.12.1	risk of introducing any alien species with a high risk of invasive behaviour regardless of whether such introductions are permitted under the existing regulatory framework?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.12.1	risk of potential accidental or unintended introductions including the transportation of substrates and vectors (such as soil, ballast, and plant materials) that may harbour alien species.	☐ YES ☐ POTENTIALLY ☒ NO
P.9.12.2	risk of spreading alien species into areas in which they have not already been established?	☐ YES ☐ POTENTIALLY ☒ NO
If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.		
N/A		

APPENDIX 2 - CONTACT INFORMATION OF PROJECT DEVELOPER(S)

Organization name	Inverbosques S.A.
Registration number with relevant authority	RUT 900151686-4
Street/P.O. Box	Caller 26 Sur #22-27
Building	N/A
City	Envigado
State/Region	Antioquia
Postcode	055420
Country	Colombia
Telephone	604 322 13 48
E-mail	alvaro.trujillo@inverbosques.com
Website	https://www.inverbosques.com/
Contact person	Álvaro Trujillo
Title	Chief Sustainability Officer (CSO)
Salutation	Mr
Last name	Trujillo
Middle name	N/A
First name	Álvaro
Department	N/A
Mobile	+57 311 736 7365
Direct tel.	604 322 13 48
Personal e-mail	alvaro.trujillo@inverbosques.com

APPENDIX 3 - LUF ADDITIONAL INFORMATION

Risk of change to the Project Area during Project Certification Period:	Low risk A prior feasibility analysis was conducted before adding each area to the project, ensuring that only suitable lands under long-term agreements were included. Efficient, sustainable management practices, along with active participation by national and international stakeholders, enhance transparency and permanence over the 30-year crediting period. Moreover, contracts signed by participants commit them to maintain the forest cover for the entire crediting period. The project area is delineated and protected from land-use changes due to its conservation and restoration model. Hydrological studies are underway to assess riparian buffer zones' effectiveness in protecting water resources and preventing erosion²¹⁰. There is no risk of conversion to extractive uses, as land ownership remains with the project, and monitoring and compliance measures are in place. The Stakeholder Consultation Report²¹¹ also confirms community support for maintaining the project area's integrity.
Risk of change to the Project activities during Project Certification Period:	Low risk The project maintains a focus on restoration and conservation, with no activities that

²¹⁰ See the Environmental and Hydrological Impact Assessment under IFC PS1 and PS6 on English and Spanish "Resultados Evaluación Impactos Componente Hidrológico IFC Proyecto Brújula" in the supporting documentation folder: [Supports\PDD\ APPENDIX 3\ Hydrologycal Assesstment]

²¹¹ See the LSC in the supporting documentation folder: [Supports\3_LSC]

	would alter the forest structure. There is no intention to change the established activities, and any adjustments would follow pre-approved management plans. Inverbosques and its partners remain committed to the project's conservation approach. There is no intention to shift project activities away from afforestation/reforestation, and any operational adjustments must adhere to the approved management plans.
Land-use history and current status of Project Area:	Historically, the land was used as grassland with low-input extensive grazing and minimal tree regeneration. Before the project began, these grassland areas were assessed and confirmed suitable for A/R activities, according to the ClearBlue Markets report,²¹² where a detailed evaluation confirmed the area's suitability for assisted regeneration (A/R) activities, taking into account the potential for enhanced carbon sequestration and ecological benefits. Small patches of native vegetation remain as conservation zones, including riparian buffers. As part of the project, these conservation areas are clearly delineated and protected to maintain local biodiversity and water resources. Biodiversity monitoring using eDNA technology²¹³ is being conducted to ensure that conservation zones remain intact and

²¹² See the Native Species Capability Building in the supporting documentation folder: [Supports\PDD\APPENDIX 3\ClearBlue_Market]

²¹³ See detailed documentation in the supporting folder: [Supports\PDD\APPENDIX 3\Biodiversity]

	support local fauna. Adaptive management strategies, informed by eDNA biodiversity assessments, are in place to refine operational practices.
Socio-Economic history:	Further cattle ranging was an activity identified during the additionality assessment. By mid-80s Colombia completed the process of territorial occupation of the Caribbean and Andean regions and to a lesser extent the Orinoco. Regions in the Orinoco were occupied to implement cattle farming systems. Current situation: due to a marginal and difficult access location, no previous activities were reported. There was a lack of investment and know-how to create a business model. The previous owner decides to sell the land and migrate to the city, to invest in other activities. Forestry activities in different rural areas can be an effective support to alleviate regional poverty, promote regional know-how, increment capacity building and be a key element for socio-economic development, by providing directly and indirectly jobs. Further, cattle ranging was an activity identified during the additionality assessment (see above). Current socio-economic studies include stakeholder consultations across rural communities (see the Local Stakeholder Consultation Report), in order to assess employment needs. This approach, highlight community feedback on poverty alleviation strategies through job creation in forestry sectors, as well as gender equity initiatives in hiring processes. These consultations also address concerns related to land access and

	resource management, and in these meetings the attendees were informed of the design of capacity-building programs and livelihood enhancement initiatives.
Forest management applied (past and future)	Previously, no structured forest management was practiced in the area, leading to degradation and poor soil quality. Initially, a rotational system was considered, but Inverbosques opted for a conservation model. This approach involves planting well-adapted species and supporting them to mature into healthy forests, without any timber extraction. Further details of these practices, such as firebreak construction, ecological monitoring, and integrated pest management, are provided in folder B.2. For its part, adaptive management frameworks based on biodiversity assessments are being implemented to refine operational practices, according to environmental monitoring data from eDNA studies and stakeholder feedback.
Forest characteristics (including main tree species planted)	The project area is reforested primarily with <i>Eucalyptus pellita</i> and native species, including Aceite (<i>Copaifera pubiflora/officinalis</i>), Congrio (<i>Acosmium nitens</i>), Macano (<i>Terminalia amazonia</i>), Simaruba (<i>Simarouba amara</i>), Yopo (<i>Anadenanthera peregrina</i>), Nauno (<i>Albizia guachapele</i>), Cedro (<i>Cedrela odorata</i>), Casia (<i>Cassia moschata</i>), Jacarandá (<i>Jacaranda copaia</i>), Saladillo Blanco (<i>Vochysia lehmannii</i>), and Carbonero (<i>Calliandra pittieri</i>). All species have proven effective in land rehabilitation and are

	planted in multiple parcels, using a staggered schedule to enhance biodiversity and ecological resilience. Biodiversity monitoring is being conducted using eDNA technology to evaluate species diversity within reforested areas, for long-term ecological resilience assessments, and the Local Stakeholder consultation, involve discussions about tree species selection and their ecological benefits.
Main social impacts (risks and benefits)	The main social benefits of the project are: • Poverty alleviation: The project provides jobs and training in forestry, reducing rural-urban migration. • Equal rights: A multicultural workforce ensures non-discrimination; women, in particular, are employed in nursery and administrative roles. • Gender equity in hiring processes: The project actively promotes gender equity in its hiring processes, especially highlighting the participation of women in the nursery, where they represent a significant percentage of the staff. • Capacity building: Local employees and neighbors learn sustainable management techniques, fostering long-term social cohesion and resource stewardship. The project promotes training in skills such as leadership, project formulation and training to promote the forestry vocation of both internal and external communities.

	- Equal rights: a multicultural team requires also the need of having a comprehensive and tolerant perception. - Youth Engagement in Rural Activities: Integrating young people into productive rural activities offers them professional and personal development opportunities, reinforcing community continuity. Finally, the Local Stakeholder consultation meetings conducted between October-November 2024 included discussions on socio-economic impacts, such as capacity building programs tailored for rural communities, along with mechanisms for grievance redressal.
Main environmental impacts (risks and benefits)	The main environmental benefits of the project are: - Building new forests The mix of native and introduced species supports water retention, soil fertility, and provides habitats for migratory and native fauna. - Forest Conservation: through this activity, the project ensures native ecosystems connectivity; creating small corridors that impact positively the interconnectivity of different regional natural ecosystems. - Climate change: By sequestering CO₂, the project helps combat global arming. Extreme weather events (floods, strong winds, fires) may affect young plantings. Some low risks of the project are: Climate impact: due to climate change strong winds, fires, and/ or floodings might occur.

Financial structure

As a conservation-oriented project, Brújula Verde relies primarily on carbon finance for revenue. Initial activities were supported by investor capital, and legal contracts define ownership of land, wood, CO₂, and other resources. The project's long-term sustainability is secured through the sale of carbon credits.

As a large scale AR project, the Brújula Verde project is investing significant capital into the local communities and represents one of the largest private employers in the region. For example, in the budget, significant expenditure flows to local communities, landholders, small service providers through salaries, contracts for operations, transportation, food, maintenance and other indirect benefits such as infrastructure investment.

In addition, Brújula Verde with its investors and operators is designing a direct revenue sharing program to ensure local communities receive direct revenues linked to the ongoing sales of carbon credit sales under Gold Standard certification and will be administered by a qualified NGO.

We would also note as guided by InverBosques' social and environmental policy, Inverbosques has a proven history supporting local communities' benefit, with benefits used to co-finance prioritized community projects such as electricity, water treatment, and internet access for rural schools.

Additionally, a Free, Prior, and Informed Consent (FPIC) agreement with Indigenous communities was signed in 2022 following a

	participatory needs assessment, and is currently under implementation and monitored by Colombia's Ministry of Interior.²¹⁴
Infrastructure (roads/houses etc):	No major infrastructure projects are planned within the project area. Existing rural roads provide access for management and monitoring activities. Any potential road maintenance is coordinated with local communities to minimize environmental impact and ensure safe access.
Water bodies:	While there are no major lakes, the project area includes or is adjacent to several rivers and streams, forming essential components of the local hydrological cycle. Riparian buffers are established to protect water quality, mitigate erosion, and preserve aquatic habitats. The hydrological study assesses the effectiveness of these riparian buffers, ensuring they maintain water quality, control erosion, and support aquatic habitats. Key parameters monitored include water flow, sediment load, and biodiversity indicators to assess the health of the aquatic ecosystems.
Sites with special significance for indigenous people and local communities - resulting from the Stakeholder Consultation:	No sites of particular cultural or spiritual significance have been identified within the project boundaries. Should any be discovered, the project will follow protocols for consultation and protection, in line with

²¹⁴ See detailed documentation in the supporting folder: [Supports\PDD\APPENDIX 3\Consultation]

	national regulations and stakeholder engagement requirements.
Where indigenous people and local communities are situated:	No indigenous communities reside in the project area, and no displacement is involved. The rural communities within the project's influence are primarily involved in subsistence farming and small-scale livestock activities outside the project boundaries. They participate in the project through employment and training opportunities.
Where indigenous people and local communities have legal rights, customary rights or sites with special cultural, ecological, economic, religious or spiritual significance:	The project area is privately owned; thus, no customary rights or indigenous land claims overlap with the reforestation zones. Existing legal agreements confirm land tenure. Any community with recognized rights or spiritual sites in the surrounding region retains those rights and can access a formal grievance mechanism if needed.

APPENDIX 4 - DESIGN CHANGES

A4.1. Details of proposed or actual design change

>> N/A

A4.2. Describe the impacts of design change on the following

a. *Additionality*

>> N/A

b. *Applicability of methodology and other methodological regulatory documents with which the project activity has been certified*

>> N/A

c. *Compliance with the monitoring plan of the applied methodology*

>> N/A

d. *Level of accuracy and completeness in the monitoring of the project activity compared with the requirements contained in the registered monitoring plan*

>> N/A

e. *Scale of the project activity*

>> N/A

f. *Stakeholder consultation*

>> N/A

g. *Sustainable development criteria*

>> N/A

h. *Safeguarding assessment*

>> N/A

i. *Compliance with applicable legislation*

>> N/A

j. Only for LUF Projects: Transparent summary of all approved changes in Project Area, Eligible Area and accompanying changes in ex-ante emissions removals.

>> N/A

DATE OF APPROVED DESIGN CHANGE (MM/DD/YYYY)	PROJECT AREA (HA)		ELIGIBLE AREA (HA)		EX-ANTE ESTIMATE (TCO ₂ E)	
	INCREASE OR DECREASE?	VALUE (HA)	INCREASE OR DECREASE?	VALUE (HA)	INCREASE OR DECREASE?	PERCENT AGE (%)

DOCUMENT HISTORY

Version	Date	Remarks
1.5	29 June 2023	Editorial changes to match V2.1 of the Safeguarding Principles Requirements
1.4	21 June 2023	Editorial changes to match V2.0 of the Safeguarding Principles Requirements
1.3	14 April 2023	Integrated the design change memo as annex of the document. Editorial changes
1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption