# CO2Bio MONITORING REPORT

Document prepared by Cataruben Foundation

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| **Follow-up report template (Version 1.1)** | |
|---|---|
| **Project name** | *CO2Bio* |
| **Project ID BCR** | *PCR-CO-635-141-001* |
| **Date of registration of the project activity** | *31/12/2020* |
| **Project owner** | *Cataruben Foundation* |
| **Contact** | ***María Fernanda Wilches***<br>*General Manager*<br><br>***Sandra Duarte Chaparro***<br>*Carbon Super Leader*<br><br>***Lisbeth Menjure Barrera***<br>*Project Leader*<br><br>*co2bio@cataruben.org*<br>*www.cataruben.org*<br>*Tel. 3204690315 / 3203108839*<br>*Carrera 20 # 36 - 04 Yopal - Casanare* |
| **Version number of the Project Document applicable to this monitoring report** | *Version 1.1*<br>*(21/09/2024)* |
| **Methodology applied** | *Methodological Document AFOLU Sector / BCR0002 Quantification of GHG Emission Reductions from REDD+ Projects. Version 4.0. May 27, 2024.* |

| Follow-up report template (Version 1.1) | |
|---|---|
| **Project Location (Country, Region, City)** | *Colombia, Orinoco region:*<br><br>*Department of Arauca: Cravo Norte.*<br><br>*Department of Casanare: Hato Corozal, Paz de Ariporo, Orocué, Pore, San Luis de Palenque, Trinidad, and Yopal.*<br><br>*Department of Vichada: Santa Rosalia.* |
| **Project start date** | *01/01/2015* |
| **GHG reductions/removals quantification period** | *01/01/2015 a 31/12/2054* |
| **Tracking period number** | *3* |
| **Follow-up period** | *01/01/2021 a 31/12/2023* |
| **Number of emission reductions or removals achieved by the project in this monitoring period.** | *Total GHG reduction or removal for this monitoring period*<br><br>*77,606 tCO2e/year* |
| **Contribution to the Sustainable Development Goals** | *SDG 5: Gender Equality*<br>*SDG 6: Water and Sanitation*<br>*SDG 13: Climate Action*<br>*SDG 15: Life of terrestrial ecosystems* |
| **Special category, related to co-benefits** | *Orchid* |

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## General description of the project

CO2Bio P1 is a climate change mitigation project that reduces $CO_2$ emissions by developing activities that reduce deforestation of natural forests in 42 private properties located in the departments of Arauca, Casanare and Vichada, the environmental, social and economic impact of the project is aimed at 38,813.04 total hectares, whose accounting areas are distributed in 8,653.2 hectares of forest.

The project is supported by actions that prevent deforestation and forest degradation, and promotes the adoption of sustainable practices in conservation areas. This project is based on the mechanism of payment by results, through the strategy of obtaining benefits through the sale of carbon certificates, effectively contributing to the preservation of forests and the prevention of land use change.

This project achieved a reduction of 77,606 tons of greenhouse gases during the period from 2021 to 2023. To ensure the management of emission reductions, the methodological guidelines detailed in BCR Standard 3.3, which establishes the principles and requirements applicable to the project, are implemented.

### 1.1 Sectoral scope and type of project

The Project is eligible under the scope of the BCR Standard by meeting one or more of the following conditions listed in Table 1.

**Table 1.** Scope of the standard.

| **The scope of the BCR Standard is limited to:** | |
|---|---|
| The following greenhouse gases, included in the Kyoto Protocol: Carbon Dioxide (CO2), Methane (CH4) and Nitrous Oxide (N2O). | **X** |
| GHG projects using a methodology developed or approved by BioCarbon Registry, applicable to GHG removal activities and REDD+ activities (AFOLU Sector). | **X** |
| Quantifiable GHG emission reductions and/or removals generated by the implementation of GHG removal activities and/or REDD+ activities (AFOLU Sector). | **X** |
| GHG projects using a methodology developed or approved by BioCarbon Registry, applicable to activities in the energy, transportation and waste sectors. | |
| Quantifiable GHG emission reductions generated by the implementation of activities in the energy, transportation and waste sectors. | |

**Source**: BioCarbon Registry, 2024.

### *1.1.1 Type of project*

The Project is classified in the AFOLU sector, which includes GHG emission reduction activities through REDD+ activities.

**Table 2**. Project characteristics.

| | |
|---|---|
| Activities in the AFOLU sector, other than REDD+ | x |
| REDD+ Activities | x |
| Activities in the energy sector | |
| Activities in the transport sector | |
| Activities related to waste management and disposal | |

**Source**: BioCarbon Registry, 2024.

## 1.2 Project start date

*The start date of the Project is January 1, 2015.*

## 1.3 Project quantification period

**Start date:** January 01, 2015

**Completion date:** December 31, 2054.

**Total years:** 40 years

*Verification period 1: January 01, 2015 - December 31, 2019.*
*Verification period 2: January 01, 2020 - December 31, 2020.*
*Verification period 3: January 01, 2021 - December 31, 2023.*

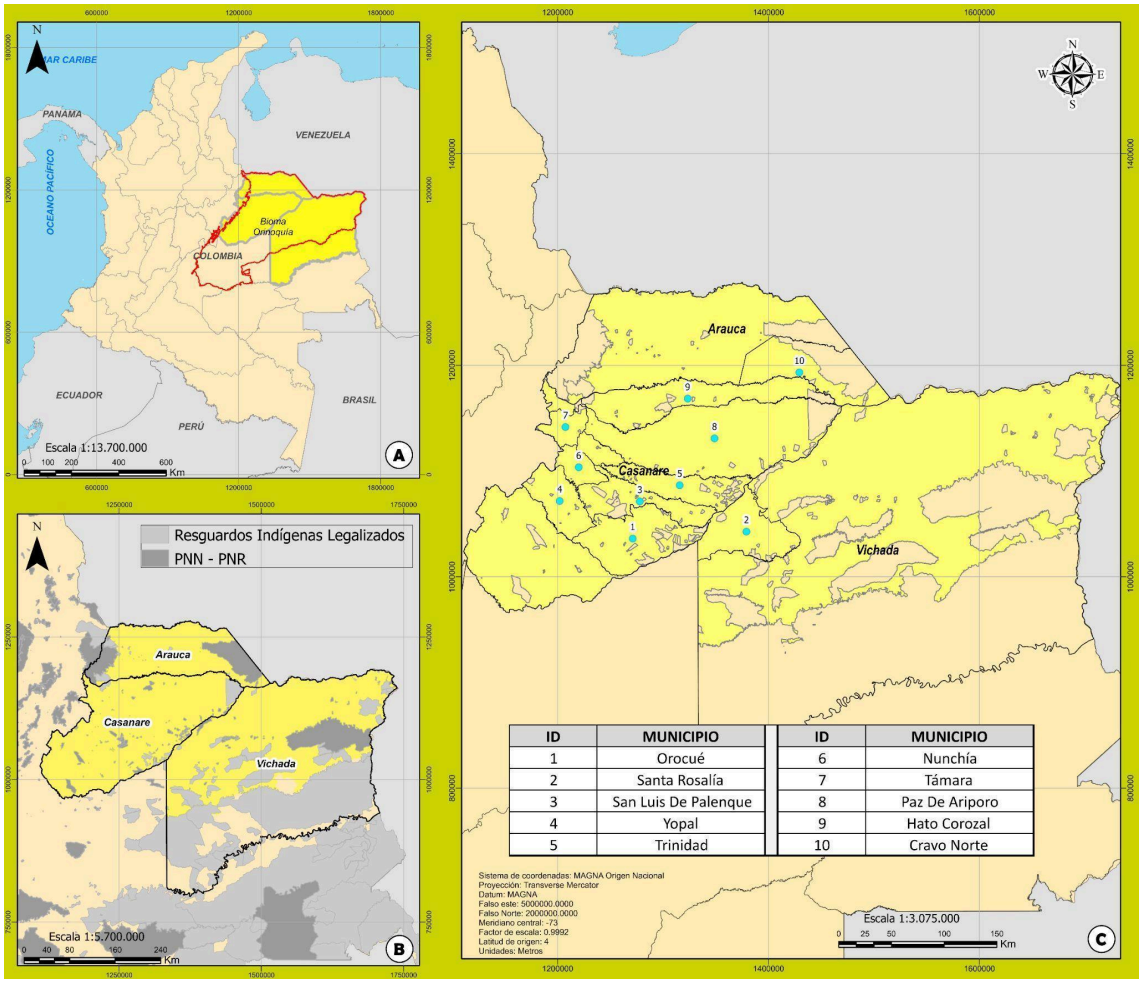
## 1.4 Project Location and Project Boundary.

The project is located in the Colombian Orinoquia biome, specifically in the departments of Casanare, Arauca and Vichada.

Figure 1 A, represents the departments and their spatial location with respect to the Orinoquia biome. However, the area of the departments is redefined based on the exclusion of collectively owned land (Legalized Indigenous Reserves) and areas with exceptional national heritage values such as National Natural Parks (PNN) and Regional Natural Parks (PNR), among others (Figure 1B).

The intervention area is located in 3 departments and 10 municipalities (Figure 1C), distributed as follows: Casanare (8 municipalities "Yopal, Nunchía, Orocué, San Luis de Palenque, Támara, Trinidad, Hato Corozal, Paz de Ariporo"), Arauca ("Cravo Norte") and Vichada ("Santa Rosalía").

**Figure 1.** Spatial dimensions, location and limits of the project. A) Delimitation of the national biomes, B) Departmental boundaries, C) Political-administrative division at the national level, in the area of influence.




| ID | MUNICIPIO | ID | MUNICIPIO |
|---|---|---|---|
| 1 | Orocué | 6 | Nunchía |
| 2 | Santa Rosalía | 7 | Támara |
| 3 | San Luis De Palenque | 8 | Paz De Ariporo |
| 4 | Yopal | 9 | Hato Corozal |
| 5 | Trinidad | 10 | Cravo Norte |

**Source:** Cataruben Foundation, 2024.

The project areas correspond solely and exclusively to private properties whose land tenure modality is consistent with those found in the reference region (Ownership,

Possession and Tenure). The pertinent cartographic information is available in the specific geospatial databases for each component, located in the path GdbProject_Area.

It is important to note that, during the 2021-2023 period, a request was registered to disassociate the project areas from the property called La Mapora, which reduces the areas to be verified by 40.8 hectares. In addition, losses of 11.8 eligible hectares were documented, of which 99% (11.7 hectares) are attributed to natural events, as indicated in the report entitled "Loss of forest of natural origin: Floods". The remaining area is due to forest loss. Thus, at its third verification, the project goes from having 8,665 hectares to 8,653.2 eligible hectares.

Table 1 lists the project areas by political-administrative division, in addition to the geographic coordinates of the centroid.

**Table 3.** Geographical coordinates of the properties enrolled in the project

| Department | Municipality | Predio | Length | Latitude |
|---|---|---|---|---|
| CASANARE | SAN LUIS DE PALENQUE | ALTAMIRA | 071° 49' 8.26" W | 05° 14' 5.94" N |
| CASANARE | YOPAL | AQUÍ ME QUEDO | 072° 10' 56.09" W | 05° 07' 29.67" N |
| CASANARE | TRINIDAD | ARIZONA | 070° 50' 37.43" W | 05° 14' 17.47" N |
| CASANARE | SAN LUIS DE PALENQUE | BUENAVISTA | 071° 39' 59.82" W | 05° 15' 16.17" N |
| CASANARE | OROCUE | BUENAVISTA II | 071° 16' 41.85" W | 04° 54' 7.6" N |
| CASANARE | OROCUÉ | CAIMAN II | 071° 13' 52.56" W | 04° 52' 45.42" N |
| CASANARE | OROCUÉ | EL CAIMAN 1 | 071° 13' 51.6" W | 04° 54' 59.54" N |
| CASANARE | TRINIDAD | EL CAMPIN | 070° 38' 29.58" W | 05° 26' 37.74" N |
| CASANARE | TRINIDAD | EL CLAVO | 071° 01' 5.92" W | 05° 20' 37.48" N |
| VICHADA | SANTA ROSALÍA | EL DERA | 070° 33' 43.51" W | 04° 51' 19.59" N |
| CASANARE | TRINIDAD | EL PROGRESO | 070° 53' 39.37" W | 05° 11' 5.46" N |
| ARAUCA | CRAVO NORTE | FI EL VALLE | 069° 44' 53.73" W | 06° 28' 39.28" N |
| ARAUCA | CRAVO NORTE | FI LA CALZADA | 069° 49' 21.92" W | 06° 26' 39.56" N |

| | | | | |
|---|---|---|---|---|
| ARAUCA | CRAVO NORTE | FI LA GUAJIRA | 069° 48' 9.71" W | 06° 27' 47.15" N |
| ARAUCA | CRAVO NORTE | FI LOS TOROS | 069° 48' 54.41" W | 06° 30' 4.82" N |
| CASANARE | TRINIDAD | FI PADROTE | 070° 49' 47.23" W | 05° 13' 5.02" N |
| CASANARE | YOPAL | FINCA EL COCO II | 072° 10' 55.23" W | 05° 07' 45.89" N |
| CASANARE | PAZ DE ARIPORO | FINCA LA MACARENA | 071° 40' 29.15" W | 05° 49' 4.45" N |
| CASANARE | YOPAL | FINCA PALMARITO | 072° 10' 38.85" W | 05° 08' 11.42" N |
| CASANARE | TRINIDAD | FLOR AMARILLO | 070° 51' 37.81" W | 05° 13' 29.43" N |
| CASANARE | OROCUE | LA CHARANGA I | 071° 14' 29.6" W | 04° 55' 16.16" N |
| CASANARE | OROCUE | LA CHARANGA II | 071° 14' 38.59" W | 04° 53' 1.14" N |
| CASANARE | SAN LUIS DE PALENQUE | LA PRIMAVERA | 071° 47' 24.76" W | 05° 17' 30.5" N |
| CASANARE | TRINIDAD | LA REGADERA | 070° 50' 55.59" W | 05° 18' 45.41" N |
| CASANARE | TRINIDAD | LA SONRISA | 070° 51' 51.94" W | 05° 22' 34.26" N |
| CASANARE | PAZ DE ARIPORO | LAS ISLAS | 071° 24' 22.35" W | 05° 44' 27.63" N |
| CASANARE | TRINIDAD | LIMONAL | 070° 53' 17.56" W | 05° 22' 47.59" N |
| CASANARE | OROCUE | LOS SARRAPIOS | 071° 15' 29.56" W | 04° 54' 37.66" N |
| CASANARE | SAN LUIS DE PALENQUE | LT MONTANA | 071° 46' 42.41" W | 05° 12' 47.89" N |
| CASANARE | SAN LUIS DE PALENQUE | MATA DE PALMA | 071° 46' 15.96" W | 05° 15' 42.2" N |
| CASANARE | TRINIDAD | PADROTE DOS | 070° 50' 13.17" W | 05° 12' 42.71" N |
| CASANARE | TRINIDAD | PADROTE UNO | 070° 49' 53.23" W | 05° 11' 54.05" N |
| CASANARE | TRINIDAD | PALMERA | 070° 48' 49.35" W | 05° 21' 1.4" N |
| CASANARE | TRINIDAD | SAN ANDRES | 070° 49' 47.99" W | 05° 18' 53.07" N |
| CASANARE | TRINIDAD | SAN CRISTOBAL | 070° 48' 57.48" W | 05° 19' 20.28" N |
| VICHADA | SANTA ROSALÍA | SHAMBALA | 070° 16' 38.8" W | 04° 50' 8.7" N |
| CASANARE | NUNCHÍA | TABLONCITO | 072° 11' 57.36" W | 05° 37' 4.74" N |
| VICHADA | SANTA ROSALÍA | TRIKUTI | 070° 15' 34.62" W | 04° 50' 21.51" N |

| | | | | |
|---|---|---|---|---|
| CASANARE | TAMARA | VERSALLES | 072° 05' 4.12" W | 05° 50' 21.11" N |
| CASANARE | HATO COROZAL | VILLA AURORA | 071° 46' 25.88" W | 06° 02' 12.73" N |
| CASANARE | TRINIDAD | VILLA RICA LT 13 | 070° 44' 23.97" W | 05° 17' 3.63" N |
| CASANARE | TRINIDAD | VILLA RICA LT 7 | 070° 47' 50.09" W | 05° 15' 1.14" N |

**Source:** Cataruben Foundation, 2024.

Different carbon standards are present in this region, including VERRA[1] , COLCX[2] , CERCARBONO[3] , GOLD STANDARD, BIOCARBONO REGISTRY . [4]Figure 2 provides geographic information on other projects being developed in the vicinity of the geographical area of the project.

To ensure that the project areas do not overlap with other projects within their boundaries, an exhaustive and rigorous process was carried out. First, cartographic information for each carbon project present in the region was downloaded directly from the corresponding standard's website. This information was organized into shapefiles according to the specific standards of each project.

Next, the "Intersect" algorithm was applied to compare the project areas with the areas defined by each carbon standard. The analysis resulted in empty shapefiles, which conclusively confirms the absence of overlaps between the project areas and other projects in the region.

The relevant geographic data are duly stored and available in the geospatial databases, located in the path Gdb_carbon_projects. Additionally, a Map Package file named CO2Bio_Estandar_Carbon has been generated, designed to be accessible in any version of ArcGIS Pro. This package includes both the cartographic information of the geodatabase and the results of the analysis, allowing its opening in any GIS software.

In addition, an Excel file titled Listado_Proyectos_Estandar_Carbono.xlsx is provided, which contains the name of each project organized by standard, providing additional documentation for easy reference.

1 https://verra.org/

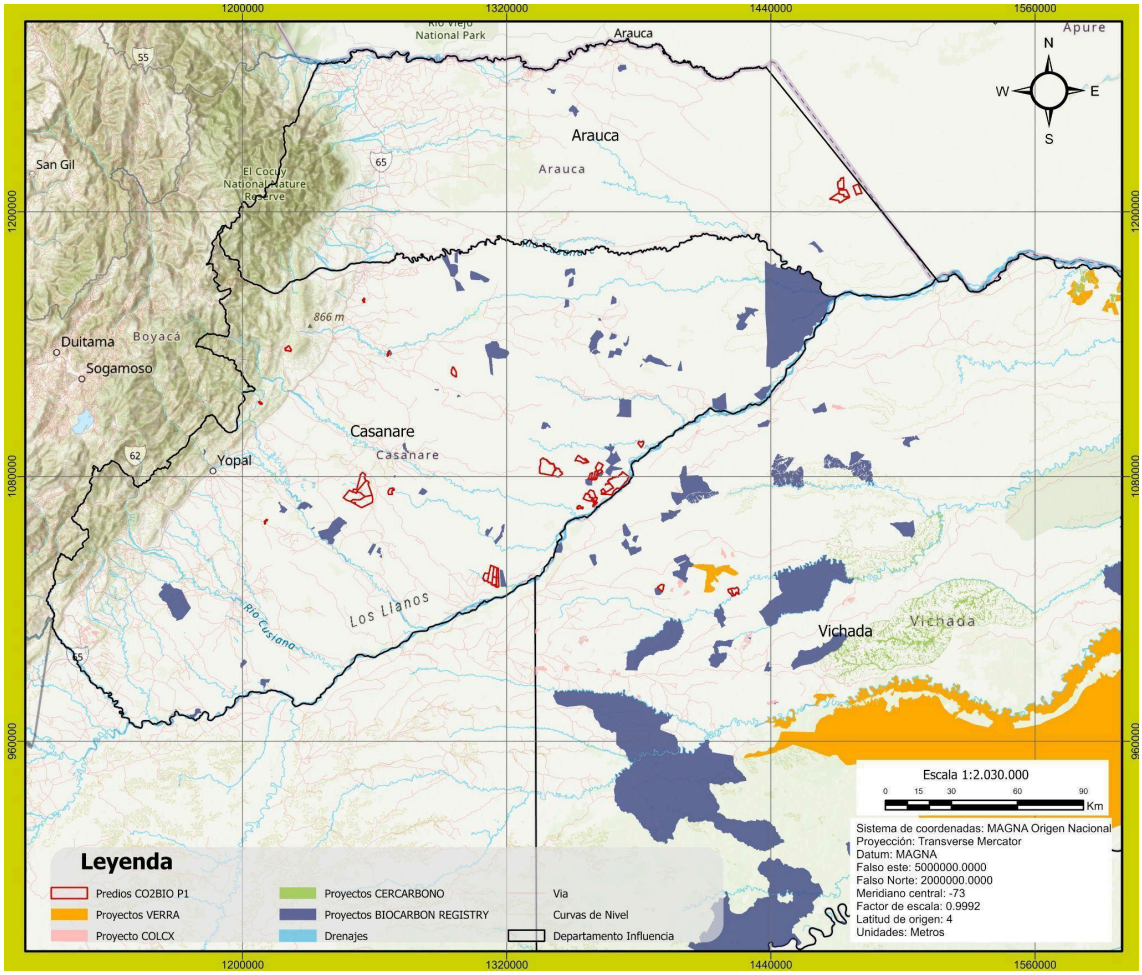
2 https://colcx.com/

3 https://www.cercarbono.com/es/

4 https://biocarbonregistry.com/es_es/

In summary, in the departments of Casanare, Arauca and Vichada there is a significant presence of carbon projects, with a total of 25 projects distributed according to the following standards: VERRA (5 projects), COLCX (3 projects), CERCARBONO (3 projects), GOLD STANDARD (2 projects) [AR projects, without geographic data] and BIOCARBONO REGISTRY (12 projects).

**Figure 2.** Location of project areas compared to other standards.




**Source:** Cataruben Foundation, 2024.

## 1.5 Summary description of the status of project implementation

For the monitoring period 2021 - 2023, project activities are under implementation. In the *"Project Implementation"* section, paragraph 14, the implementation status of the project activities is presented in detail. Below is a general description of the degree of implementation of each activity.

Summary description of the implementation status of REDD+ project activities.

| ID | Description of the activity | Implementation dates | General progress of the activity | Total GHG |
|---|---|---|---|---|
| 1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | The development of this activity begins on January 01, 2015. | 6.800 | 77,606 $tCO_2e$ reduced |
| 2 | Promote sustainable forest management through the implementation of sustainable productive practices and conservation actions on the properties, in line with the Environmental Management Plan and the Property Implementation Plan. | The development of this activity begins on January 01, 2015. | 96% | |
| 3 | Strengthening forest governance to promote the conservation and sustainable use of forests | The development of this activity begins on January 01, 2015. | 25,00% | |
| 4 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | The development of this activity begins on January 01, 2015. | 22,50% | |
| 5 | Identifying and mapping | The development of | 22,50% | |

| ID | Description of the activity | Implementation dates | General progress of the activity | Total GHG |
|---|---|---|---|---|
| | areas of regeneration gain or loss | this activity begins on January 01, 2015. | | |
| 6 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | The development of this activity begins on January 01, 2015. | 11,43% | |
| 7 | Monitor biodiversity variables or indicators in land cover with the use of remote sensing for the project area and its surroundings. | The development of this activity begins on January 01, 2015. | 25% | |
| 8 | Develop a Plan for the Efficient Use and Saving of Water in Households (PUEAA) enrolled in the initiative. | The development of this activity begins on January 01, 2015. | 25% | |

**Source:** Cataruben Foundation, 2024

For the period from 01/01/2021 - 12/31/2023, 77,606 tCO2e will be reduced by avoiding deforestation and forest degradation in the project areas.

## Title, reference and version of the baseline and monitoring methodology applied to the project.

The project is based on the Biocarbon Registry voluntary standard version 3.3 and its methodologies described below:

- Methodological document AFOLU sector BCR0002 Quantification of GHG Emission Reductions from REDD+ Projects. *Version 4.0. May 27, 2024.*

In addition, the following tools provided by the BCR standard were used:

- Baseline and Additionality Tool Version 1.3, dated March 01, 2024.
- Tool to demonstrate compliance with REDD+ safeguards Version 1.1, January 26, 2023.
- Sustainable Development Safeguards SDSs Tool Version 1.0, dated April 10, 2024.

- Sustainable Development Goals (SDGs) Tool Version 1.0, dated June 27, 2023.
- Tool to avoid double counting.2.0, dated February 07, 2024.
- Monitoring, Reporting and Verification Tool. v 1. February 13, 2023.
- Tool Permanence Risk Management Version 1.1 March 19, 2024.
- The Monitoring Report document under the GHG project template in its version 1.1.

## 3. Registration or participation in other GHG Programs/Registers

The project has not been enrolled or registered in another GHG program.

## 4. Contribution to the Sustainable Development Goals (SDGs)

Since its inception, the CO2Bio project has been actively engaged with the Sustainable Development Goals (SDGs). In particular, it has focused its efforts on **SDG 5** (Gender Equality), **SDG 13** (Climate Action) and **SDG 15** (Life of Terrestrial Ecosystems). Following a thorough review of its activities, this commitment was expanded to include **SDG 6** (Clean Water and Sanitation).

The project has been aligned to the current version 3.3 of the BCR Standard From Differentiated to Common Responsibility, the Sustainable Development Safeguards (SDSs) Tool Version 1.0 and the SDG Tool (2023). These documents provide clear guidelines for reporting contributions towards the targets of the Global Goals. Successful implementation of conservation activities under CO2Bio not only aims to mitigate climate change and reduce greenhouse gas (GHG) emissions, but also to assess the positive impact on the selected SDGs.

Detailed evidence of these contributions can be found in the SDG Tool (See: Annexes Folder / 3. SDGs / SDG Tool). The following will describe each of the selected SDGs, the specific focus and the degree of contribution, based on the activities carried out during the period from 2021 to 2023.

## 4.1 SDG 5 (Gender Equality)

**Figure 3** SDG 5


**Retrieved from:** https://www.un.org/sustainabledevelopment/es/news/communications-material/, 2024.

The measures taken for gender equality are crucial in themselves, if not play a key role in the achievement of Sustainable Development Goal 5 (SDG 5). Following the application of the SDG tool in the project, it is evident that SDG 5, focused on gender equality, actively seeks to achieve and contribute to target 5.5 *"Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life",* specifically indicator 5.5.2 *"Proportion of women in decision-making positions"*. That is, promoting women's participation in leadership development environments, leading to a significant contribution to the Sustainable Development Goals.

### *4.1.1 Progress against global target 5.5*

The CO2Bio project currently has 42 enrolled properties, which are represented by 26 women and 30 men who own these properties and are called "Ecosystem Managers". During the period 2021-2023, activity I1 of the project promoted a virtual space for the exchange of knowledge, with the objective of supporting and making visible the leadership and valuation of women's work (See: Annexes Folder / 1. Project Activities / ID.1 / Report activity I1- Strengthening of capacities in the component of Leadership and Valuation of women's work).

This space brought together **14** participants, including **9** women and **5** men.

Simultaneously, a training on natural regeneration, silvicultural techniques and the importance of meliponiculture was carried out, with the attendance of **41** people, including **10** women and **31** men, as well as **21** participants in meliponiculture, including

**4** women and **17** men. (See: Annexes Folder / 1. Project Activities / ID.1 / Activity Report I1- Strengthening of technical capacities CO2Bio (2021-2023).

In summary, during the 2021-2023 period, 23 women, in addition to owning land enrolled in the CO2Bio project, have assumed leadership roles in the sustainable management of their lands. This has allowed them to influence the local economy and environmental conservation, increasing their presence in leadership positions in forest governance. These spaces brought together women directly or indirectly involved in the project, with the objective of providing them with access to new knowledge and strengthening their capacities to make active and informed decisions. The meetings were pedagogical, collaborative and promoted gender articulation.

A Training Plan has been developed for the remainder of the project period, aimed at strengthening access to and management of financial goods and services by women owners enrolled in the project. By strengthening women's participation in the local economy, sustainable economic growth will be promoted and a more equitable and fair development for the regional community will be fostered, with benefits for the entire local community (See: Annexes Folder / 3. SDG / SDG 5 / Training Plan).

**Figure 4.** SDG Tool (2023) - SDG 5 Gender Equality.

| ODS 5 | | Igualdad de Género | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nivel global ODS y meta | | Nivel de proyecto | | | | | | |
| Metas globales | Indicador global del ODS | Actividad del proyecto | Contribución de la actividad del proyecto | Tipo de Actividad | Unidad de medida de la Actividad | Soportes | | |
| | | | | | | Verificacion (Periodo 2015 - 2019) | Verificacion (Periodo 2020) | Verificacion (Periodo 2021 - 2023) |
| 5.5 Asegurar la participación plena y efectiva de las mujeres y la igualdad de oportunidades de liderazgo a todos los niveles decisorios en la vida política, económica y pública. | 5.5.2 Proporción de mujeres en cargos directivos | Fortalecimiento de capacidades a hombres y mujeres vinculados al proyecto, en los siguientes componentes: técnico-ambiental, social y administrativo-financiero, con el fin de fortalecer la toma de decisiones en pro de los objetivos del proyecto. | Las capacitaciones en gestión técnica, ambiental, social y financiera brindan a las mujeres herramientas clave para la administración sostenible de sus predios. Estos espacios fomentan el desarrollo de habilidades de liderazgo, permitiéndoles asumir roles importantes y aumentar su participación en la toma de decisiones y posiciones directivas | Permanente | % Mujeres propietarias vinculadas al proyecto | | | Reporte de mujeres propietarias en cargos directivos |

**Source:** Cataruben Foundation, 2024.

**Table 5.** Result of the contribution to SDG 5 (Gender Equality), with respect to the global target.

| ODS | Global SDG Indicator | Approach and Contribution | Progress (%) Period 2021-2023 with respect to the global target |
|---|---|---|---|
| 5 | 5.5.2 Proportion of women in management positions | 23 women, in addition to owning properties enrolled in the CO2Bio project, have assumed leadership roles in the sustainable management of their properties, which has allowed them to influence the local economy and environmental conservation, increasing their presence in management positions in forest governance. This has been achieved through different spaces for the exchange of knowledge on leadership and valuing women's work, natural regeneration, silvicultural techniques, and the importance of meliponiculture. | 39% |

**Source:** Cataruben Foundation, 2024

## 4.2 SDG 6 (Clean Water and Sanitation)

**Figure 6.** SDG 6


**Retrieved from:** https://www.un.org/sustainabledevelopment/es/news/communications-material/, 2024.

Measures taken for the sustainable management of household water resources are not only crucial in themselves, but also play a key role in the achievement of Sustainable Development Goal 6 (SDG 6). Following the application of the SDG tool in the project, it becomes evident that SDG 6, focused on water and sanitation, actively seeks to

achieve and contribute to target 6.4. *"By 2030, significantly increase the efficient use of water resources in all sectors and ensure sustainability of freshwater withdrawals and supplies to address water scarcity and significantly reduce the number of people suffering from water stress",* specifically indicator 6.4.1 *"Change in water use efficiency over time"*. In other words, by promoting and adopting practices that encourage the responsible use of water in households, we are not only addressing an immediate vital need, but we are also making a significant contribution to the realization of global sustainable development goals.

#### *4.2.1 Progress against overall goal*

To achieve this purpose, a characterization of the enrolled properties was carried out, focused on a water component, allowing the identification of the sources of water supply and water management. This process, in turn, contributes to identifying the key needs of the project community.

Based on the data collected in this survey, the *Water Efficiency and Saving Program (PUEAA in spanish)* is developed for each property. The objective is to raise awareness among the project population about the importance of sustainable water management and to promote activities and practices that promote its quality, conservation and efficient use. It is crucial to highlight that this project plays a role in guaranteeing equitable access to drinking water and basic sanitation, which has a direct impact on people's quality of life and the achievement of sustainable development.

Different studies reveal that the preservation of water sources is essential to maintain biodiversity and the health of aquatic ecosystems; additionally, it allows us to face the challenges of water scarcity that affect communities. Data reported by the United Nations stipulate that worldwide, one in three people do not have access to safe drinking water, two out of five people do not have a basic facility to wash their hands with soap and water, and more than 673 million people still defecate in the open. Given these global statistics, the project brings together efforts to address these issues and bring about change in the quality and efficiency of water use over time.

The project adheres to the fulfillment of SDG 6 through the application of the four methodological stages established in the Project Design Document. The following equation is used to evaluate the project's progress:

$$Progress\ \% \ = \frac{(N°D*0{,}10)+(N°DI*0{,}15)+(N°I*0{,}55)+(N°S*0{,}20)}{n}$$

**Equation 1.** Calculation to determine the percentage of progress in meeting SDG 6 in the CO2Bio project.

**Where:**

**N°D** = Number of diagnosed farms

**N°DI** = Number of properties with Design

**N°I** = Number of Implemented properties

**N°S** = Number of properties with monitoring.

**n =** Total number of properties

It should be noted that this document is focused on the diagnosis and design of programs aimed at water quality, efficient use and savings in the **42** properties that make up the project.

To date, a total of **42** properties have been characterized and **42** individual Water Quality, Efficient Use and Saving Programs (PUEAA) have been developed, which are available in the Annexes section (See: Annexes Folder / 1. Project Activities / ID A.1 / Documents), together with the diagnosis that presents the statistical results obtained from the characterization of the properties in relation to the water component.

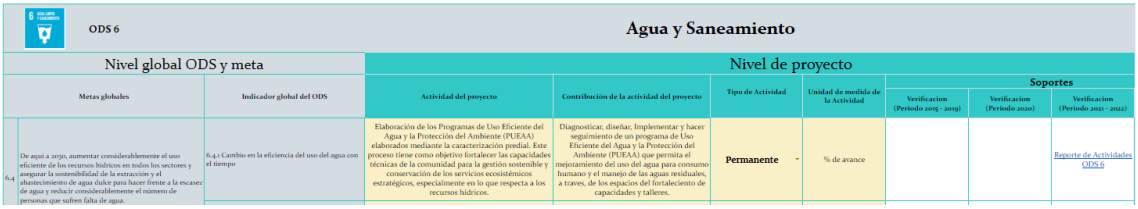
In summary, to date, the project has made significant progress. **A total of 4.2%** of the diagnostic phase has been completed, which represents the 10% previously established (with the characterization of **42** properties). In addition, a solid **6.3%** has been achieved in the design phase, equivalent to the planned 15% (with **42** properties having their respective Water Efficiency and Saving Plans, PUEAA). These combined achievements demonstrate an overall progress of **25%** towards the overall goal, as can be seen in the distribution of the stages in the equation:

$$Progress\ \% \ = \frac{(42*0{,}10)+(42*0{,}15)+(0*0{,}55)+(0*0{,}20)}{42} = \ 25$$

**Equation 2.** Calculation to determine the percentage of progress in terms of compliance with SDG 6 project.

Regarding indicator 6.4.1, a starting point or benchmark has been established for 2018 of zero (0), which represents the lack of actions aimed at improving the efficient use and saving of water. According to the progress of activities, **25%** progress has been achieved to date.

**Figure 7.** SDG Tool (2023) - SDG 6 Water and Sanitation.



| ODS 6 | Agua y Saneamiento | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nivel global ODS y meta | | Nivel de proyecto | | | | | | |
| Metas globales | Indicador global del ODS | Actividad del proyecto | Contribución de la actividad del proyecto | Tipo de Actividad | Unidad de medida de la Actividad | Soportes | | |
| | | | | | | Verificacion (Periodo 2015 - 2019) | Verificacion (Periodo 2020) | Verificacion (Periodo 2021 - 2022) |
| 6.4 De aquí a 2030, aumentar considerablemente el uso eficiente de los recursos hídricos en todos los sectores y asegurar la sostenibilidad de la extracción y el abastecimiento de agua dulce para hacer frente a la escasez de agua y reducir considerablemente el número de personas que sufren falta de agua. | 6.4.1 Cambio en la eficiencia del uso del agua con el tiempo | Elaboración de los Programas de Uso Eficiente del Agua y la Protección del Ambiente (PUEAA) elaborados mediante la caracterización predial. Este proceso tiene como objetivo fortalecer las capacidades técnicas de la comunidad para la gestión sostenible y conservación de los servicios ecosistémicos estratégicos, especialmente en lo que respecta a los recursos hídricos. | Diagnosticar, diseñar, Implementar y hacer seguimiento de un programa de Uso Eficiente del Agua y la Protección del Ambiente (PUEAA) que permita el mejoramiento del uso del agua para consumo humano y el manejo de las aguas residuales, a traves, de los espacios del fortaleciento de capacidades y talleres. | Permanente | % de avance | | | Reporte de Actividades ODS 6 |

**Source:** Cataruben Foundation, 2024.

Now that the number of diagnosed and designed properties is 100% completed, the objective is to implement the indicator and its respective follow-up according to the training document (See: Annexes Folder / 1. Project Activities / ID A.1 / Water Quality Training Plan), which includes a process of knowledge transfer, addressing the management and protection of natural resources. This development process will be carried out in person and remotely at strategic points, responding to circumstances that have contributed to the deterioration of ecosystems. The aim is to halt the transformation of forests and savannas, promoting sustainable economic practices to preserve nature.

Result of the contribution to SDG 6 (Water and sanitation), with respect to the global target.

| ODS | Global SDG Indicator | Approach and Contribution | Progress (%) Period 2021-2023 with respect to the global target |
|---|---|---|---|
| 6 | 6.4.1 Change in water use efficiency over time | Of the **42** properties enrolled, **42** diagnoses have been completed and PUEAA's have been created. The main activities have included the characterization of the properties, the preparation of plans for the efficient use and saving of water, and the diagnosis of the project. | **25%** |

**Source:** Cataruben Foundation, 2024.

*4.2.2 Compliance with indicator 6.4.1*

To check progress on indicator 6.4.1 of Sustainable Development Goal 6, equation 3 is presented, which relates and links the three management sheets included in each PUEAA. It is important to note that the use of all the tabs will depend on the specific needs of each property.

$$\%\ \text{Cumplimiento indicador 6.4.1 (ODS 6)} = \frac{\left(\sum_{i=1}^{n} \bar{X}\ \text{Imp. Fichas}\right) * n\ \text{P. Imp.}}{n}$$

Calculation to determine the percentage of compliance with indicator 6.4.1.

**Where:**

**∑(i=1)^n x̄ Imp. Chips** = Sum of the average implementation of the 3 Management Chips per property.

**n P. Imp.** = Number of implemented properties

**n =** Total number of properties

The sum of the average implementation of the management sheets can be understood as follows:

$$\sum_{i=1}^{n} \bar{X}\ \text{Imp. Fichas} = \sum_{i=1}^{n} \frac{\left(\frac{\%\text{Cum. F1} + \%\text{Cum. F2} + \%\text{Cum. F3}}{\text{n Fichas. P. 1}}\right)\left(\frac{\%\text{Cum. F1} + \%\text{Cum. F2} + \%\text{Cum. F3}}{\text{n Fichas P. 2}}\right)\ldots}{n}$$

**Equation 4.** Sum of the average of the implementation of the 3 management sheets.

**Where:** the average percentage of compliance of the three management sheets for each of the properties enrolled in the project must be taken into account. According to the development and compliance of these activities, the percentage of compliance is calculated. Based on this, the following equation shows specifically how the percentage of compliance with Indicator 6.4.1 (SDG 6) is calculated:

$$\%\ \text{Cumplimiento indicador 6.4.1 (ODS 6)} = \frac{\left(\sum_{i=1}^{n} \frac{\left(\frac{\%\text{Cum. F1} + \%\text{Cum. F2} + \%\text{Cum. F3}}{\text{n Fichas. P. 1}}\right) + \left(\frac{\%\text{Cum. F1} + \%\text{Cum. F2} + \%\text{Cum. F3}}{\text{n Fichas P. 2}}\right)\ldots}{n}\right) * \text{n P. Imp.}}{n}$$

**Equation 5.** Calculation for the percentage of compliance with Indicator 6.4.1.

According to the results of the characterizations carried out, to date, significant progress has been made in the CO2Bio project, aligned with the different phases and promoting a more efficient and responsible use of water resources, prioritizing indicator 6.4.1, which measures the efficiency of water use. Since 2018, the project has contributed to the fulfillment of SDG 6. However, in rural areas, where access to water depends on decentralized sources, measuring efficient use presents challenges. For the implementation phase, two key strategies are proposed:

**Estimation of water use:** The available volume will be evaluated through storage capacity and recharge frequency.

**Household surveys:** Daily consumption adjusted to local conditions will be calculated.

These methodologies will make it possible to monitor the efficient use of water and make progress in meeting SDG 6.

## 4.3 SDG 13 (Climate Action)

**Figure 8.** SDG 13


**Retrieved from:** https://www.un.org/sustainabledevelopment/es/news/communications-material/, 2024.

Sustainable Development Goal 13 (SDG 13) focuses on integrating climate change measures into national policies, strategies and plans. This particular project adopts an approach to reduce greenhouse gas (GHG) emissions by reducing deforestation and forest degradation as a result of the implementation of project activities.

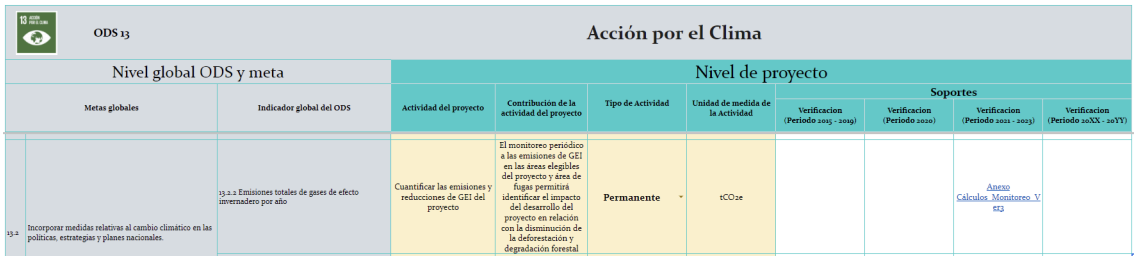
In this regard, applying the SDG tool of the BCR standard identifies target 13.2, which seeks to "*Integrate climate change measures into national policies, strategies and plans*", with indicator 13.2.2, which measures "*Total greenhouse gas emissions per year*".

### *4.3.1 Progress against the global target*

For the period 01/01/2021 - 12/31/2023, GHG emissions in the project area and leakage area were monitored, comparing their reduction in relation to the reference value calculated in the baseline.

Thus, although GHG emissions of 2,296 tCO2e were recorded, there was a 97.13% reduction in emissions compared to the annual average estimated in the baseline scenario, which represents an advance of 21.75% compared to the overall goal for the project's execution period.

**Figure 9.** SDG Tool (2023) - SDG 13 Climate Action.



| ODS 13 | | | Acción por el Clima | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nivel global ODS y meta | | | Nivel de proyecto | | | | | | | |
| Metas globales | | Indicador global del ODS | Actividad del proyecto | Contribución de la actividad del proyecto | Tipo de Actividad | Unidad de medida de la Actividad | Soportes | | | |
| | | | | | | | Verificacion (Periodo 2015 - 2019) | Verificacion (Periodo 2020) | Verificacion (Periodo 2021 - 2023) | Verificacion (Periodo 20XX - 20YY) |
| 13.2 | Incorporar medidas relativas al cambio climático en las políticas, estrategias y planes nacionales. | 13.2.2 Emisiones totales de gases de efecto invernadero por año | Cuantificar las emisiones y reducciones de GEI del proyecto | El monitoreo periódico a las emisiones de GEI en las áreas elegibles del proyecto y área de fugas permitirá identificar el impacto del desarrollo del proyecto en relación con la disminución de la deforestación y degradación forestal | Permanente | tCO2e | | | Anexo Cálculos_Monitoreo_V 5r3 | |

**Source:** Cataruben Foundation, 2024.

Result of the contribution to SDG 13 (Climate action), with respect to the global target.

| ODS | Global SDG Indicator | Approach and Contribution . | Progress (%) Period 2021-2023 with respect to the global target |
|---|---|---|---|
| 13 | 13.2.2 Total greenhouse gas emissions by year | GHG emissions in the project area and leakage area were monitored, comparing their reduction in relation to the reference value calculated in the baseline. | 21,75 % |

**Source:** Cataruben Foundation, 2024.

## 4.4 SDG 15 (Life of Terrestrial Ecosystems)

**Figure 10.** SDG 15


**Retrieved from:** https://www.un.org/sustainabledevelopment/es/news/communications-material/, 2024.

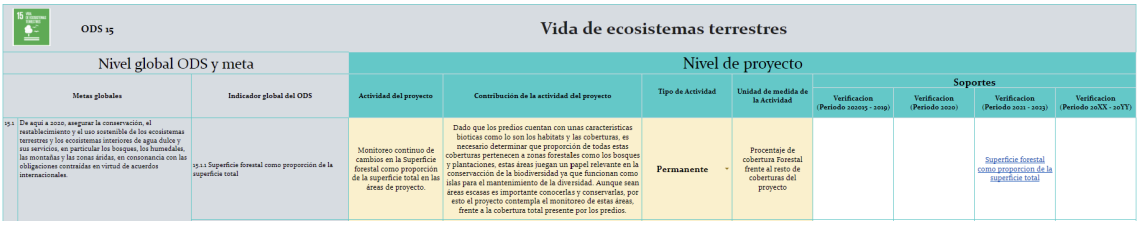
The conservation of terrestrial ecosystems is not only fundamental in its own right, but also plays a crucial role in achieving Sustainable Development Goal 15 (SDG 15). The CO2Bio project applies the SDG tool, to demonstrate its active contribution to the SDG 15 target, focused on the life of terrestrial ecosystems, specifically contributing to target *15.1. "By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, consistent with obligations under international agreements"*, through indicators 15.1.1 "*Forest area as a proportion of total area"* and 15.1.2 "*Proportion of sites important for terrestrial and freshwater biodiversity that are part of protected areas, by ecosystem type".*

### *4.4.1 Progress of indicator 15.1.1 against the global target*

As a result of the implementation of the project, 6.07% of the forest cover or Portion of Natural Forest Area, or PSBN in Spanish, is increased compared to the total areas of the project, the project activities promote the protection of the forest resource during the period 2021-2023.

In general, the forest mass for the years 2015 and 2023 remains constant, there are no abrupt changes that represent significant losses that affect the proportion of forest conservation, on the contrary, it is observed that some of the properties have a higher proportion of forest for the year 2023. *G1. Forest area as a proportion of total area CO2Bio*.

**Figure 11.** SDG Tool (2023) - SDG 15 Life of Terrestrial Ecosystems.



| ODS 15 | | Vida de ecosistemas terrestres | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Nivel global ODS y meta | | Nivel de proyecto | | | | | | | |
| Metas globales | Indicador global del ODS | Actividad del proyecto | Contribución de la actividad del proyecto | Tipo de Actividad | Unidad de medida de la Actividad | Soportes | | | |
| | | | | | | Verificacion (Periodo 202015 - 2019) | Verificacion (Periodo 2020) | Verificacion (Periodo 2021 - 2023) | Verificacion (Periodo 20XX - 20YY) |
| 15.1 De aquí a 2020, asegurar la conservación, el restablecimiento y el uso sostenible de los ecosistemas terrestres y los ecosistemas interiores de agua dulce y sus servicios, en particular los bosques, los humedales, las montañas y las zonas áridas, en consonancia con las obligaciones contraídas en virtud de acuerdos internacionales. | 15.1.1 Superficie forestal como proporción de la superficie total | Monitoreo continuo de cambios en la Superficie forestal como proporción de la superficie total en las áreas de proyecto. | Dado que los predios cuentan con unas caracteristicas bioticas como lo son los habitats y las coberturas, es necesario determinar que proporción de todas estas coberturas pertenecen a zonas forestales como los bosques y plantaciones, estas áreas juegan un papel relevante en la conservacción de la biodiversidad ya que funcionan como islas para el mantenimiento de la diversidad. Aunque sean áreas escasas es importante conocerlas y conservarlas, por esto el proyecto contempla el monitoreo de estas áreas, frente a la cobertura total presente por los predios. | Permanente | Procentaje de cobertura Forestal frente al resto de coberturas del proyecto | | | Superficie forestal como proporcion de la superficie total | |

**Source:** Cataruben Foundation, 2024.

**Table 8.** Result of the contribution to Indicator 15.1.1 of SDG 15 Life of terrestrial ecosystems, with respect to the global target

| ODS | Global SDG Indicator | Approach and Contribution | Progress (%) Period 2021-2023 with respect to the global target |
|---|---|---|---|
| **15** | 15.1.1 Forested area as a proportion of total area | Monitor forest conversion and reduce the rate of forest conversion against the baseline.<br><br>The calculation and reporting followed the guidelines defined in the environmental indicators of the Ministry of Environment and Sustainable Development and IDEAM, corresponding to the indicator "Proportion of the area covered by natural forest". | 6,07% |

**Source:** Cataruben Foundation, 2024.

### *4.4.2 Progress of indicator 15.1.2 against the global target*

As a project activity we have to monitor biodiversity indicators in the multiple land covers within the project and its surroundings, to meet this indicator of SDG 15, along with target 15.1 which is identified as indicator 15.1.2. In the context of the 2021 to 2023 monitoring period of the project, a total of 8653.2 hectares of forest were identified within the 42 properties within the project through a methodology of satellite images, as well as supervised and unsupervised classification of these images using Geographic Information System or GIS tools.

SDG 15 aims to achieve two indicators that aim to: (i) increase the forest area as a proportion of the total area and (ii) increase the proportion of important sites for terrestrial and freshwater biodiversity that are part of protected areas, broken down by ecosystem type. Under this premise and taking into account that the monitoring report corresponds to the period 2021-2023, the following are the most relevant results, which are related to an innovative methodology for research such as the use of Audiomoths tools, which allow us to interact directly with ecosystem managers and get involved in the various processes of conservation and knowledge of the territory.

From these forest areas and from a participatory acoustic and bioacoustic sampling methodology enrolled local stakeholders of the properties, we found that the project area is home to a diversity of 197 species of birds, as well as 8 acoustic indices which focus on knowing the sound state of the environment, as well as its effect on biodiversity, these mitigation and conservation actions of these coverages, impact generally as presented in the document (See: Folder Annexes / 3. SDG / SDG15 / 15.1.2 / Bioaquatic and ecoacoustic monitoring plan), where it is exposed that in addition to the HCV's these areas are of vital importance due to the presence of species in some degree of threat, within this item we also find an analysis on the acoustic status of forests in terrestrial ecosystems which improved from the actions of the project, impacting positively within SDG 15.

Within the framework of the CO2Bio conservation project and in alignment with the Sustainable Development Goals (SDGs), the activity related to the proportion of important sites for terrestrial and freshwater biodiversity that are part of protected areas, broken down by ecosystem type, is highlighted, given that most of the properties are enrolled as RNSC (See: Folder Annexes / 3. SDGs / SDG15 / 15.1.2 / Predio RNSC proyecto CO2Bio.xlsx).

This project focuses on the conservation and protection of key biodiversity areas, both in terrestrial and aquatic ecosystems. It takes into account both the reserve areas already established before the beginning of the project as well as those new areas that seek to be formalized as Civil Society Nature Reserves (RNSC). Our team offers technical support to the owners of these properties interested in joining the reserve system, facilitating the process of linkage and formalization.

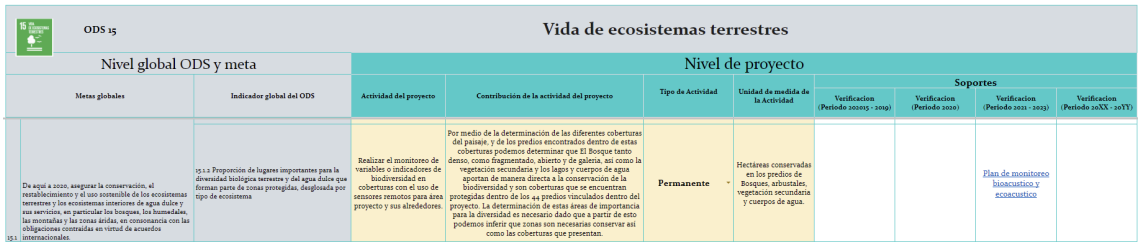
The support provided is not only limited to technical advice, but is also reinforced through a series of complementary actions, such as the training of ecosystem managers (See: Folder Annexes / 3. SDGs / SDG15 / 15.1.2 / Recording - Conservation Figures.mp4). These trainings are essential for stakeholders to understand the benefits of being part of the protected areas system, which contributes significantly to biodiversity conservation. This information was recorded in these attendance forms (See: Folder Annexes / 3. SDG / SDG15 / 15.1.2 / Attendance Record - Conservation Figures.pdf).

In addition, explanatory audiovisual material is available, such as videos detailing the process and benefits of incorporation into the CSERN. A specific example is the Las Islas property, which is currently in the process of formalization to be recognized as a

CSERN. This case reflects the commitment of the CO2Bio project to support both previously constituted areas and those in the process of incorporation.

Therefore, it can be concluded that the activity in question is covered by the project's actions, contributing directly to the protection and sustainable management of key ecosystems for biodiversity. The attached annexes contain videos and detailed documents on the training and technical processes offered to landowners and ecosystem managers.

**Figure 12.** SDG Tool (2023) - SDG 15 Life of Terrestrial Ecosystems.




**Source:** Cataruben Foundation, 2024.

**Table 9.** Result of the contribution to Indicator 15.1.2 of SDG 15 Life of terrestrial ecosystems), with respect to the global target.

| ODS | Global SDG Indicator | Approach and Contribution | Progress (%) Period 2021-2023 with respect to the global target |
|---|---|---|---|
| 15 | 15.1.2 Proportion of sites important for terrestrial biodiversity and freshwater that are part of protected areas broken down by ecosystem type. | Carrying out VCA's 1 focused on the diversity of fauna species and their distribution in the different coverages of the landscape, 2 focused on the dominant coverages of the landscape, 3 focused on the conservation areas and 4 focused on the ecosystem services within the project. Likewise, the document Bioacoustic and ecoacoustic monitoring plan is presented where the results of the biodiversity in the project area are shown. | 12,5% |

| | | | |
|---|---|---|---|
| | | Support activities that consider previously established reserves, and promote the incorporation of new properties as Civil Society Nature Reserves (RNSC), providing technical and logistical support to interested landowners, strengthening ecosystem managers through socialization and training, facilitating their involvement and formalization within the reserve system. | |

**Source:** Cataruben Foundation, 2024.

## 5. Compliance with Applicable Legislation

The Cataruben Foundation recognizes the importance of complying with national and international regulations related to climate change mitigation. In this sense, it has established a regulatory monitoring procedure within its quality system to ensure continuous compliance with the regulations applicable to its carbon projects, information that is related and updated through a Regulatory Monitoring Matrix.

Below is a table summarizing the legislation applicable to the CO2Bio project, which provides a clear overview of the laws and regulations that must be followed during the implementation and monitoring of the project:

**Table 10.** Legislation applicable to the CO2Bio project.

| AREA | STANDARD OR LAW | CHARACTERISTICS | COMPLIANCE |
|---|---|---|---|
| **APPLICABLE CLIMATE CHANGE LEGISLATION** | Decree 2811 of 1974 - Protection of the environment | Whereby the National Code of Renewable Natural Resources and Environmental Protection is enacted. | As part of the development and impact of the Co2Bio project, the Cataruben Foundation is committed to implement effective measures to preserve biodiversity, soil quality, water and other elements that make up local ecosystems, these measures will be designed and implemented carefully, taking into account the specific needs of each area and seeking to achieve a harmonious balance |

| | | | |
|---|---|---|---|
| | | | between environmental conservation and sustainable development, in order to comply with Decree 2811 that regulates the protection of the environment. |
| | Law 164 of 1994 - Climate Change | United Nations Framework Convention on Climate Change Whereby the commitment to adopt measures to reduce GHG emissions into the atmosphere is ratified. | Through this project, Cataruben is committed to implementing concrete and effective actions that contribute to the protection and conservation of forests, as well as to the reduction of greenhouse gas emissions associated with deforestation and forest degradation. The CO2Bio project focuses on achieving a significant reduction of 38,403 tons of CO2 equivalent. This goal reflects our firm commitment to climate change mitigation and the promotion of responsible environmental practices for the benefit of present and future generations. |
| | National Policy for the Integrated Management of Biodiversity and its Ecosystem Services of 1996. | To prevent and control the accelerated loss and transformation of biodiversity, as well as to reduce and mitigate the negative effects this generates on the quality of life. | Integrating monitoring and conservation of threatened species into projects such as CO2Bio is crucial to understanding and mitigating the impacts of climate change and deforestation on natural ecosystems. By identifying priority areas for conservation and implementing appropriate management measures, the protection of wildlife and ecosystems can be significantly improved. In addition, raising public awareness of the importance of biodiversity is |

| | | | |
|---|---|---|---|
| | | | essential to promote societal participation and support for nature conservation. It is encouraging to see how the national policy for the integrated management of biodiversity addresses these key aspects, recognizing the need for coordinated and multifaceted actions to protect our natural heritage and face contemporary environmental challenges, an initiative to which the Co2Bio project is aligned in the implementation of each of the activities. |
| | Forestry Policy- Conpes 2834 of 1996 | Its general objective is to achieve the sustainable use of forests in order to conserve them, consolidate the incorporation of the forestry sector into the national economy and contribute to improving the quality of life of the population. | The joint work between the project owner and the Ecosystem Manager reflects a shared commitment to the preservation of the environment and biodiversity, as well as a collaborative approach to the sustainable management of natural resources. These activities are fundamental to ensuring the health and resilience of forest ecosystems, as well as mitigating the impacts of climate change and promoting sustainable development in the region. With the implementation of the CO2Bio project, conservation activities are carried out in the forest areas identified in each of the private properties formally enrolled in the project, these areas cover a total of **8,868.34 hectares** and represent a joint effort between the parties. |

| | | | |
|---|---|---|---|
| | Law 629 of 2000 - Approval of the Kyoto Protocol in Colombia | Greenhouse gas quantification and reduction, climate change mitigation strategies | The Co2Bio project is aligned with Law 629 of 2000, which establishes provisions for climate change management in Colombia. The law promotes the adoption of measures to reduce GHG emissions and encourages the participation of public and private entities in mitigating the effects of climate change. The main objective of this project is to manage the reduction of emissions by 38,403 tons of carbon dioxide equivalent (tCO2e) as part of the efforts to mitigate climate change through the conservation of ecosystems that are part of the properties formally enrolled in the project. To achieve this reduction, activities are being carried out to reduce greenhouse gas (GHG) emissions in the region. |
| | 2002 National Plan for the Prevention, Control of Forest Fires and Restoration of Affected Areas | Strengthen the global response to the threat of climate change by keeping the global temperature increase this century well below 2 degrees Celsius above pre-industrial levels, and continue efforts to further limit the temperature increase to 1.5 degrees Celsius. In addition, the agreement aims to enhance the ability of countries to cope with the impacts of climate change and to ensure that funding | The purpose of implementing activities in the execution of the CO2Bio project is to strengthen the knowledge of private landowners in forest fire prevention, a crucial strategy for the conservation of forests and savannas. The implementation of practices such as controlled burns, the creation of firebreaks and proper waste management can have a significant impact on reducing fire risk and protecting natural ecosystems. Controlled burns, for example, can help reduce the accumulation of combustible material and promote the regeneration of |

| | | | |
|---|---|---|---|
| | | flows are consistent with a low level of greenhouse gas (GHG) emissions and a climate-resilient pathway. | certain fire-adapted plant species. Firebreaks act as physical barriers that can help stop or slow the spread of fire, protecting critical conservation areas. In addition to these technical measures, it is important to educate landowners about the importance of adopting sustainable land management practices that reduce the vulnerability of ecosystems to fire and promote their resilience to the impacts of climate change. |
| | 2016 National Climate Change Policy | Strategies and actions to manage knowledge about climate change and its potential consequences on communities, biodiversity, ecosystem services and the country's economy. | The implementation of landscape management tools in the Co2Bio project allows for more efficient management of natural resources, promoting the conservation and restoration of key habitats. Biodiversity monitoring is essential to understand the impact of climate change on species populations and to take appropriate measures for their protection. Finally, actions to restore degraded ecosystems not only help mitigate climate change by increasing carbon sequestration, but also strengthen the resilience of ecosystems to adverse climate impacts. The coherence between these actions and the national climate change policy demonstrates a strong commitment to mitigating the effects of climate change and protecting natural resources, thus contributing to a more sustainable and resilient future. |

| | | | |
|---|---|---|---|
| | Decree 298 of 2016 National System of Climate Change-SISCLIMA | Establish the National Climate Change System SISCLIMA, in order to coordinate, articulate, formulate, follow up and evaluate policies, regulations, strategies, plans, programs, projects, actions and measures for adaptation to climate change and mitigation of greenhouse gases, whose intersectoral and transversal nature implies the necessary participation and co-responsibility of national, departmental, municipal or district public entities, as well as private and non-profit entities. | The CO2Bio project focuses on forest conservation on private land in the departments of Casanare, Arauca and Vichada. The Co2Bio project not only contributes to environmental protection, but also generates positive impacts on local communities and the regional economy. The conservation of these natural ecosystems can generate tangible benefits, such as the protection of water sources, biodiversity conservation, and job creation in activities related to the sustainable management of natural resources. In addition, involving private landowners in the implementation of the project promotes local participation and cooperation, which strengthens community ties and fosters a sense of shared responsibility for environmental protection, thus generating regulatory alignment. |
| | Decree 298 of 2016 - National Climate Change System. | Whereby the organization and operation of the National Climate Change System is established and other provisions are issued. | The active and effective participation of civil society in the CO2Bio project is a fundamental aspect. The involvement of diverse actors, including civil society, increases the legitimacy and effectiveness of the measures adopted. It also promotes a sense of shared responsibility and empowers local communities to be part of the solution to climate change. The Co2Bio project is aligned with the National Climate Change System (Sisclima) and |

| | | | |
|---|---|---|---|
| | | | ensures compliance with the national climate change policy. This alignment is crucial to ensure that the actions implemented are in line with the strategies and goals established at the national level to effectively address climate change. |
| | Law 1844 of 2017- Paris Agreement | Adopts the Paris Agreement in Colombia for all countries that are party to it | The non-deforestation of **8,868.34 hectares** contractually enrolled in the CO2Bio project is a significant achievement that demonstrates a solid commitment to reducing emissions and conserving natural ecosystems. By protecting these vast territories from deforestation, the project directly contributes to climate change mitigation by preventing the release of large amounts of carbon stored in forest biomass. The positive impact on Sustainable Development Goals (SDGs) 6 (Clean Water and Sanitation) and 15 (Life of Terrestrial Ecosystems) is another highlight of the project's alignment with international commitments, including the Paris Agreement. The conservation of forests and savannas contributes to the protection of biodiversity, the preservation of ecosystem services and the assurance of a sustainable water supply, which are key aspects for sustainable development and resilience to climate change. |

| | | | |
|---|---|---|---|
| | Law 1447 of 2018- Monitoring, reporting and verification system for mitigation actions at the national level. | Regulate the System for Monitoring, Reporting and Verification of mitigation actions at the national level, in relation to the Accounting System for the Reduction and Removal of Greenhouse Gas Emissions and the National Registry for the Reduction of Greenhouse Gas Emissions (GHG), which includes the National Registry of Programs and Projects of actions for the Reduction of Emissions from Deforestation and Forest Degradation in Colombia (REDD+). | The Co2Bio project is an excellent example of collaboration between different stakeholders to mitigate the effects of greenhouse gas (GHG) emissions and contribute to climate change goals and commitments. The partnership between private landowners and Cataruben demonstrates a comprehensive and collaborative approach to address this global challenge. In this way the project aligns with Law 1447 and the guidelines established therein regarding REDD (Reducing Emissions from Deforestation and Forest Degradation) initiatives, as this demonstrates a commitment to international best practices and standards in forest conservation and climate change mitigation. |
| | Law 1931 of 2018 - Climate Change Guidelines | Establishes guidelines, mainly on climate change adaptation actions, as well as on greenhouse gas mitigation, in order to reduce the vulnerability of the country's population and ecosystems to the effects of climate change and promote the transition to a competitive, sustainable economy and low-carbon development. | The CO2Bio project is aligned with Law 1931 and promotes the active participation of private landowners in climate change management. This law clearly establishes the responsibility of all natural and legal persons to contribute to climate change management and develop actions to mitigate its impacts. By enrolling 42 private landowners who are committed to ensuring emissions reductions on their land, the Co2Bio project is meeting the requirements of the law and promoting meaningful participation in climate action at the local level. |

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| | CONPES 3918 of 2018-Strategy for the Implementation of the Sustainable Development Goals (SDGs) in Colombia. | Consolidate sustainable alternatives for production, conservation, recovery of goods and ecosystem services and improve the management of information on the status and pressures on the resource.<br>The purpose of this project is to develop actions aimed at the administration and sustainable management of the country's forests. | The CO2Bio project demonstrates a strong commitment to Colombia's environmental and sustainable development agenda, which is critical to ensure that project activities are aligned with national objectives and effectively contribute to the achievement of these goals. Furthermore, by integrating the SDGs into its approach and implementation, the CO2Bio project contributes directly to multiple sustainable development goals, such as climate action (SDG 13), life of terrestrial ecosystems (SDG 15), clean water and sanitation (SDG 6), among others. This amplifies the positive impact of the project, as it addresses not only environmental challenges, but also the social and economic aspects of sustainable development. |
| | Law 2169 of 2021 - Carbon Neutrality | This regulation establishes minimum goals and measures to achieve carbon neutrality, climate resilience and low carbon development in the country in the short, medium and long term, and establishes other provisions. | The fact that the CO2Bio project, implemented by Fundación Cataruben, is making a significant contribution to the fulfillment of the goal set out in Law 2169 throughout Colombia is a remarkable achievement. This law establishes an ambitious goal of 51% reduction of greenhouse gas emissions by 2030, addressing different sectors including fossil fuel consumption, coal mining, electric power, among others. By focusing on forest conservation, |

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| | | | the CO2Bio project plays an important role in mitigating greenhouse gas emissions, particularly by avoiding deforestation. This action contributes directly to the reduction of carbon emissions, which are one of the main causes of climate change. |
| | Resolution 849 of 2022 - Integral Territorial Climate Change Management Plans - PIGCCT | Establish the "Guide for the formulation and implementation of Integrated Territorial Climate Change Management Plans - PIGCCT". | The CO2Bio project effectively addresses this area by developing an environmental, social and economic risk matrix to measure and mitigate the impacts of the project on the territory. In addition, the generation of a baseline scenario based on the temporal and spatial history of the CO2Bio project provides an important reference for assessing the project's progress and impacts over time. In summary, Resolution 849 and the actions of the CO2Bio project are aligned in their approach to climate change management and mitigation of its impacts, which contributes significantly to environmental resilience and sustainability at the local and national levels. |

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| **PROGRAMS** | Law 1955 OF 2019- National Development Plan 2018-2022 "Pact for Colombia, Pact for Equity". | Its objective is to lay the foundations of legality, entrepreneurship and equity that will allow achieving equal opportunities for all Colombians, in accordance with a long-term project with which Colombia will achieve the Sustainable Development Goals by 2030. | Consideration of updates to the municipal Development Plans and the CAR Action Plan is essential to ensure the consistency and legality of project activities at the local and regional level. By keeping up to date with current policies and regulations, the project can avoid potential conflicts with environmental and municipal authorities, which in turn strengthens its legitimacy and acceptance by the community and stakeholders. This adaptability and commitment to environmental management are not only key to the long-term success of the Co2Bio project, but also contribute to conservation and sustainability in the region. By working in harmony with local policies and regulations, the project can maximize its positive impact on the environment and the community, thus ensuring a lasting legacy of environmental protection and sustainable development. |

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| | 2019 Territory of Life Forest Policy | Integral Strategy for the Control of Deforestation and Forest Management, as a cross-sectoral policy instrument that involves the co-responsibility of the different sectors of the Colombian State, with the purpose of halting deforestation and forest degradation, addressing the complexity of the causes that generate it, based on the recognition of the strategic significance of these ecosystems for the country, due to their socio-cultural, economic and environmental importance, their potential as a development option in the framework of the peace building process, and their contribution to the mitigation and adaptation to climate change. | The conservation of existing ecosystems on each property is a shared objective that contributes not only to the protection of biodiversity and ecosystem services, but also to the capture and storage of carbon, thus helping in the mitigation of GHGs. As the CO2Bio project aligns with the Bosques Territorios de Vida strategy, it reflects a comprehensive and collaborative approach to addressing environmental and climate challenges in the region. By working together with local communities and promoting sustainable forest management practices, the project contributes significantly to forest conservation and mitigating the impacts of climate change. |

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| | Update of Colombia's Nationally Determined Contribution (NDC) - 2020 | The NDC incorporates three components: i) Greenhouse Gas (GHG) mitigation, ii) climate change adaptation, and iii) means of implementation as an instrumental component of policies and actions for low carbon, climate resilient and adapted development. | The Nationally Determined Contribution (NDC) is a fundamental document in the fight against climate change, in which countries establish their commitments and strategies to reduce greenhouse gas (GHG) emissions and address other aspects related to climate change. The CO2Bio project, aligned with the objectives of the NDC, has as its main function to reduce GHG emissions and promote carbon sequestration, this is achieved through a variety of activities and strategies that are implemented in the private properties that were enrolled, with the commitment to strengthen their knowledge and conserve the forest areas identified in their properties. |
| **Indigenous communities** | ILO Convention 169 Concerning Indigenous and Tribal Peoples | Convention No. 169 has two basic tenets: the right of indigenous peoples to maintain and strengthen their distinct cultures, ways of life and institutions, and their right to participate effectively in decisions that affect them. The Convention also guarantees the right of indigenous and tribal peoples to decide their own priorities for the process of development as it affects their lives, beliefs, institutions and spiritual well-being and | It is important to note that ILO Convention 169 establishes that States must consult and cooperate in good faith with indigenous peoples in developing and implementing legislative and administrative measures that concern them. In addition, States must take special measures to protect the rights of indigenous peoples and guarantee their effective participation at all levels of decision-making. The CO2Bio project requires consultation with the National Land Agency to validate and verify that the land enrolled in the CO2Bio project does not affect the rights of |

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| | | the lands they occupy or otherwise use, and to control, to the extent possible, their own economic, social and cultural development. | communities with special protection. |
| | United Nations Declaration on the Rights of Indigenous Peoples | The United Nations Declaration on the Rights of Indigenous Peoples is a document that recognizes and protects the rights of indigenous peoples worldwide. It establishes the individual and collective rights of indigenous peoples, as well as the fundamental principles for their protection and promotion. | The CO2Bio project develops activities on private lands that are not part of the special indigenous jurisdiction. Respect for the rights of indigenous peoples is not only a legal and ethical obligation, but also a necessity to ensure the sustainability and legitimacy of any project affecting these communities. By following the principles of the United Nations Declaration on the Rights of Indigenous Peoples, the CO2Bio project can promote a more just, equitable and respectful collaboration with all parties involved directly or indirectly. |

**Source:** Cataruben Foundation, 2024.

## 6. Adaptation to climate change

Table 11 describes compliance and annexes the verification supports of how the project activities lead to climate change adaptation actions.

**Table 11.** Adaptation to climate change.

| Criteria | Compliance | Project activity in which the adaptation action is derived. | Activity progress in the monitoring period 2021 - 2023 |
|---|---|---|---|
| Improve the conservation | The project promotes and provides | **I2:** Promote sustainable forest management through | **I2:** 66% Support link: |

| Criteria | Compliance | Project activity in which the adaptation action is derived. | Activity progress in the monitoring period 2021 - 2023 |
|---|---|---|---|
| conditions of biodiversity and its ecosystem services in the areas of influence, outside the project boundaries (e.g. natural coverage in areas of special environmental interest, biological corridors, water management in watersheds, among others). | improvement actions for the conservation and safeguarding of biodiversity and its ecosystem services. In addition, it identifies and monitors HCVs within the geographical boundaries of the project, and manages the improvement of water resources within the properties. | the implementation of sustainable productive practices and conservation actions on the properties, in line with the Environmental Management Plan and the Predial Implementation Plan. | ID-I2 |
| | | **G1:** Continuous monitoring of changes in forest area as a proportion of total area in project areas. | **G1:** 6,07% Support link: ID-G1 |
| | | **G2:** Monitor environmental threats (fire) in the project area and/or possible management alerts. | **G2:** 8,57% Support link: ID-G2 |
| | | **B1:** Conduct monitoring of biodiversity variables or indicators in coverages with the use of remote sensing for the project area and its surroundings. | **B1:** 25% Support link: ID-B1 |
| | | **A1:** Develop a Plan for the Efficient Use and Saving of Water in Households (PUEAA) enrolled in the initiative. | **A1:** 15% Support link: ID-A1 |
| Implements activities that contribute to sustainable low-carbon productive landscapes. | Complies. The project promotes the implementation of sustainable production systems and practices. The project strengthens the capacities of the project participants, | **I1:** Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision-making in favor of | **I1:** 4,651 Persons trained Support link: ID-I1 |

| Criteria | Compliance | Project activity in which the adaptation action is derived. | Activity progress in the monitoring period 2021 - 2023 |
|---|---|---|---|
| | with the purpose of empowering the communities in the development of responsible actions for the care and preservation of natural resources. | the project's objectives. | |
| | | **I2:** Promote sustainable forest management through the implementation of sustainable productive practices and conservation actions on the properties, in line with the Environmental Management Plan and the Predial Implementation Plan. | **I2:** 66% Support link: ID-I2 |
| | | **S1:** Strengthening forest governance to promote the conservation and sustainable use of forests. | **S1:** 25% Support link: ID-S1 |
| | | **B1:** Conduct monitoring of biodiversity variables or indicators in coverages with the use of remote sensing for the project area and its surroundings. | **B1:** 25% Support link: ID-B1 |
| Design and implement adaptation strategies based on an ecosystem approach. | Complies. The project is based on the conservation and sustainable management of natural ecosystems, within nature-based solutions. Therefore, it is important to develop actions to strengthen the capacities of local communities to achieve compliance with conservation strategies for strategic ecosystems. | **I1:** Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision-making in favor of the project's objectives. | **I1:** 4,651 people trained Support link: ID-I1 |
| | | **I2:** Promote sustainable forest management through the implementation of sustainable productive practices and conservation | **I2:** 66% Support link: ID-I2 |

| Criteria | Compliance | Project activity in which the adaptation action is derived. | Activity progress in the monitoring period 2021 - 2023 |
|---|---|---|---|
| | | actions on the properties, in line with the Environmental Management Plan and the Predial Implementation Plan. | |
| | | **A1:** Develop a Plan for the Efficient Use and Saving of Water in Households (PUEAA) enrolled in the initiative. | **I2:** 15% Support link: ID-A1a Support link: ID-A1b |
| Strengthens the local capacities of institutions and/or communities to make informed decisions to anticipate negative effects derived from climate change (recognition of vulnerability conditions). | Complies. The project includes the development of training for the transfer of knowledge with the local community, with the purpose of providing the necessary tools to make informed decisions on the management of the properties. These trainings are oriented towards climate change and conservation actions for strategic ecosystems. In addition, a governance strategy was implemented to coordinate the project's stakeholders. | **I1:** Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision-making in favor of the project's objectives. | **I1:** 4,651 people trained Support link: ID-I1 |
| | | **S1:** Strengthening forest governance to promote the conservation and sustainable use of forests. | **S1:** 25% Support link: ID-S1 |

**Source:** Cataruben Foundation, 2024.

## 7. Carbon ownership and rights

The right to property establishes the ownership of a person over duly registered real estate. In Colombia, the regulations related to property are established in the Civil

Code, which provides the legal basis for accrediting ownership of a property, whether as owner, possessor or holder, this being a fundamental part of the analysis of carbon ownership, since although there is no specific regulation governing it in greenhouse gas (GHG) mitigation projects, the hierarchy of norms established in the Colombian legal system applies. In this sense, the provisions of the Civil Code and other laws related to ownership are of utmost importance.

In the specific case of the Co2Bio project, there are 42 enrolled properties, which have undergone an exhaustive analysis of the ownership according to the documents provided by each owner and the updating of the same to validate that there has been no modification or transfer of such ownership. This information is included in a document of Cataruben's quality system called "Title Study", which provides a solid basis for the results of the analysis carried out and the carbon ownership rights in the project.

In accordance with the provisions established in the contract clauses, the possibility is contemplated for landowners formally linked to the project to request voluntary withdrawal. When such a request is made, it is processed by generating impact reports on the project, followed by the contractual formalization of the withdrawal. In this context, the La Mapora property adopted this process and was withdrawn from the project. On the other hand, the Buenavista property, although initially linked, was excluded after an internal verification process determined that it did not have eligible forest areas. Therefore, both properties were disengaged from the project and are excluded from the current verification process, as they do not contribute to the project's activities or to the generation of benefits related to the reduction of GHG emissions.

## 8. Environmental aspects

Given the nature of the conservation activities, sustainable production and delivery of economic benefits, the project is expected to generate positive net environmental and socioeconomic impacts.

In this regard and in compliance with the criteria established in paragraph 14 of BCR Standard Version 3.3, as well as in the Sustainable Development Safeguards Tool (SDSs Tool) Version 1.0 of April 10, 2024, the project owner has conducted the environmental assessment for the project, in which it analyzed the impacts that the implementation of the project could cause in the area of influence of the project (See Annexes / 4. Environmental and Socioeconomic Aspects).

The environmental assessment matrix has determined that the project activities do not represent any negative impact in the area of influence of the project, and all activities are oriented towards environmental protection and greenhouse gas (GHG) reduction, which indicates that the project is considered favorable from an environmental perspective.

## 9. Socioeconomic aspects

As in the analysis of environmental impacts, socioeconomic impacts can be considered as those resulting after the execution of an activity, product or service, which may have repercussions on the conditions of the components, leaving as a consequence specific alterations or modifications on the aspects in which the different activities to be evaluated were carried out.

For the implementation of the project, the economic impact assessment was conducted taking into account the project activities, safeguards, SDGs and co-benefits proposed for the project, and the impact that these could cause within the social elements of study such as: gender equity, education and training, communication with stakeholders and forest governance in the territories; and the economic elements of study such as: access to goods and financial services, economic benefits of the project, formalization of environmental services as an economic activity and implementation of sustainable production practices. The above, taking into account that although the impacts can be positive or negative, in the case of the valuation of this project it is evident that the impacts are positive.

After conducting the evaluation (See Annexes / 4. Environmental and Socioeconomic Aspects), it can be determined that the project activities do not represent negative impacts within the area of influence of the project, because all activities are aimed at generating social and economic benefits with respect to climate change mitigation actions, in order to reduce and remove greenhouse gasses (GHG) within the areas established and enrolled in the project. Therefore, it is concluded that since there are no negative effects there is no need to generate socioeconomic management plans to prevent, mitigate and eliminate these impacts.

## 10. Stakeholder consultation

To ensure continuous and effective communication with local stakeholders around the CO2Bio project, we have implemented a comprehensive mechanism that includes regular meetings, newsletters, events and workshops, as well as the use of digital

platforms, participation in different conservation bodies and the implementation of a governance strategy. These activities have allowed us to maintain a constant and open dialogue with ecosystem managers, local community representatives, NGOs and government entities, ensuring their active participation in project initiatives. Through this collaborative approach, we have strengthened strategic alliances, promoted environmental education and facilitated continuous feedback, contributing to the success of our conservation and climate change mitigation goals.

Within the framework of the CO2Bio initiative, we have developed a number of key activities that demonstrate our ongoing commitment to conservation, climate change and sustainable management of natural resources. Below are some of the main initiatives and collaborations we have carried out in recent years:

Since 2020, Cataruben Foundation has annually organized the Biodiversity, Carbon and Water Forum in commemoration of Earth Day. This event has become a key space to socialize the progress of our initiatives, present new proposals and be accountable to the community. The forum brings together experts in the areas of biodiversity, climate change and water resources, who share knowledge and experiences, thus strengthening our network of collaboration and continuous learning. See Safeguard B: Biodiversity+Carbon and Water Forum.

We also actively participate in the Municipal System of Protected Areas of the Orinoquia (SIRAPO). During 2023, we were active members of the steering committee, contributing significantly to the planning and management of protected areas in the region. Our participation in SIRAPO has allowed us to coordinate efforts with other local entities, promoting the conservation and sustainable use of natural resources.

During the years 2022 and 2023, we are part of the board of directors of the Colombian Association of Carbon Actors - ASOCARBONO. In this role, we have strategically engaged with various entities to promote and strengthen the carbon market in Colombia. This collaboration has been crucial to advance the implementation of policies and projects that support the reduction of emissions and mitigation of climate change in the country.

Through our communication strategy, we have given visibility to CO2Bio and kept ecosystem managers informed. We use various digital platforms and communication tools to share updates, achievements and opportunities for engagement, ensuring a constant flow of information among all stakeholders. See Safeguard B.

Finally, we have implemented a governance strategy that includes the formation of the *Governance Board* with the participation of ecosystem managers (carbon owners), LATAM Airlines as a strategic ally, and the Cataruben Foundation as the owner of the CO2Bio initiative. The steering committee of this roundtable aims to guide, articulate and promote the efforts of the participants of the initiative towards the implementation of climate change mitigation activities, capacity building, access to information, forest governance and the increase of social and environmental benefits. See ID S.1. Forest governance strategy.

## 11. REDD+ safeguards

Based on version 3.3 of the BCR Standard entitled "From differentiated responsibility to common responsibility", REDD+ safeguards are detailed, covering crucial aspects such as compliance with current legal regulations, promotion of transparency and access to information, respect for the knowledge of local communities and stakeholders, full and effective participation, as well as the conservation of forests, water sources and native biodiversity. In addition, emphasis is placed on the timely prevention of reversion risks to ensure the permanence of conservation and restoration practices, avoiding predatory dynamics and minimizing the leakage of greenhouse gas emissions.

The tool "Social and Environmental Safeguards for REDD+ in Colombia" highlights fifteen operational elements specifically adapted to the national context. These elements are aligned with the seven Cancun safeguards and are grouped into practical categories: Institutional, Social and Cultural, and Environmental and Territorial (Camacho A, Lara I & Guerrero, 2017). This underscores the importance of deeply understanding the territory and its people, ensuring that activities are adjusted to their particularities for a successful implementation and without significant collateral damage.

To demonstrate compliance with these safeguards during the 2021-2023 period, the REDD+ Safeguards Monitoring Plan was adjusted (See: Annexes Folder / 2. REDD+ Safeguards Compliance / REDD+ Safeguards Monitoring Plan). This plan is periodically updated following the guidelines of the BioCarbon Registry's "Tool for Demonstrating Compliance with REDD+ Safeguards", version 1.1, and its National Interpretation, focusing on the 15 elements mentioned above. In addition, the document "Sustainable Development Safeguards (SDSs) Tool" version 1.0 is considered, which enrolled the safeguards with the Sustainable Development Goals (SDGs) and projects possible negative effects of REDD+ activities, thus ensuring that these activities

minimize or do not cause adverse environmental, social or economic impacts in the long term.

Below is a detailed report describing how each of the REDD+ safeguards are addressed, guided by the documents mentioned above:

## 11.1 Safeguard A

"The complementarity or compatibility of the measures with the objectives of national forestry programs and international conventions and agreements on the subject."

### *11.1.1 Correspondence with national legislation*

The legal analysis to assess the project's compliance with national legislation has now been established in a legal compatibility matrix (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.1.) This document describes and lists all conservation activities designed for CO2Bio, verifying their alignment with international agreements signed by the national government, as well as with the Political Constitution, laws, decrees, policies and major programs on forest conservation, biodiversity, water resources and climate change mitigation.

Currently, the CO2Bio project is fully compliant with all applicable regulations. During the implementation of the project, the legal matrix will be updated periodically as the relevant regulations evolve.

**Table 12.** Safeguard A approach according to project activities.

| SAFEGUARD A<br>THEMATIC NATIONAL INTERPRETATION: INSTITUTIONAL | | | | | |
|---|---|---|---|---|---|
| **Item** | **Requirement "BCR tool to demonstrate compliance with REDD+ safeguards".** | **National Interpretation Element** | **ID** | **Project Activity** | **Compliance** |
| **1.1** | On compatibility: Demonstrate that the project activities are in accordance with | A1 Correspondence with national legislation. | I1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, | Compliance with this national element of the REDD+ safeguards is visualized in the 2.1.1 Legal Compatibility |

| SAFEGUARD A<br>THEMATIC NATIONAL INTERPRETATION: INSTITUTIONAL | | | | | |
|---|---|---|---|---|---|
| | these policies and are not contrary to them. | | | social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | Matrix. This matrix lists all of the project's conservation activities and shows their alignment with the United Nations Framework Convention on Climate Change, the Kyoto Protocol, the Paris Agreement, the National Code on Renewable Natural Resources and Environmental Protection, the Forestry Policy, the National Policy for the Integrated Management of Biodiversity and its Ecosystem Services, the National Climate Change Policy, and the National Plan for the Prevention and Control of Forest Fires and Restoration of Affected Areas, among other relevant norms. |
| | | | I2 | Promote sustainable forest management through the implementation of sustainable production practices and conservation actions on the properties, in line with the Environmental Management Plan and the Land Implementation Plan. | |
| | | | S1 | Strengthening forest governance to promote the conservation and sustainable use of forests. | |
| | | | G1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | |
| | | | G1 | Identify and map areas of regeneration gain or loss. | |
| | | | G2 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | |
| | | | B1 | Monitor biodiversity variables or indicators in land cover with the use of remote sensing for the area, project and its surroundings. | |
| | | | A1 | Develop a plan for efficient use and saving of water in households (PUEAA) enrolled in the initiative. | |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress made in complying with Safeguard A and its indicators in relation to the overall goal.

**Table 13.** Percentage of compliance with Safeguard A over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|
| **Safeguard A** | 1.1 | Legal compatibility reports | 100% | 100% |

**Source**. Cataruben Foundation, 2024

## 11.2 Safeguard B

*"The transparency and effectiveness of national forest governance structures, taking into account national legislation and sovereignty. Provide transparent and consistent information that is accessible to all stakeholders and regularly updated. Be transparent and flexible to allow for improvements over time. Build on existing systems, if any."*

### *11.2.1 B2 Transparency and access to information*

To ensure transparency and access to information, continuous use has been made of the means of communication established for the project. Cataruben has integrated the Regional Beneficiary Service Center (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels / 2.2.1.1. This center is led by the Attention area, composed of a group of multidisciplinary professionals called "Gestores Prediales", who provide personalized face-to-face attention and remote communication through phone calls, text messages, WhatsApp (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels / 2.2.1.4. Social Networks / 2.2.1.4.4. WhatsApp Correspondence) and E-mail (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2.)

Since the beginning of the project, the System of Petitions, Complaints, Claims and Suggestions has been active (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2. PQRS Management Procedure), designed to address requests, complaints, claims or suggestions from the community and those enrolled in the project. During the 2021-2023 period, the following PQRS were received and addressed: in 2021, 2 petitions and 2 complaints; in 2022, 1 claim and 3 petitions; and in 2023, 5 petitions and 1 complaint. All of these PQRS were addressed in a timely manner and are currently closed (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.2 PQRS System).

Various media have been used for mass dissemination of information, showing progress, announcing meetings and highlighting relevant aspects of the project. These media include post publications (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.3. Digital Documents / 2.2.3.1. Compliance REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels / 2.2.1.4. Social Networks / 2.2.1.4.2. Dissemination of Information on Instagram / 2.Disclosure of Information on Facebook), as well as informative videos (See: Folder Annexes / 2. Compliance REDD+ Safeguards / 2.2. Safeguard B / 2.2.3. Digital Documents / 2.2.3.2. Videos) that were published on the YouTube page (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels / 2.2.1.4.) Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels / 2.2.1.3. Web Page - Cataruben Foundation), a specific section has been consolidated to consult CO2Bio project progress data (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2.) Cataruben has developed the CQTX application (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels / 2.2.1.3. Platforms / 2.2.1.3.3. CQTX Platform), where ecosystem managers can access economic information related to the enrolled properties, such as the inventory of greenhouse gas (GHG) reductions and the economic benefits distributed and to be distributed.

Additionally, meetings of vital importance for access to information, transparency and interaction have been held, such as the II Biodiversity and Carbon Forum held in 2021 virtually, the III Biodiversity + Carbon and Water Forum held in 2022 in the city of Yopal and the IV Biodiversity + Carbon and Water Forum held in 2023 in the city of Barranquilla. These spaces were important for the transfer and exchange of knowledge, strengthening transparency, access to information and participation (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.4. Activities with Organizations).

Currently, the formulation phase of the CO2Bio project is registered in the National Registry of Greenhouse Gas Emission Reductions - RENARE (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. We are in the process of moving the project registration from the formulation phase to the implementation phase.

In summary, these are the advances made by the CO2Bio project in terms of ensuring the transparency and effectiveness of forest governance structures, providing consistent and up-to-date information available to all stakeholders.

#### *11.2.2 B3 Accountability*

Transparency and accountability in information management are essential at all stages of the project. In order to guarantee these principles, Cataruben has developed specific documents for each ecosystem manager. These documents detail the economic benefits obtained, among which two key reports stand out: The Carbon Certificates Emissions Report (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. Carbon Certificates Emissions Report), which informs the ecosystem manager about the initial stock of carbon certificates that were issued in its property during a verification, and the Account Statements (See: Folder Annexes / 2. Statements of Account), which presents the statement of account of the economic benefits acquired from the commercialization of carbon certificates in their properties, as well as the verified carbon certificate movements and inventories.

To keep the ecosystem managers informed about the progress, activities, results and challenges of the CO2Bio project, Newsletters are issued (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2. Management Reports / 2.2.6.1.) These reports are distributed through various communication channels.

In addition, the Governance Strategy (See: Annexes Folder / 1. Project Activities / ID S.1) has been designed specifically for the CO2Bio project. This strategy establishes a meeting framework that promotes transparency and facilitates the active and equitable participation of all stakeholders in decision making. This approach contributes to strengthening coherent and sound governance in the enrolled properties, aligned with the fundamental ethical principles of environmental, social and economic care.

#### *11.2.3 B4 Recognition of forest governance structures*

A socio-environmental characterization was carried out with the objective of analyzing the economic, social and environmental aspects of the ecosystem managers through

the Socio-environmental and Productive characterizations (See: Annexes Folder / 1. Project Activities / ID I.2 / Socio-environmental and Productive Characterizations). These studies were essential to understand the region and the territory, thus facilitating the successful development of conservation activities and providing information on the relationship of the local population with their environment.

Forest governance lies in the capacity of local people to make decisions on the management and use of their natural capital. In this sense, strengthening these local governance structures is crucial. To this end, the Governance Strategy has been designed (See: Annexes Folder / 1. Project Activities / ID S.1.), which will be implemented through the formalization of a governance table. This space will provide the necessary tools and conditions so that those involved in the project can make decisions in a conscious and informed manner.

#### *11.2.4 B5 Capacity building*

In the context of the project activities, different knowledge exchanges and training sessions have been carried out on the technical environmental component, biodiversity and gender equity, (See: Annexes Folder / 1. Project Activities / ID I.1) focused on capacity building, specifically in the governance of the properties. These sessions are designed to facilitate an active and bi-directional participation, integrating local and traditional knowledge about the link with the territory, complemented by the experience of Cataruben's interdisciplinary technical team in environmental, social and economic aspects.

The topics covered range from alternative strategies for the management of ecosystem services to sustainable and innovative production models, as well as a review of the gender roles that have historically limited the role of women compared to men.

The purpose of this integrated approach is to enrich the capabilities of the participants, facilitating more informed and effective decision making to meet the project objectives in a comprehensive and sustainable manner.

**Table 14.** Safeguard B approach according to project activities.

| SAFEGUARD B<br>THEMATIC NATIONAL INTERPRETATION: INSTITUTIONAL | | | | | |
|---|---|---|---|---|---|
| **Item** | **Requirement "BCR tool to demonstrate compliance with REDD+ safeguards".** | **National Interpretation Element** | **ID** | **Project Activity** | **Compliance** |
| **2.1** | Implement appropriate communication channels to deliver and share project information. | B2 Transfer and access to information | I1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | During this verification period, access to information was ensured through multiple channels such as 2.2.1.1.1. CARBO and varied digital platforms, including phone calls, text messages, 2.2.1.4.4. WhatsApp and 2.2.1.2.1. email. The 2.2.2.2.1. PQRS system was efficiently managed. In addition, various social networks were used to disseminate relevant information such as 2.2.1.4.2. Instagram, 2.2.1.4.1. Facebook, and 2.2.1.4.3. YouTube, through publications 2.2.3.1. Post and 2.2.3.2. Videos among other formats. The 2.2.1.3.1 Web page was also kept active, and the mobile application 2.2.1.3.4. |
| **2.2** | PQRS system for addressing and attending to comments, questions, suggestions or complaints. | B2 Transfer and access to information | I2 | Promote sustainable forest management through the implementation of sustainable productive practices and conservation actions on the properties, in line | The PQRS system, designed to manage petitions, complaints, claims and suggestions within the project, operated efficiently. In 2021, 2 petitions and 2 complaints were received and addressed; in 2022, 1 petition, 1 complaint and 2 petitions; and in 2023, 5 |

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| | | | | with the Environmental Management Plan and the Property Implementation Plan. | petitions and 1 complaint. All PQRS were addressed in a timely manner and are currently closed. |
| **2.3** | Digital documents produced and disseminated within the framework of the project, such as brochures, posters, illustrative documents, guides, among others. | B2 Transfer and access to information | I1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | A series of 2.2.3.1. Post and 2.2.3.2. Videos were produced which were of vital importance to raise awareness of the importance of forest and biodiversity conservation. In addition, this material is used to show the ecosystem managers visual data on the development of the project. |
| **2.4** | Activities or documents carried out with organizations, associations, community action boards or interest groups. | B2 Transfer and access to information | I1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | In 2021, the 2nd Biodiversity and Carbon Forum was held virtually. III Biodiversity + Carbon and Water Forum was held in Yopal in 2022, while in 2023 the 2.2.4.3. IV Biodiversity + Carbon and Water Forum was held in Barranquilla.<br><br>These events were attended by leading organizations such as USAID, Latam Airlines, LUKER Chocolate, USDA, Partners of the Americas, Unubac and Ecopetrol, among other environmental entities and corporations. These meetings and the resulting documents contributed to the strengthening of |

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| | | | | | collaborative and coordinated community participation in the protection of natural ecosystems. |
| **2.5** | Project registration on the RENARE platform | B2 Transfer and access to information | I2 | Promote sustainable forest management through the implementation of sustainable productive practices and conservation actions on the properties, in line with the Environmental Management Plan and the Property Implementation Plan. | Currently, the formulation phase of the CO2Bio project is registered in 2.2.5.1. RENARE, and progress is being made to transfer the project from the formulation phase to the implementation phase. |
| **2.6** | Project management reports | B3 Accountability | S1 | Strengthening forest governance to promote the conservation and sustainable use of forests | 2.2.6.2. Carbon Certificate Emissions Reporting, and 2.2.6.3. Statements of Account, to keep ecosystem managers informed about the economic benefits derived from ecosystem conservation. In addition, 2.2.6.1. Newsletters have also been created to communicate the progress of the project. |
| **2.7** | Forest governance strategy | B4. Recognition of Governance Structures | S1 | Strengthening forest governance to promote conservation and sustainable use of forests | Forest Governance Strategy has been designed as a mechanism to recognize governance structures through the active participation of stakeholders, promoting informed decision making and facilitating dialogue |

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| | | | | | and collaboration between local people, governmental and private entities and conservation experts. |
| **2.8** | Socializations, workshops, knowledge exchange, capacity building and other scenarios that contribute to building a participatory dynamic. | B5 Capacity building | I1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | Capacity-building activities were carried out, focusing on natural regeneration, silvicultural techniques, meliponiculture, biodiversity, climate change, non-timber forest products and alternative water solutions. The importance of conserving biodiversity was highlighted and effective actions were implemented to halt its loss. In addition, participatory eco-acoustic monitoring was carried out in areas of high biological diversity. In the social area, leadership was addressed and women's work was valued. |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress in compliance with Safeguard B and its indicators in relation to the overall goal.

Percentage of compliance with Safeguard B over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|
| **Safeguard B** | 2.1 | Implementation of suitable communication channels to deliver and share project information. | 6% | 20% |
| | 2.2 | PQRS system for addressing and attending to comments, questions, suggestions or complaints. | 100% | |

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| | 2.3 | Digital documents produced and disseminated within the framework of the project, such as brochures, posters, illustrative documents, guides, among others. | 6% | |
| | 2.4 | Activities or documents carried out with organizations, associations, community action boards or interest groups. | 17% | |
| | 2.5 | Project registration in the RENARE platform. | 6% | |
| | 2.6 | Project management reports. | 6% | |
| | 2.7 | Forest governance strategy | 12% | |
| | 2.8 | Socializations, workshops, knowledge exchange, capacity building and other scenarios that contribute to building a participatory dynamic. | 12% | |

**Source**. Cataruben Foundation, 2024

## 11.3 Safeguard C

*"Respect for the knowledge and rights of indigenous peoples and members of local communities, taking into consideration relevant international obligations and national circumstances and legislation, and bearing in mind the United Nations General Assembly on the rights of indigenous peoples."*

### *11.3.1 C6 Free Prior and Informed Consent (FPIC)*

The consolidation of the Pre-farm Implementation Plans (See: Annexes Folder / 1. Project Activities / ID I.2 / Pre-farm Implementation Plans) represented a crucial step where the ecosystem managers formally expressed their consent to participate in the conservation of natural ecosystems. These plans not only expressed conservation intent, but also detailed how conservation activities would be carried out on their properties throughout the duration of the project.

In addition, training spaces, knowledge exchange and forums (See: Annexes Folder / 1. Project Activities / ID I.1) played a fundamental role in obtaining this consent. These spaces allowed the ecosystem managers to acquire the necessary knowledge, share

experiences and actively participate in the planning and execution of conservation measures. Thus, the commitment and collaboration between all parties involved in the environmental conservation project is strengthened.

### *11.3.2 C7 Respect for traditional knowledge*

In compliance with this requirement, the National Land Agency (ANT) has requested detailed information on the ethnic communities that are legalized or in the process of legalization in the departments of Arauca, Casanare and Vichada. Based on this information, a precise (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.3. Safeguard C / 2.3.1. Mapping Analysis on Communities / 2.3.1.2. This inventory includes maps (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.3. Safeguard C / 2.3.1. Mapping Analysis on Communities / 2.3.1.1.

Cataruben also strictly conforms to the provisions of national regulations concerning private property, in order to avoid any negative impact on the social fabric, traditional knowledge and local forms of interaction with the territory.

Additionally, in order to avoid overlapping with collective territories, the Request for Proceedings and Timeliness of Prior Consultation has been carried out. In 2021, the Directorate of the National Authority for Prior Consultation issued the Resolution (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.3. During the period from 2021 to 2023, there were no territorial expansions of the project or significant developments in the communities legally established or in the process of being established.

### *11.3.3 C8 Benefit sharing*

The commercialization of the certificates issued and released in the two verifications of the project has generated economic benefits that have been distributed equitably among the enrolled properties. This distribution respects the ABC inventory management principle, which in carbon projects indicates that the amount of inventory generated by the properties is prioritized from smallest to largest. In other words, economic benefits are first sold and distributed to those properties with the least amount of certificates generated. This ensures that the value that the ecosystem manager receives is not divided into many payment cuts, allowing the value received to be significant and maximizing administrative efficiency in this process.

Compliance with REDD+ Safeguards / 2.3. Safeguard C / 2.3.2. Benefit Sharing

Report), which details the results obtained in terms of certificate issuance, the economic benefits generated by the commercialization of these CCVs and the economic benefits delivered by each of the enrolled properties.

#### *11.3.4 C9 Land rights*

During this verification period, and as always, collective land rights have been respected, as reflected in the Resolution (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.3. Safeguard C / 2.3.3.3. Resolution Proceeding with Prior Consultation), which determines that prior consultation is not appropriate for ethnic communities in the implementation of the project. Regarding individual ownership, the ecosystem managers enrolled in the project maintain land tenure according to the review of the updated legal documents Resolution (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.3. This process is carried out in order to avoid affecting the land rights of communities and ensure an equitable distribution of economic benefits among carbon owners.

**Table 16.** Safeguard C approach according to project activities.

| SAFEGUARD C<br>THEMATIC NATIONAL INTERPRETATION: SOCIAL AND CULTURAL | | | | | |
|---|---|---|---|---|---|
| **Item** | **Requirement "BCR tool to demonstrate compliance with REDD+ safeguards".** | **National Interpretation Element** | **ID** | **Project Activity** | **Compliance** |
| **3.1** | Working groups held with the communities | C6 Free, prior and informed consent | S1 | Strengthening forest governance to promote the conservation and sustainable use of forests | ID 1.2. Pre-implementation plans which reflect the willingness of ecosystem managers to carry out conservation activities. In addition, various spaces for participation are highlighted, such as ID I.1. Trainings, and 2.2.4. |

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|---|---|---|---|---|---|
| **3.2** | Analysis of developed community mappings. | C7. Respect for traditional knowledge | C1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | 2.3.1.2. Inventory specifying the ethnic communities legalized or in process, complemented by a 2.3.1.1. map showing the location of these territories. In addition, the Request for the Proceeding and Opportunity of Prior Consultation was carried out, according to Resolution No. ST-1477 of October 29, where it was determined that the consultation does not proceed. |
| **3.3** | To supervise and guarantee the adequate distribution of economic benefits. | C8. Profit sharing | S1 | Strengthening forest governance to promote the conservation and sustainable use of forests | 2.3.2 Economic Benefit Sharing Report is presented, taking into account the benefits generated and delivered in the first two verifications of the project. |
| **3.4** | Legal analysis of land tenure | C9. Territorial rights | S1 | Strengthening forest governance to promote the conservation and sustainable use of forests | 2.3.4. Updated legal documents were analyzed, which demonstrate that the ecosystem managers maintain ownership of the carbon. |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress made in complying with Safeguard C and its indicators in relation to the overall goal.

**Table 17.** Percentage of compliance with Safeguard C over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **Safeguard C** | 3.1 | Working groups held with the communities | 12% | 31% |
| | 3.2 | Analysis of developed community mappings | 100% | |
| | 3.3 | To supervise and guarantee the adequate distribution of economic benefits. | 6% | |
| | 3.4 | Legal analysis of land tenure | 6% | |

**Source**. Cataruben Foundation, 2024

## 11.4 Safeguard D

*"The full and effective participation of stakeholders, in particular indigenous peoples and local communities."*

### *11.4.1 D10 Participation*

Various mechanisms have been established to ensure participation for stakeholders. These include communication channels such as the CARBO Regional Beneficiary Service Center, social networks such as WhatsApp, Instagram, Facebook, and YouTube, as well as email, the Website, the CQTX application and the Petitions, Complaints and Claims system (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.2. Safeguard B / 2.2.1. Communication Channels).

In addition, this process was strengthened through the II Biodiversity and Carbon Forum, III Biodiversity + Carbon and Water Forum, IV Biodiversity + Carbon and Water Forum, training and exchanges of knowledge on technical environmental, biodiversity and gender equity issues (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.2.)

In short, ensuring the full and effective inclusion of all project stakeholders ensures equal participation. It is crucial for the success of REDD+ projects that stakeholders can participate in a free, full and informed manner, recognizing and respecting local forest governance structures and land use (Camacho A, Lara & Guerrero, 2017). This promotes an ethical, honest and respectful link between the community and the land it inhabits.

**Table 18.** Safeguard D approach according to project activities.

| SAFEGUARD D<br>THEMATIC NATIONAL INTERPRETATION: SOCIAL AND CULTURAL | | | | | |
|---|---|---|---|---|---|
| **Item** | **Requirement "BCR tool to demonstrate compliance with REDD+ safeguards".** | **National Interpretation Element** | **ID** | **Project Activity** | **Project Activity** |
| **4.1** | Means of communication for the transparent, clear, complete, inclusive and effective dissemination of information. | D10. Participation | S1 | Strengthening forest governance to promote the conservation and sustainable use of forests | Various communication channels have been established to ensure clarity and effectiveness in communication with all stakeholders. Notable among these are the 2.2.1.1.1.1. CARBO, which includes phone calls, text messages, 2.2.1.4.4. WhatsApp, 2.2.1.2.1. email and 2.2.2.2.1. PQRS system. |
| | | | I1 | Strengthening the technical capacities of the community in relation to sustainable forest management, delimitation, marking, conservation, ecosystem regeneration and sustainable production practices. | |
| **4.2** | Real and effective participation mechanisms from the feasibility and structuring phase of the project. | D10. Participation | C1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | Various participation channels were used, through social networks such as, 2.2.1.4.2. Instagram, 2.2.1.4.1. Facebook, 2.2.1.4.3. YouTube, and digital platforms such as 2.2.1.3.1. Website and 2.2.1.3.4. II Biodiversity and Carbon Forum, 2.2.4.2. III Biodiversity + Carbon and Water Forum, 2.2.4.3. IV Biodiversity + Carbon and Water Forum, as well as training and exchanges of |
| | | | G2 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | knowledge on technical environmental, biodiversity and gender equity issues were carried out. |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress made in complying with Safeguard D and its indicators in relation to the overall goal.

**Table 19.** Percentage of compliance with Safeguard D over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|
| **Safeguard D** | 4.1 | Means of communication for the transparent, clear, complete, inclusive and effective dissemination of information. | 6% | 6% |
| | 4.2 | Real and effective participation mechanisms from the feasibility and structuring phase of the project. | 6% | |

**Source**. Cataruben Foundation, 2024

## 11.5 Safeguard E

*"Compatibility of the measures with the conservation of natural forests and biological diversity, ensuring that the measures identified in paragraph 70 of this decision are not used for the conversion of natural forests, but instead serve to incentivize the protection and conservation of these forests and their ecosystem services and to enhance other social and environmental benefits."*

### *11.5.1 E11 Conservation of forests and their biodiversity*

An analysis was carried out to identify High Conservation Value Areas (HCV) within the framework of the CO2Bio project, focusing the assessment on biodiversity and ecosystem status. This study was carried out in the departments of Arauca, Casanare and Vichada, using various methods and tools.

First, the High Biodiversity Value Areas (HCV 1) were defined, considering variables such as species richness, the presence of protected areas and specific ecosystems. For this purpose, platforms such as the Colombian Biodiversity Information System (SIB), iNaturalist and the Global Biodiversity Information Facility (GBIF) were used. In addition, species distribution models and richness analysis of plants, birds, mammals, amphibians and reptiles were used.

Second, Areas with Ecosystems in Good Conservation Status at the Landscape Level (HCV 2) were addressed by assessing land cover using the Corine Land Cover 2018 layer and analyzing landscape fragmentation with Fragstats software. This analysis included metrics such as total number of patches and distance to nearest neighbor, allowing the identification and categorization of different land cover types and their conservation status.

Finally, Areas Containing Ecosystems in Threatened Status (HCV 3) were examined, using the IUCN Red List of Ecosystems methodology to classify ecosystems at risk. The rarity of the ecosystems and their threat status were considered, generating a final integrated layer with these data.

This analysis is detailed in the document High Conservation Values (See: Folder Annexes / 2. REDD+ Safeguards Compliance / 2.5. Safeguard E / 2.5.2.1. Monitoring of forest non-conversion) on the monitoring of forest non-conversion, which includes maps that visualize this non-conversion (See: Folder Annexes / 2. Compliance with REDD+ Safeguards / 2.5. Safeguard E / 2.5.2. Satellite Analysis)

This comprehensive analysis facilitates the identification and prioritization of key areas for conservation within the project, with the primary objective of protecting biodiversity and ecosystem integrity in the region.

#### *11.5.2 E12 Provision of environmental goods and services*

Through the capacity building spaces, we seek to gradually transform traditional or local practices, most of which are related to socioeconomic and environmental aspects. These practices directly influence the management and responsible use of natural capital, generating benefits both for the social fabric and in material terms. The objective is to reduce degradation and deforestation in REDD+ areas, thus promoting the conservation of natural ecosystems.

These spaces were mainly focused on training on biodiversity aspects and environmental technical components (See: Annexes Folder / 1. Project Activities / ID.1). In addition, as part of its commitment to transparency and ethics, Cataruben has demonstrated an efficient use of natural resources. It has not been directly or indirectly involved in environmental infractions and has not been subject to investigations by governmental entities, as confirmed by the Regional Autonomous Corporations (See: Annexes Folder / 2. Safeguard E / 2.5.3. Certificates of NO environmental violations or investigations).

**Table 20.** Safeguard E approach according to project activities.

| SAFEGUARD E<br>THEMATIC NATIONAL INTERPRETATION: ENVIRONMENTAL AND TERRITORIAL | | | | | |
|---|---|---|---|---|---|
| **Item** | **Requirement "BCR tool to demonstrate compliance with REDD+ safeguards".** | **National Interpretation Element** | **ID** | **Project Activity** | **Compliance** |
| **5.1** | High Conservation Values (HCVs) Report | E11. Conservation of Forests and their Biodiversity | I2 | Promote sustainable forest management through the implementation of sustainable production practices and conservation actions on the properties, in line with the Environmental Management Plan and the Property Implementation Plan. | An analysis was conducted to identify High Conservation Value Areas (HCVs) under the project, which was documented in report 2.5.1.1 High Conservation Value HCVs. |
| **5.2** | No forest conversion | | C1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | An analysis of the conservation areas was carried out and documented in 2.5.2.1. This analysis includes maps that visualize this non-conversion. |
| | | | G1 | Identify and map areas of regeneration gain or loss | |

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|---|---|---|---|---|---|
| | | | G2 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | |
| | | | B1 | Monitor biodiversity variables or indicators in land cover with the use of remote sensing for the area, project and its surroundings. | |
| **5.3** | Cycles of training given to the community | E12. Provision of Environmental Goods and Services | I1 | Capacity building for men and women enrolled in the project, in the following components: technical-environmental, social and administrative-financial, in order to strengthen decision making in favor of the project's objectives. | A series of training sessions have been held to strengthen knowledge about the conservation of natural ecosystems and biodiversity. |
| **5.4** | Compliance with environmental regulations | | S1 | Strengthening forest governance to promote conservation and sustainable use of forests | It is important that the Cataruben Foundation, as developer of the project, does not incur in investigations for environmental infractions, in accordance with the Corporinoquia Certificate. |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress made in complying with Safeguard E and its indicators in relation to the overall goal.

**Table 21.** Percentage of compliance with Safeguard E over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|
| Safeguard E | 5.1 | High Conservation Values (HCVs) Report | 14% | 8% |
| | 5.2 | No forest conversion | 6% | |
| | 5.3 | Cycles of training given to the community | 6% | |
| | 5.4 | Compliance with environmental regulations | 7% | |

**Source**. Cataruben Foundation, 2024

## 11.6 Safeguard F

*"The adoption of measures to address the risks of reversion."*

### *11.6.1 F13 Environmental and territorial management*

A reversion risk analysis has been established to evaluate the possible risks that could compromise the long-term sustainability of the project (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.6.) It is essential to integrate the project with local land-use plans and to understand the social, environmental and economic characteristics of the departments of Arauca, Casanare and Vichada, where the project is being developed.

In accordance with the above, risk analysis and management is implemented to identify environmental, social and financial risks. The level of impact and probability of occurrence is evaluated and each risk is rated, establishing appropriate mitigation actions.

In this context, it is crucial to establish commitments through the enrolled contract (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.6. Reversion Risk). This contract defines the specific obligations of the ecosystem managers, focusing on guaranteeing the permanence and vigilance of the conserved area. It also ensures the conservation of the area by mitigating actions that could result in the reduction, decrease or displacement of emissions. Failure to comply with these obligations triggers the penalty clause, which may involve the imposition of financial fines or the application of other corrective measures.

In order to address potential risks related to land tenure and disputes between neighbors, we have developed an action plan. This plan aims to establish a set of concrete actions to prevent, mitigate and manage the risks associated with land tenure disputes and conflicts between CO2Bio project stakeholders. (See: Annexes Folder / 2. Compliance with REDD+ Safeguards / 2.6. Risks Land Tenure Disputes).

#### *11.6.2 F14 Sectoral Planning*

Sectoral planning involves a detailed analysis of the specific aspects of a particular sector. In the case of CO2Bio, we focused on the environmental, social and economic aspects of the region. This analysis was carried out through socio-environmental characterizations, (See: Folder Annexes / 1. Project Activities / ID I.2 / Socio-environmental and productive characterizations) which also allowed us to understand the organization of the territory. This characterization provides a solid basis for informed decision making and effective implementation of the project, with the purpose of preventing possible risks in the execution framework.

**Table 22**. Safeguard approach F according to project activities.

| SAFEGUARD F<br>THEMATIC NATIONAL INTERPRETATION: ENVIRONMENTAL AND TERRITORIAL | | | | | |
|---|---|---|---|---|---|
| **Item** | **Requirement "BCR tool to demonstrate compliance with REDD+ safeguards".** | **National Interpretation Element** | **ID** | **Project Activity** | **Compliance** |
| **6.1** | Reversal risk analysis carried out under the initiative | F13. | I1 | Strengthening the technical capacities of local men and women in relation to sustainable forest management, delimitation, marking, conservation, ecosystem regeneration, sustainable production practices, and access to and management of financial goods and services. | A 2.6.1 Reversion Risk Analysis was performed to evaluate the possible risks, which were documented in 2.6.4 Risk Analysis and Management. This document identifies the environmental, social and financial risks, evaluating their level of impact and probability of occurrence, and each of them are rated, |

| | | | | | |
|---|---|---|---|---|---|
| | | Environmental and territorial planning | S1 | Strengthening forest governance to promote conservation and sustainable use of forests | establishing appropriate mitigation actions. |
| **6.2** | Actions to ensure that the project is sustained over time | F14. Sector planning | C1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | In order to guarantee the continued maintenance of the project activities, specific clauses have been included in the linkage contract to ensure its long-term continuity. |
| | | | G1 | Identifying and mapping areas of regeneration gain or loss | |
| | | | G2 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | |
| | | | B1 | Monitor biodiversity variables or indicators in land cover with the use of remote sensing for the area, project and its surroundings. | |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress made in complying with Safeguard F and its indicators in relation to the overall goal.

**Table 23.** Percentage of compliance with Safeguard F over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|
| **Safeguard F** | 6.1 | Reversal risk analysis carried out within the framework of the project | 100% | 53% |
| | 6.2 | Actions to ensure that the project is sustained over time | 6% | |

**Source**. Cataruben Foundation, 2024

## 11.7 Safeguard G

*"The adoption of measures to reduce emissions displacement."*

### *11.7.1 G15 Forestry control and monitoring to prevent displacement of emissions*

As project developer, Cataruben is responsible for conducting a preliminary investigation of the territory where conservation activities will be carried out. This preliminary investigation provides the basis for a detailed analysis aimed at identifying the causes of displacement of greenhouse gas (GHG) emissions, also known as leakage. It has been concluded that approximately 80% of these causes are the result of human activities, which can vary significantly from one territory to another, even within the same region. However, there are common patterns in many rural contexts, such as unplanned agricultural expansion, extractive activities, forest fires and changes in land use.

It is crucial to note that these leakages can originate both inside and outside the project's reference region. Therefore, it is essential to comprehensively examine the environmental and economic context of the territory, as well as to understand the linkages and interactions between local communities, in order to prevent long-term negative impacts on the territory and the local community.

These aspects underscore the importance of implementing effective leakage control and periodic monitoring strategies. In this sense, the document entitled leakage analysis has been developed (See: Annexes Folder / 2. Safeguard G / 6.7.2. Leakage Analysis) which identifies, addresses and establishes actions to mitigate these potential emissions displacements.

**Table 24.** Safeguard G approach according to project activities.

| SAFEGUARD G<br>THEMATIC NATIONAL INTERPRETATION: ENVIRONMENTAL AND TERRITORIAL |
|---|

| Item | Requirement "BCR tool to demonstrate compliance with REDD+ safeguards". | National Interpretation Element | ID | Project Activity | Compliance |
|---|---|---|---|---|---|
| 7.1 | Analysis of leakage identification and its causes | G15. Forestry control and monitoring to avoid displacement of emissions. | C1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | A report was prepared that analyzes the possible causes, monitoring and actions to mitigate and minimize the impact of leaks during the implementation of CO2Bio 6.7.2. |
| | | | G1 | Identifying and mapping areas of regeneration gain or loss | |
| 7.2 | Response protocol to minimize such leakage | | G2 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | |
| | | | B1 | Monitor biodiversity variables or indicators in land cover with the use of remote sensing for the area, project and its surroundings. | |

**Source**. Cataruben Foundation, 2024

Based on the table above, the following table shows the progress made in complying with Safeguard G and its indicators in relation to the overall goal.

**Table 25.** Percentage of compliance with Safeguard G over the global target established in the Monitoring Plan.

| Safeguard | Item | Indicator(s) | Progress (%) Period 2021-2023 | Compliance (%) Global Target |
|---|---|---|---|---|
| Safeguard G | 7.1 | Analysis of leakage identification and its causes | 11% | 6% |
| | 7.2 | Response protocol to minimize such leakage | | |

**Source**. Cataruben Foundation, 2024

## 12. Special categories, related to Co-Benefits

The additional benefits derived from the CO2Bio project go beyond simple greenhouse gas (GHG) removal and capture, biodiversity conservation and responsible water management. In many cases, these benefits are reflected in the strengthening of the social fabric, the improvement of the material living conditions of the community, the gradual recovery of wildlife, and the improvement of both water and air quality. These co-benefits are closely enrolled to the progressive wellbeing of local communities and the intervened territory.

The project generates additional benefits in the Orchid category, which encompasses three fundamental requirements: biodiversity conservation, community benefits and gender equity. These requirements are assessed in accordance with the activities planned in the Activity Monitoring Plan, (See: Folder Annexes / 1. Project Activities / Project Activity Monitoring Plan). A detailed summary illustrating how access to these co-benefits has been facilitated is presented below.

### 12.1 Biodiversity conservation

To ensure the effective development of actions aimed at halting the loss of biological diversity within the framework of the CO2Bio initiative, Cataruben has established the General Training Plan as a key goal (See: Annexes Folder / 1. Project Activities / ID.1 / Activity Report I1- Biodiversity Capacity Building). Through this plan, the ecosystem managers and the people they decide to involve, such as family members, collaborators, employees or neighbors, were trained in a variety of topics related to biodiversity and its preservation. The initiative seeks to promote awareness and encourage consistent actions when carrying out activities on the properties, as well as

to raise awareness of the importance of biodiversity conservation to maintain and sustain ecosystem services on each of the project properties.

In addition, to meet this objective, an Acoustic and Bioacoustic Monitoring Plan was developed and implemented (See: Annexes Folder / 3. SDG / SDG 15 / 15.1.2 Proportion of sites important for terrestrial and freshwater biodiversity that are part of protected areas, broken down by ecosystem type / Bioacoustic and Ecoacoustic Monitoring Plan) designed to identify the diversity of bird and other species present in the project area. This participatory bioacoustic monitoring also involves ecosystem managers interested in better understanding the diversity of fauna on their properties. This approach not only helps to prevent the introduction of invasive species by identifying the species distributed and their prevalence patterns in different properties and coverages, but also complements traditional visual observation techniques.

Echo-acoustic sampling is a highly effective technique for studying biodiversity in areas where direct visual observations of animal species are difficult to perform. This non-invasive methodology allows valuable information to be collected without the need for physical contact with the animals. Combined with the additional methodologies and training of the VCA's Methodology (See: Annexes Folder / 3. SDGs / SDG 15 / 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are part of protected areas, broken down by ecosystem type / CO2Bio VCA Methodology) on the importance of conservation and biodiversity areas, it constitutes a comprehensive tool for knowledge and awareness of biodiversity conservation and ecosystem services.

### 12.2 Benefits to communities

The benefits for the community involved, composed entirely of natural and legal persons involved in productive activities such as agroforestry systems or raising livestock, can be manifested in both material and symbolic benefits. Through the focus on social and environmental safeguards, priority is given to action without harm, ensuring that all CO2Bio project activities contribute to the well-being of the social group and its territory. These benefits are broken down into:

- **Social benefits**: These include the strengthening of the social fabric through the articulation of conservation efforts, the promotion of gender equity, the strengthening of trust between neighboring properties, conflict resolution and training in the management of natural capital.
- **Economic benefits**: These refer to the increase in income through the issuance and sale of verified carbon certificates (VCCs), as a result of capturing

and storing greenhouse gasses. These resources are reinvested in technologies, strategies and materials to strengthen conservation practices and generate new sources of income, such as green jobs.

- **Environmental benefits**: Focus on the conservation of ecosystem services and natural capital, which contributes to regulating the local and global climate, protecting endangered species, preserving strategic water sources and preventing soil erosion.
- **Cultural benefits**: Involve respect and promotion of local knowledge, practices and beliefs, strengthening the communities' identity with their forest cover, promoting cultural ecotourism and reinforcing the population's bond with nature and their territory.

These benefits have been generated through spaces for social and community participation, through training and knowledge exchanges in technical-environmental and biodiversity aspects, as well as the promotion of local leadership (See: Annexes Folder / 1. Project Activities / ID.1 / Report activity I1- Strengthening of technical capacities CO2Bio (2021-2023) / Report activity I1- Strengthening of biodiversity capacities).

### 12.3 Gender Equity

The additional benefits of effectively addressing gender inequalities in the context of intervened territory and native ecosystem conservation activities transcend specific environmental conservation objectives. This positive impact can be summarized in the following key points:

**Promoting equitable participation**: Ensuring that men and women have equal agency in decision-making at all stages of the project, drawing on a wide range of skills, knowledge and local visions of the territory.

**Reducing gender disparity**: Addressing the social and economic inequities that have historically affected women the most in certain contexts, strengthening equitable and responsible use of natural resources, economic opportunities and effective decision making. This improves the resilience of the collective in the face of regional environmental challenges.

**Improved sustainability**: Empowering the role of women in managing social, environmental and economic challenges promotes long-term sustainable use of natural capital.

**Fostering creativity and community development**: By harnessing the diversity of perspectives, experiences and skills, creative and effective solutions tailored to local needs are generated. This enhances the effectiveness of conservation activities and promotes holistic community development by integrating social, economic and environmental well-being.

**Promoting shared leadership and empowerment in rural settings**: By focusing on the gender perspective, equitable participation and shared leadership in conservation activities, which are fundamental to achieving sustainable rural development, are promoted. This is done without denying or minimizing the male role, but rather by promoting collaboration and cooperation based on mutual respect.

It is relevant to explore how women's work is represented and valued in these specific contexts to better understand the benefits for communities, gender equality and biodiversity conservation that the CO2Bio project offers by integrating these approaches in an organic and clear manner. As part of this effort, training in leadership and valuing women's work has been carried out (See: Annexes Folder / 1. Project Activities / ID.1 / Activity Report I1 - Capacity Building in the Leadership and Valuing Women's Work component).

## 13. Grouped projects

The Project does not consider the inclusion of new areas after validation.

## 14. Project implementation

### 14.1 Project implementation status

#### *14.1.1 Progress of project activities*

The CO2Bio project has a start date of January 1, 2015. The operation of the project has been based on strengthening the sustainable management of forests and ecosystems, as well as empowering local communities in conservation, sustainable production, and territorial governance. Another relevant issue has been to promote forest ownership, which implies that communities actively engage in the protection, conservation and sustainable use of forest resources, beyond mere legal ownership. This appropriation promotes more effective forest management by taking advantage of traditional knowledge and the emotional connection of the communities with their environment.

Similarly, implementing sustainable production practices in forests and surrounding areas helps to reduce pressure on natural resources, conserve biodiversity and mitigate climate change, while improving the well-being of local communities. At the same time, strengthening forest governance is essential to ensure proper forest management, encourage community participation in decision-making and prevent deforestation and forest degradation.

Continuous monitoring of forest area and biodiversity provides valuable information on the state of ecosystems and helps to identify areas of regeneration, as well as to warn of potential threats such as forest fires. In addition, developing plans for efficient water use is crucial to ensure the availability of this vital resource, especially in areas where access is limited or threatened by climate change.

Together, these activities contribute significantly to forest conservation, biodiversity protection and strengthening the resilience of local communities in the face of climate change, promoting long-term sustainable development.

Regarding the process of monitoring the implementation of conservation activities and sustainable production practices, advanced field visits were made to each of the properties enrolled in the CO2Bio. For the purposes of this report, the adoption of conservation activities and sustainable production practices was observed. These include the implementation of electric fences, water troughs, signage and delimitation of conservation areas. In addition, the strengthening of economies around beekeeping, meliponiculture, tourism, turmeric, and livestock farming under sustainability guidelines was also evidenced. As a result, the monitoring of the implementation of conservation actions showed an advance of 95.83%.

For the monitoring period (2021-2023) the following progress in project activities is presented Project activities monitoring report:

**Table 26.** Progress of project activities, period 2021 - 2023.

| ID | Project Activity | Indicator | Monitoring | Supporting | General |
|---|---|---|---|---|---|

| | | | results (2021-2023) | document | progress |
|---|---|---|---|---|---|
| I1 | Strengthening the technical capacities of local men and women in relation to sustainable forest management, delimitation, marking, conservation, ecosystem regeneration, sustainable production practices, and access to and management of financial goods and services. | Number of people trained per year | 4.651 | Activity I1 Report: CO2Bio Capacity Building (2021-2023) | 6.800 |
| I2 | Promote sustainable forest management through the implementation of sustainable production practices and conservation actions on the properties, in line with the Environmental Management Plan and the Land Implementation Plan. | Farms that implement sustainable production practices (SPP), ecosystem conservation actions and strategies. | 66% | Activity I2 Report: Sustainable Forest Management | 95.83% |
| S1 | Strengthening forest governance to promote the conservation and sustainable use of forests. | Progress of the governance roundtable | 25% | Activity Report S1: Forest Governance Strategy | 25% |
| G1 | Continuous monitoring of changes in forest area as a proportion of total area in project areas. | Rate of change of coverage | 7,5% | Activity G1 Report: Forested area as a proportion of total land area | 22,5 |
| G2 | Identify and map areas of regeneration gain or loss. | Forest Gain | 7,5 | G2 activity report: Forest Gain | 22,5 |

| | | | | | |
|---|---|---|---|---|---|
| G3 | Monitor environmental threats (fire) in the project area and/or possible management alerts. | Thermal anomalies/land cover fire monitoring | 11,43% | Activity Report G3: REDD Hot Spot Monitoring | 8,57% |
| B1 | Monitor biodiversity variables or indicators in land cover with the use of remote sensing for the project area and its surroundings. | Participatory biodiversity monitoring for identification of fauna in the project area | 12,5% | Biodiversity monitoring plan | 25% |
| A1 | Develop a plan for efficient use and saving of water in households (PUEAA) enrolled in the initiative. | Change in water use efficiency over time. | 15% | 1. Water Efficiency and Saving Plans (PUEAA)<br><br>2. General diagnosis of the use and management of water resources in the home. | 25% |

**Source:** Cataruben Foundation, 2024.

### *14.1.2 Risk Management Monitoring*

During the monitoring period, mitigation actions were implemented with the risks initially rated as high and medium according to the BCR Tool Permanence Risk Management Version 1.1 March 19, 2024. Likewise, risks were reassessed and mitigation actions were adapted within the framework of adaptive management, risk analysis and management.

### *14.1.3 Leakage and non-permanence risk management*

Within the framework of monitoring and management of leakage and permanence risks for the current monitoring period, the area of leakage is monitored according to the methodologies applied (see section 16.3 Leakage) and management to reduce the risk of leakage is also carried out (see section 11.7 Safeguard G). While the permanence of

the activities is evaluated with the progress in the implementation of the project (section 14.1.1 Progress of project activities) and the continuation of the project participants.

#### *14.1.4 Uncertainty management*

According to BCR002 methodology, section 13.1, uncertainty management is determined by the accuracy of the maps used to calculate the activity data and the application of discounts in the emission factors. Thus, for the period 2021-2023, uncertainty management was implemented as follows:

##### ***14.1.4.1 Activity Data Uncertainty***

In order to monitor the project areas for the year 2023, the following code was provided, which performs a series of steps to train, evaluate and optimize a classification model using satellite images in Google Earth Engine. Initially, a Random Forest classifier is trained with specific training data, selecting the most relevant bands. Then, the code evaluates the accuracy of the classified model using a validation dataset by generating a confusion matrix and calculating the Kappa index. These metrics allow verifying the accuracy of the model by classifying independent validation data, identifying and correcting classification errors, measuring the agreement with real labels, and validating its performance in practical conditions. Specifically, for the project areas, a Kappa index value between 55% to values above 85% was obtained, with values ranging from good to excellent. *6.1.1. Non-forest Forest Code Procedure*.

For the REDD+ component, the uncertainty management is referred to the non-forest forest model, through the Google Earth Engine platform using the Random Forest algorithm for the year 2023, using Sentinel remote sensors (resolution 30 m / pixel) respectively and feeding with national information (national bnb map, smbyc, therefore, This process was performed through the QGIS add-on called AcATaMa (Thematic Map Accuracy Assessment, for its acronym in Spanish) (See Instructive), being a tool designed to assess the accuracy of land use/land cover classification.

To determine the control points of the models, field visits were used to verify that the point effectively meets the standards to determine that an area is a forest according to the national definition. As the uncertainty is determined with the precision, to validate the model with 20% of the data taken in the field, the process is replicated and it is determined that the precision for 2023 is (98.5%), the methodology indicates that the precision must be above 90%, it can be reviewed in the following link where it is stored 6.2.2 Acatama Analysis.

#### *14.1.4.2 Uncertainty of emission factors*

In the specific case of the CO2Bio project, the values presented in the most recently evaluated NREF (Ministry of Environment and Sustainable Development - IDEAM, 2020) were used as a reference to define emission factors, which present a variation coefficient of 11.4%. Given that the values are in line with the national emissions scenario, no adjustments are made for uncertainty management.

### 14.2 Review of the follow-up plan.

The Monitoring Plan did not undergo any adjustments during the last two project verifications. However, some adjustments are planned for the current verification and are detailed in the Deviation Request section. The approval date for these adjustments will be included once the corresponding review and approval process is completed.

### 14.3 Deviation request applied to this monitoring period

Regarding the deviations made to this monitoring period, these are due to adjustments made to the Project Activity Monitoring Plan, related to the consolidation of several activities that shared similarities, therefore the name of the activity, indicators, and targets for the project accreditation period (40 years) were adjusted; likewise, adjustments were made to the Safeguards Monitoring Plan in accordance with the update of the *Tool to demonstrate compliance with REDD+ safeguards* Version 1.1, dated January 26, 2023 and the *Sustainable Development Safeguards SDSs Tool* Version 1.0, dated April 2024.

Likewise, new updates are adopted: Monitoring Report to BCR Standard Version 3.3, the implementation of the *Baseline and Additionality Tool Version* 1.2, of September 27, 2023, *Tool to Demonstrate Compliance with REDD+ Safeguards* Version 1.1, January 26, 2023, *Sustainable Development Safeguards SDSs Tool* Version 1.0, April 2024, *Sustainable Development Goals (SDGs) Tool* Version 1.0, June 27, 2023, *Tool for Avoiding Double Accounting*, Version 1. March 09, 2023, *Tool for Monitoring, Reporting and Verification*. V 1. February 13, 2023 and *Tool Permanence Risk Management Version* 1.1 March 19, 2024.

**Table 27.** List of deviations applied to this follow-up period.

| Component | Description of deviations |
|---|---|

| | |
|---|---|
| Project activity monitoring plan | The project activity monitoring plan, in its initially validated version 1, stipulated 25 activities grouped into 10 components.<br><br>During the current verification period, it was identified that several of these activities shared similarities in objectives, methods and expected results. For this reason, a consolidation of these activities was carried out, reducing the total number and adjusting the activity names, indicators and targets to be reported during the project accreditation period (40 years), as detailed in version 2 of the Project Activity Monitoring Plan, Version 2.<br><br>The consolidation of activities was carried out under an exhaustive and meticulous review, ensuring that the combined activities maintained coherence and achieved synergies that not only simplify monitoring, but also enhance the effectiveness of the actions implemented. This deviation is considered suitable for the following reasons:<br><br>Operational Efficiency: Consolidation reduces the redundancy of efforts, allowing for more efficient management of human and financial resources.<br><br>Clarity and Focus: By grouping similar activities together, monitoring and evaluation of the components is facilitated, providing a clearer and more focused view of progress and results.<br><br>Improved Information Management: Reduced activities allow for better data collection and analysis. |

**Source:** Cataruben Foundation, 2024.

### 14.4 Notification or request for approval of changes

For the current verification of the period 2021 - 2023, the approval of changes is requested, taking into account the deviations mentioned in section 14.4.

## 15. Monitoring system

### 15.1 Description of the monitoring plan

Sections 15.2 and 16 of this Monitoring Report detail both the data and the procedures used to quantify the baseline or reference scenario. In addition, the methods used to calculate greenhouse gas (GHG) emissions from the project and due to leakage, which were recorded during the first monitoring period, are presented.

## 15.2 Data and parameters for quantifying emission reductions

*15.2.1 Data and parameters determined in the registry and not monitored during the monitoring period, including default values and factors*

| **Data/Parameter** | ***Total biomass in forests*** |
|---|---|
| **data unit** | *t/ha* |
| **Description** | *Plant biomass contained in forest ecosystems (Orinoco Biome). It is estimated from the sum of aboveground biomass (BA) and belowground biomass (BS).* |
| **Measured/Calculated/ Predetermined:** | *Default* |
| **Source of data** | *Ministry of Environment and Sustainable Development - IDEAM (2019)* |
| **Value(s) of the monitored parameter** | *106* |
| **Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)** | - *Carbon emission factor in total biomass.*<br>- *Calculation of baseline deforestation emissions.*<br>- *Calculation of emissions from deforestation in the scenario with the project.*<br>- *Calculation of emissions from deforestation in leakage areas.* |
| **Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)** | *N/A* |
| **Measuring/reading/recording frequency** | *N/A* |
| **Calculation method (if applicable)** | *According to the guidelines of the National Forest Inventory.* |
| **Quality control procedures applied** | *The value is taken from the evaluated proposal of the national reference emission level (NREF), so it represents a conservative value, according to the national context for the estimation of GHG emissions.* |

| | |
|---|---|
| ***Data/Parameter*** | ***Soil organic carbon (COS)*** |
| ***data unit*** | *tC/ha* |
| ***Description*** | *Cumulative carbon content in soils in forest ecosystems* |
| ***Measured/Calculated/ Predetermined:*** | *Default* |
| ***Source of data*** | *Ministry of Environment and Sustainable Development - IDEAM (2019)* |
| ***Value(s) of the monitored parameter*** | *65* |
| ***Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)*** | - *Soil carbon emission factor (COS)*<br>- *Calculation of baseline deforestation emissions.*<br>- *Calculation of emissions from deforestation in the scenario with the project.*<br>- *Calculation of emissions from deforestation in leakage areas.* |
| ***Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)*** | *N/A* |
| ***Measuring/reading/recording frequency*** | *N/A* |
| ***Calculation method (if applicable)*** | *According to the guidelines of the National Forest Inventory.* |
| ***Quality control procedures applied*** | *The value is taken from the evaluated proposal of the national reference emission level (NREF), so it represents a conservative value, according to the national context for the estimation of GHG emissions.* |

| | |
|---|---|
| ***Data/Parameter*** | ***Mean difference in aboveground biomass*** |
| ***data unit*** | *t/ha* |
| ***Description*** | *Changes in aboveground biomass stocks between fragmentation classes (Core - Patch and Perforated - Patch).* |
| ***Measured/Calculated/*** | *Calculated* |

| | |
|---|---|
| ***Predetermined:*** | |
| ***Source of data*** | *Ramírez-Delgado et al. (2018) - Estimating Colombia's forest degradation through fragmentation analysis (Annex 2).* |
| ***Value(s) of the monitored parameter*** | *Core - patch transition = 117.46*<br>*Perforated - patch transition = 83.23* |
| ***Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)*** | - *Emission factor for degradation*<br>- *Calculation of baseline degradation emissions.*<br>- *Calculation of emissions due to degradation in the scenario with the project.*<br>- *Calculation of emissions due to degradation in leakage areas.* |
| ***Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)*** | *N/A* |
| ***Measuring/reading/recording frequency*** | *N/A* |
| ***Calculation method (if applicable)*** | $\Delta BA_{perforado-parche} = BA_{perforado} - BA_{parche}$<br>*Where:*<br>$\Delta BA_{núcleo/perforado-parche}$ *= Changes in aboveground biomass stocks between fragmentation classes.*<br>$BA_{núcleo}$ *= Average aboveground biomass in the core class*<br>$BA_{perforado}$ *= Average aboveground biomass in the drilled class*<br>$BA_{parche}$ *= Average aboveground biomass in patch class* |
| ***Quality control procedures applied*** | *Selection of values according to the type of forest.* |

| | |
|---|---|
| ***Data/Parameter*** | ***FC*** |

| | |
|---|---|
| ***data unit*** | |
| ***Description*** | *Carbon fraction of dry matter* |
| ***Measured/Calculated/ Predetermined:*** | *Default* |
| ***Source of data*** | *Methodology BCR0002* |
| ***Value(s) of the monitored parameter*** | *0,47* |
| ***Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)*** | - *Emission factor*<br>- *Calculation of baseline emissions.*<br>- *Calculation of emissions in the scenario with the project.*<br>- *Calculation of emissions in leakage areas.* |
| ***Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)*** | *NA* |
| ***Measuring/reading/recording frequency*** | *NA* |
| ***Calculation method (if applicable)*** | *NA* |
| ***Quality control procedures applied*** | *NA* |

### *15.2.2 Monitored data and parameters*

| | |
|---|---|
| ***Data/Parameter*** | ***Eligible forest area*** |
| ***data unit*** | *Hectares* |
| ***Description*** | *Areas within the geographic boundaries of the project that correspond to the forest category, according to the national forest definition. Year 2023.* |
| ***Measured/Calculated/*** | *Calculated* |

| | |
|---|---|
| ***Predetermined:*** | |
| ***Source of data*** | *Forest and Carbon Monitoring System - Own elaboration through supervised classification using the Google Earth Engine platform.* |
| ***Value(s) of the monitored parameter*** | *8,653.2 hectares* |
| ***Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)*** | *Calculation of emissions in forest ecosystems in the project areas*<br>*Calculation of emissions in forest ecosystems in leakage areas* |
| ***Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)*** | *ArcGISV3.2 and QGIS V3.28 software, Google Earth Engine.* |
| ***Measuring/reading/recording frequency*** | *Annual* |
| ***Calculation method (if applicable)*** | *Supervised forest classification procedure*<br>*Eligible areas monitoring procedure* |
| ***Quality control procedures applied*** | *Formats for on-site observations in field coverage - Open Data Kit*<br>*AcATaMa procedure* |

## 16. Quantification of GHG emission reductions/removals.

The quantification of reference emissions was performed according to the guidelines of the BCR 0002 methodology. The following is a general description of the formulas and values used.

### 16.1 Reference Emissions

#### *16.1.1 Emissions from deforestation*

The calculation of the activity data was based on the historical change in forest area recorded in the reference region, applying the following equation:

$$CSB_{year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_1 - A_2\right)$$

$$CSB_{year} = (\frac{1}{2015-2005})\ x\ (442.344\ -\ 409.551)$$

$$CSB_{year} = 3.279$$

Where:

| | |
|---|---|
| $CSB_{año}$ | Annual change in the area covered by forest in the reference region; ha |
| $t_1$ | Year of beginning of reference period; year |
| $t_2$ | Year end of reporting period; year |
| $A_1$ | Area of forest in the reference region, at the initial moment; ha |
| $A_2$ | Area of forest in the reference region at the final point in time; ha |

According to the historical trend of deforestation in the reference region, the change in forest area in the eligible area of the project was projected. For the analysis period there was an adjustment in the eligible area, therefore the projection of $CSB_{proyecto,\ año}$ was adjusted according to the new conditions (section 1.4 describes in detail the adjustments applied).

Likewise, the adjustment for national conditions was made to the $CSB_{proyecto,\ año}$ for the years 2021-2023, according to the values estimated in the national NREF (Ministry of Environment and Sustainable Development - IDEAM, 2020; Ministry of Environment and Sustainable Development - IDEAM, 2024).

With respect to the emission factors, the BCR0002 methodology establishes that the validated values can be applied in the estimation of monitored emissions. Therefore, the same values were used for this monitoring period.

In this sense, the following equation was applied to quantify emissions from deforestation in the reference scenario:

$$EA_{lb} = DA_{lb}\ x\ CT_{eq}$$

Where:

$EA_{lb}$ Annual emission in the baseline scenario; $tCO_{2e}$

$DA_{lb}$ Annual historical deforestation in the baseline scenario; ha

$CT_{eq}$ Total carbon dioxide equivalent; tCO /$ha_{2e}$

Table 28 presents the quantification of changes in forest area in the without-project scenario and the baseline GHG emissions due to forest deforestation, contemplating the period 2021-2023.

**Table 28.** Reference emissions from forest deforestation for the monitoring period.

| Year | Adjustment for national circumstances *(%CN)* | CSB *lb,yr* + %CN | *CTeq* *(tCO2e/ha)* | GHG emissions in baseline scenario *(tCO2e/year)* |
|---|---|---|---|---|
| 2021 | 49,62% | 103,81 | 194,59 | 20.200,0 |
| 2022 | 53,55% | 106,32 | | 20.689,1 |
| 2023 | 25,90% | 87,00 | | 16.928,7 |

**Source:** Cataruben Foundation, 2024

The step-by-step calculations can be reviewed in Annex 5. Emission Monitoring / Calculations_Monitoring_Ver3 / Sheet 1. Deforestation_LB.

### *16.1.2 Emissions from degradation*

The quantification of emissions due to forest degradation in the reference scenario considered the effects on carbon stocks between the transitions from core forest to patch and perforated forest to patch. Thus, the calculation of baseline activity data was carried out using the following equations:

$$DFP_{lb,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{núcleo,lb} - A_{núcleo-par,lb}\right)$$

Where:

$DFP_{lb,year}$ Annual historical primary degradation in baseline; ha

| | |
|---|---|
| $t_2$ | Year end of reporting period; year |
| $t_1$ | Year of beginning of reference period; year |
| $A_{núcleo,lb}$ | Area of the reference region in core class in the year of the start of the reference period; ha |
| $A_{núcleo-par,lb}$ | Area of the reference region that goes from core to patch in the final year of the reference period; ha |

y,

$$DFS_{lb,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{perforado,lb} - A_{perforado-par,lb}\right)$$

Where:

| | |
|---|---|
| $DFS_{lb,year}$ | Historical annual secondary degradation in the without-project scenario; ha |
| $t_2$ | Year end of reporting period; year |
| $t_1$ | Year of beginning of reference period; year |
| $A_{núcleo,lb}$ | Area of the reference region in class drilled in the year of the beginning of the reference period; ha |
| $A_{núcleo-par,lb}$ | Area of the reference region that changes from drilled to patch in the final year of the reference period; ha |

Subsequently, the activity data was multiplied by the equivalent carbon value contained in the difference of total biomass between fragmentation classes for the two types of degradation (primary and secondary), applying the following equation:

$$EA_{d,lb,year} = \left(DFP_{lb,year} x DCBT_{DP}\right) + \left(DFS_{lb,year} x DCBT_{DS}\right)$$

Where:

$EA_{d,lb,year}$ Annual emission due to degradation, in the baseline scenario; tCO2/ha

$DFP_{lb,year}$ Historical annual primary degradation in the baseline scenario; ha

$DFS_{lb,year}$ Annual historical secondary degradation in the without project scenario; ha

$DCBT_{DP}$ Carbon dioxide equivalent contained in the total biomass difference per hectare in the primary degradation class; tCO2e/ha

$DCBT_{DS}$ Carbon dioxide equivalent contained in the total biomass difference per hectare in the secondary degradation class; tCO2e/ha

Table 29 presents the quantification of baseline GHG emissions due to forest degradation, contemplating the period 2021-2023.

**Table 29.** Reference emissions from forest degradation for the monitoring period.

| Year | Type of degradation | PFD*,lb,year (ha)* | DBTi *(tCO2e/ha)* | GHG emissions in the baseline scenario *(tCO2e/year)* |
|---|---|---|---|---|
| 2021 | Core - Patch | 28,34 | 251,85 | 7.137,2 |
| 2022 | Core - Patch | 28,11 | | 7.078,7 |
| 2023 | Core - Patch | 27,88 | | 7.020,6 |
| 2021 | Perforated - Patch | 1,59 | 177,86 | 283,7 |
| 2022 | Perforated - Patch | 1,59 | | 282,5 |
| 2023 | Perforated - Patch | 1,58 | | 281,4 |

**Source:** Cataruben Foundation, 2024

The step-by-step calculations can be reviewed in Annex 5. Emissions Monitoring / Calculations_Monitoring_Ver3 / Sheet 2.

## 16.2 Project emissions/removals

### *16.2.1 Emissions from deforestation*

The estimation of deforestation in the project area involved the analysis of the change from forest to non-forest area during the monitoring period. Subsequently, the change

value was related to the emission factor to calculate the GHG emissions in the project area. The following equations were applied to perform the analyses:

$$CSB_{proy,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{REDD+proy,1} - A_{REDD+proy,2}\right)$$

Where:

| | |
|---|---|
| $CSB_{proy,year}$ | Annual change in the area covered by forest in the project area; ha |
| $t_2$ | Year end of monitoring period; year |
| $t_1$ | Year of beginning of monitoring period; year |
| $A_{REDD+proy,1}$ | Area of forest in the project area at the beginning of the monitoring period; ha |
| $A_{REDD+proy,2}$ | Area under forest, in the project area at the end of the monitoring period; ha |

y,

$$EA_{REDD+proy,año} = DEF_{REDD+proy,año} x TCO_{2eq}$$

| | |
|---|---|
| $EA_{REDD+proy,year}$ | Annual emission in the project area; tCO2/ha |
| $DEF_{REDD+proy,year}$ | Annual deforestation in the project area; ha |
| $TCO_{2eq}$ | Total carbon dioxide equivalent; tCO2e/ha |

For the 2021-2023 period, an average annual forest cover loss of 3.93 ha/year was recorded in the project areas. This corresponds to 765.4 tCO2e per year (Table 30). This behavior is mainly due to natural causes such as flooding patterns in the area that occurred during the monitoring period (6.1.2.2.2.Methodological process Flooding).

**Table 30.** Project emissions from deforestation, for the period 2021-2023.

| Year | CSBproy,*year* *(ha/year)* | CTeq *(tCO2e/ha)* | Project GHG Emissions *(tCO2e)* |
|---|---|---|---|
| 2021 | 3,93 | 194,59 | 765,4 |

| | | | |
|---|---|---|---|
| 2022 | 3,93 | | 765,4 |
| 2023 | 3,93 | | 765,4 |

**Source:** Cataruben Foundation, 2024

*16.2.2 Emissions from degradation*

The estimation of annual degradation in the project area was estimated with the following equations:

$$DFP_{REDD+proy,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{núcleo} - A_{núcleo-parche}\right)$$

*Where:*

| | |
|---|---|
| $DFP_{REDD+proy,year}$ | Annual primary degradation in the project area; ha |
| $t_1$ | Year of beginning of monitoring period; year |
| $t_2$ | Year end of monitoring period; year |
| $A_{núcleo}$ | project area in core class, in the year of the beginning of the monitoring period; has |
| $A_{núcleo-parche}$ | area of the project changing from core to patch, the final year of the monitoring period; has |

*y,*

$$DFS_{REDD+proy,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{perforado} - A_{perforado-parche}\right)$$

*Where:*

| | |
|---|---|
| $DFS_{REDD+proy,year}$ | Annual secondary degradation in the project area; ha |
| $t_1$ | Year of beginning of monitoring period; year |
| $t_2$ | Year end of monitoring period; year |
| $A_{perforado}$ | Area of the project in class drilled, in the year of the beginning of |

the monitoring period; has

$A_{perforado-parche}$ Area changing from drilled to patch, in the final year of the monitoring period; has

During the monitoring period, no alterations in forest area due to primary or secondary degradation were observed. Therefore, annual emissions for the period 2021-2023 are considered zero (0) (Table 31).

**Table 31.** Project emissions from deforestation, for the period 2021-2023.

| Year | Type of degradation | PFD *projection, year (ha/year)* | DBTi *(tCO2e/ha)* | Project GHG emissions *(tCO2e)* |
|---|---|---|---|---|
| 2021 | Core - Patch | 0,00 | 251,85 | 0,0 |
| 2022 | Core - Patch | 0,00 | | 0,0 |
| 2023 | Core - Patch | 0,00 | | 0,0 |
| 2021 | Perforated - Patch | 0,00 | 177,86 | 0,0 |
| 2022 | Perforated - Patch | 0,00 | | 0,0 |
| 2023 | Perforated - Patch | 0,00 | | 0,0 |

**Source:** Cataruben Foundation, 2024

## 16.3 Leakage

### *16.3.1 Emissions from deforestation*

The calculation of emissions from deforestation in the leakage area was made taking into account the change in forest area and the emission factor, using the following equations:

$$CSB_{f,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{f,1} - A_{f,2}\right)$$

Where:

$CSB_{f,year}$ Annual change in area covered by forest in the leakage area; ha

$t_2$ Year end of monitoring period; year

$t_1$ Year of beginning of monitoring period; year

$A_{f,1}$ Area in forest, in the leakage area at the beginning of the monitoring period; ha

$A_{f,2}$ Area in forest, in the leakage area at the end of the monitoring period; ha

y,

$$EA_{f,year} = \left(DEF_{f,year} x TCO_{2eq}\right) - EA_{lb,f,year}$$

Where:

$EA_{f,year}$ Annual emission in the leakage area; tCO2/ha

$DEF_{f,year}$ Annual deforestation in the leakage area; ha

$TCO_{2eq}$ Total carbon dioxide equivalent; tCO2e/ha

$EA_{lb,f,year}$ Annual emission from deforestation in the leakage area in the baseline scenario; tCO2e

According to the above, a total of $CSB_{f,year}$ = 10.75 ha/year during the monitoring period. This represents average annual emissions of 2,091.41 tCO2e. However, when comparing this record with the baseline emissions scenario, it does not represent a significant increase in GHG emissions as a result of the implementation of the project's REDD+ activities.

**Table 32.** Emissions from deforestation in the leakage area, for the period 2021-2023.

| Year | CSBproy,year (ha/year) | CTeq (tCO2e/ha) | GHG emissions in the leakage area (tCO2e) | GHG emissions in the leakage area in baseline (tCO2e) | GHG emissions attributable to leakage due to project activities (tCO2e) |
|---|---|---|---|---|---|
| 2021 | 10,75 | 194,59 | 2.091,41 | 4.903,67 | -2.812 |
| 2022 | 10,75 | | 2.091,41 | 4.903,67 | -2.812 |

| | | | | | |
|---|---|---|---|---|---|
| 2023 | 10,75 | | 2.091,41 | 4.903,67 | -2.812 |

**Source:** Cataruben Foundation, 2024

*16.3.2 Emissions from degradation*

The estimation of annual degradation in the leakage area was estimated by applying the following equations:

$$DFP_{f,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{núcleo,f} - A_{núcleo-parche,f}\right)$$

Where:

| | |
|---|---|
| $DFP_{f,year}$ | Annual primary degradation in the leakage area; ha |
| $t_1$ | Year of start of monitoring period; year |
| $t_2$ | Year end of monitoring period; year |
| $A_{núcleo,f}$ | Leakage area in core class, in the year of the beginning of the monitoring period; has |
| $A_{núcleo-parche,f}$ | Leakage area changing from core to patch, in the final year of the monitoring period; has |

y,

$$DFS_{f,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{perforado,f} - A_{perforado-parche,f}\right)$$

| | |
|---|---|
| $DFS_{f,year}$ | Annual secondary degradation in leakage area; ha |
| $t_1$ | Year of beginning of monitoring period; year |
| $t_2$ | Year end of monitoring period; year |
| $A_{perforado,f}$ | Area of leakage in perforated class year of beginning of monitoring period; ha |

$A_{perforado-parche,f}$ area of leakage changing from borehole to patch, in the final year of the monitoring period; has

Similar to what occurred in the project area, there was no evidence of degradation processes affecting the forest cover in the leakage area. Therefore, annual emissions for the period 2021-2023 are considered zero (0) (Table 33).

**Table 33.** Emissions from degradation in the leakage area, for the period 2021-2023.

| Year | Type of degradation | DFi *f, year (ha/year)* | DBTi *(tCO2e/ha)* | GHG emissions attributable to leakages *(tCO2e)* |
|---|---|---|---|---|
| 2021 | Core - Patch | 0,00 | 251,85 | 0,0 |
| 2022 | Core - Patch | 0,00 | | 0,0 |
| 2023 | Core - Patch | 0,00 | | 0,0 |
| 2021 | Perforated - Patch | 0,00 | 177,86 | 0,0 |
| 2022 | Perforated - Patch | 0,00 | | 0,0 |
| 2023 | Perforated - Patch | 0,00 | | 0,0 |

**Source:** Cataruben Foundation, 2024

## 16.4 Net GHG emission reductions/removals

The quantification of emissions reduced by avoided deforestation and degradation during the monitoring period is the result of the relationship between emissions in the baseline scenario, emissions during the project and emissions due to leakage, applying the following equation:

$$RE = (t_2 - t_1) x (EA_{lb,year} - EA_{proy,year} - EA_{f,year})$$

Where:

$RE$ Net reduction of GHG emissions; tCO2e

$t_2$ Year end of monitoring period; year

$t_1$ Year of beginning of monitoring period; year

$EA_{lb,year}$ Annual emission in the baseline scenario; tCO2e

$EA_{proy,year}$ Annual emission in the project area for the period monitored; tCO2e

$EA_{f,year}$ Annual emission in the leakage area for the monitored period; tCO2e

For the monitoring period, there was no significant increase in GHG emissions in the area of leakage due to deforestation and forest degradation, so to avoid overestimations at the time of applying the equation, the values recorded as negative were taken as zero (0) in the final calculations.

Thus, during the third monitoring period of the project, a reduction of 77,606 tCO2e was recorded (Table 34), of which 71.54% is attributed to avoided deforestation and the remaining 28.46% to avoided forest degradation.

**Table 34.** Project emissions from deforestation, for the period 2021-2023.

| Verification | Year | GHG emissions in the baseline scenario *(tCO2e)* | Project GHG Emissions *(tCO2e)* | GHG emissions attributable to leakage *(tCO2e)* | Net GHG reduction *(tCO2e)* |
|---|---|---|---|---|---|
| THIRD | 01/01/2021 - 31/12/2021 | 27.621 | 765 | - | 26.856 |
| | 01/01/2022 - 31/12/2022 | 28.050 | 765 | - | 27.285 |
| | 01/01/2023 - 31/12/2023 | 24.231 | 765 | - | 23.465 |
| | **Total** | **79.902** | **2.296** | **-** | **77.606** |
| | **Annual average** | **26.634** | **765** | **-** | **25.869** |

**Source:** Cataruben Foundation, 2024

## 16.5 Comparison of actual emission reductions with project document estimates

The actual net emissions reductions recorded during the 2021-2023 monitoring period showed differences compared to the ex-ante estimate, presenting a variation of approximately 46.7%, higher than initially projected (Table 35).

These differences are mainly due to the decrease in deforestation and degradation events in both the leakage area and the project area, being significantly lower than those projected in the baseline scenario. Thus, GHG emissions in the with-project scenario were lower, which directly impacts the project's total emissions reduction.

**Table 35.** Comparison of estimated and reported GHG emission reductions in the monitoring period (2021-2023).

| Year | Estimated net GHG reduction *(tCO2e)* | Observed net GHG reduction *(tCO2e)* | Difference |
|---|---|---|---|
| 2021 | 18.612 | 26.856 | 44,30% |
| 2022 | 18.734 | 27.285 | 45,65% |
| 2023 | 15.530 | 23.465 | 51,09% |
| **Total** | **52.876** | **77.606** | **46,77%** |

**Source:** Cataruben Foundation, 2024

## 16.6 Comments on the difference with the estimated value in the recorded project document

The differences observed between the baseline scenario and monitoring are mainly due to the behavior of GHG emissions in the leakage area and in the project area.

In terms of avoided deforestation results, a reduction of 83.29% of GHG emissions in the project area had been projected; however, during the 2021-2023 period, a 96% reduction was recorded, i.e., 12.7% more than initially projected. Likewise, due to the implementation of the project activities, a 16% increase in emissions in the leakage area was expected; however, emissions during this period were significantly lower than the baseline scenario; therefore, since there was no increase, they are assumed to be zero (0).

Regarding forest degradation, there were no changes in the forest area attributed to primary and secondary degradation events, both in the project area and in the leakage area. In this sense, emissions during the monitoring period were zero, which implies a 100% reduction.

*History of the document*

| *Version* | *Date* | *Nature* |
|---|---|---|

| | | |
|---|---|---|
| *1.0* | *28/06/2024* | *Initial version of the document* |
| *1.1* | *21/09/2024* | *Update of maps and titles, description of SDGs and safeguards.* |