MONITORING REPORT 2018-2022
ORINOCO2

Document prepared by Cataruben Foundation

Date of issue (*V2.6 09/12/2024*)

Monitoring report template (Version 1.1)[1]	
Name of project	**ORINOCO$_2$**
BCR Project ID	*BCR-CO-635-14-006*
Registration date of the project activity	
Project holder	*Cataruben Foundation*
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Version number of the Project Document applicable to this monitoring report	*Version 2.6* *(09/12/2024)*
Applied methodology	BCR 0002 Y BCR 0005

[1] The instructions on this form are a guide. No It represents an exhaustive list of the information that the preparer must provide in each section of the template.

Monitoring report template (Version 1.1)[1]	
Project location (Country, Region, City)	***Colombia, orinoquia,*** ***Meta: Puerto Gaitán, Puerto López; San Martín; Mapiripán.*** ***And*** ***Vichada: Puerto carreño, La Primavera, Santa Rosalía, Cumaribo***
Project starting date	*01/10/2018*
Quantification period of GHG reductions/removals	*01/10/2018–31/12/2027*
Monitoring period number	*1*
Monitoring period	*01/10/2018–31/12/2022*
Amount of emission reductions or removals achieved by the project in this monitoring period	*Total reduction of GHG :**657.082** tCO2e* *Annual average: **154.608** tCO2e*
Contribution to Sustainable Development Goals	6, 13,15
Special category, related to co-benefits	WAX PALM

Table of Content

1. General description of the project

ORINOCO$_2$: Is a climate change mitigation project that is developed in the highlands of the departments of Meta and Vichada in Colombia. The project seeks to reduce greenhouse gas emissions caused by deforestation, forest degradation and land use change in the savanna ecosystem.

The project is led by the Cataruben Foundation, with the support of Ecopetrol and the owners of the properties. Cataruben and Ecopetrol are responsible for generating the enabling conditions of the project, leading the monitoring, reporting and management procedures for verifications, as well as ensuring the commercialization of carbon credits. While the owners of the properties carry out the necessary activities within their properties.

The main causes of deforestation, forest degradation and change in land use in the region are the expansion of the agricultural frontier and forest fires. The project implements forest conservation activities and promotes the sustainable use of natural savannas to reduce pressure on these ecosystems.

The project includes environmental and social co-benefits, therefore certifying the benefits in the Wax Palm category of the standard BCR. The project activities also contribute to Sustainable Development Goals 6, 13 and 15.

1.1. Sectoral scope and type of project

The project is classified within the AFOLU sector in the categories REDD+ and Activities that prevent land use change in natural savannas.

1.2. Project start date

The project start date is October 1, 2018.

1.3. Project quantification period

Start date: October 1, 2018

Finish date: December 31, 2027

Total years: 10 years.

1.4. Project location and project boundaries.

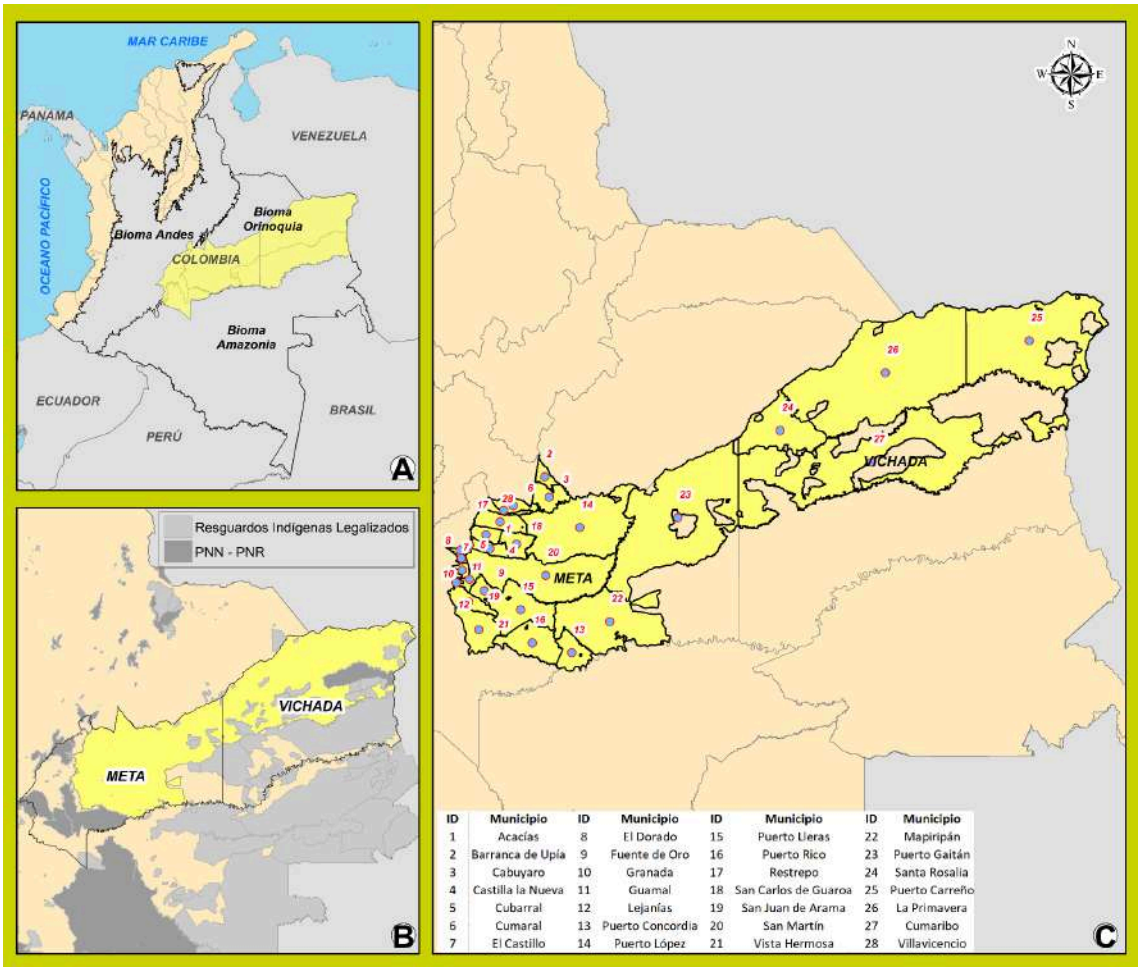
The project is located in the Colombian Orinoquia biome, Los Llanos Ecoregion, according to the WWF[2], within the high plain of the departments of Meta and Vichada.

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

The intervention area is located in 2 departments with 28 municipalities (Figure 1C), distributed as follows: Meta (24 municipios “Acacias, Barranca de Upía, Cabuyaro, Castilla La Nueva, Cubarral, Cumaral, El Castillo, El Dorado, Fuente de Oro, Granada, Guamal, Lejanías, Puerto Concordia, Puerto López, Puerto Lleras, Puerto Rico, Restrepo, San Carlos de Guaroa, San Juan de Arama, San Martín, Vista Hermosa, Mapiripán, Puerto Gaitán”) and Vichada (4 Municipios “Cumaribo, La Primavera, Puerto Carreño y Santa Rosalía”).

2 WWF= Worldwildlife, https://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world.

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



Source: Own elaboration.

The project areas correspond solely and exclusively to private properties whose land ownership modality is comparable to those found in the reference region (Ownership, Possession and Tenure). The relevant cartographic information is available in the specific geospatial databases for each component, located on the route Gdb\project_area.

The Table 1, shows the project areas by political-administrative division, additionally geographical coordinates of the centroid are recorded.

Table 1. Geographic coordinates of the properties linked to the project.

DEPARTMENT	MUNICIPALITY	PROPERTY	LENGTH	LATITUDE
Vichada	La Primavera	La Reforma	69° 56' 46.469" W	5° 24' 26,979" N
Vichada	La Primavera	El Morichal	69° 30' 46.275" W	5° 6' 27,373" N
Vichada	Santa Rosalia	Tierra Santa	70° 41' 50.630" W	5° 2' 55,945" N
Vichada	Cumaribo	La Conquista	70° 6' 40.075" W	4° 35' 49,746" N
Vichada	Santa Rosalia	El Amparo	70° 41' 28.173" W	5° 3' 3,252" N
Vichada	Cumaribo	Muzolandia	70° 11' 16.636" W	4° 51' 42,640" N
Vichada	Cumaribo	Santa Ana	70° 9' 57.506" W	4° 51' 46,724" N
Vichada	Cumaribo	Santa Paula	70° 8' 24.575" W	4° 52' 39,414" N
Vichada	Cumaribo	La Hermita	70° 7' 51.415" W	4° 37' 0,420" N
Vichada	Puerto Carreño	Lote El Ocarro	68° 3' 50.076" W	5° 56' 17,799" N
Vichada	La Primavera	Lote Cacay	70° 11' 8.483" W	5° 7' 19,817" N
Vichada	La Primavera	Boral	70° 16' 51.530" W	5° 4' 6,874" N
Vichada	Santa Rosalía	Saigon	70° 59' 28.727" W	4° 54' 42,518" N
Vichada	La Primavera	La Cristalina	70° 37' 19.784" W	5° 19' 50,576" N
Vichada	Santa Rosalía	Palma Seca	70° 37' 45.072" W	5° 13' 8,660" N
Vichada	Santa Rosalía	La Pradera	70° 48' 10.797" W	4° 56' 32,819" N
Vichada	Santa Rosalía	Samaria	70° 48' 55.547" W	5° 9' 49,786" N
Vichada	Santa Rosalía	La Pradera	70° 49' 15.091" W	4° 56' 30,570" N
Vichada	Santa Rosalía	La Chumascada	70° 35' 13.140" W	5° 11' 29,549" N
Vichada	Santa Rosalía	Miami	70° 47' 6.015" W	4° 56' 44,665" N
Vichada	Santa Rosalía	Simaru	70° 46' 15.469" W	4° 59' 47,274" N
Vichada	Santa Rosalía	Costa Rica	70° 44' 59.548" W	4° 57' 19,051" N
Vichada	Santa Rosalía	Tamanaco	70° 40' 2.860" W	5° 10' 54,288" N
Vichada	La Primavera	Venus	70° 14' 53.478" W	5° 4' 40,333" N
Vichada	Santa Rosalía	Villa Carolina	70° 49' 11.361" W	5° 7' 57,215" N

Vichada	Cumaribo	Bellavista	70° 12' 3.943" W	4° 44' 35,061" N
Vichada	Cumaribo	Cawinanay	70° 9' 25.065" W	4° 47' 2,640" N
Vichada	Cumaribo	Dos Diamantes	70° 7' 37.786" W	4° 49' 56,418" N
Vichada	La Primavera	El Venado	70° 13' 35.729" W	5° 6' 54,934" N
Meta	Puerto Gaitan	Lote Tres Cielos Lote 2	71° 32' 23.140" W	4° 8' 52,147" N
Vichada	Cumaribo	Waykiky	70° 5' 50.912" W	4° 34' 15,456" N
Vichada	La Primavera	Los Deseos San Andres	70° 39' 53.831" W	5° 18' 1,890" N
Vichada	Santa Rosalía	El Manguito	70° 38' 57.852" W	5° 16' 28,867" N
Vichada	La Primavera	Lote 1	70° 28' 16.799" W	5° 21' 26,325" N
Vichada	Santa Rosalía	Mata Negra	70° 45' 13.656" W	5° 0' 1,788" N
Vichada	Santa Rosalía	El Milagro	70° 49' 53.270" W	5° 0' 52,427" N
Vichada	Santa Rosalía	Puerto Dabeiba	70° 40' 9.962" W	5° 20' 58,922" N
Vichada	La Primavera	Lote 13	70° 29' 42.758" W	5° 20' 2,326" N
Vichada	Santa Rosalía	Costa Rica	70° 46' 2.107" W	4° 57' 3,770" N
Vichada	Cumaribo	Capijirito	70° 11' 40.221" W	4° 46' 21,160" N
Vichada	La Primavera	La Macarena	70° 37' 45.208" W	5° 20' 53,851" N
Vichada	La Primavera	La Esmeralda	70° 34' 5.765" W	5° 16' 42,275" N
Vichada	La Primavera	Los Cocos	70° 8' 52.814" W	5° 2' 29,419" N
Vichada	La Primavera	Los Laureles	70° 8' 39.742" W	5° 1' 9,054" N
Vichada	La Primavera	Mi Conuco	70° 8' 22.129" W	5° 3' 50,442" N
Vichada	Cumaribo	La Bohemia	70° 26' 56.502" W	4° 29' 35,701" N
Vichada	Cumaribo	Yaguarama	70° 27' 40.909" W	4° 23' 33,850" N
Vichada	La Primavera	Lote 2	70° 28' 42.378" W	5° 21' 17,374" N
Vichada	Cumaribo	Los Claveles	70° 13' 51.132" W	4° 44' 53,343" N
Vichada	La Primavera	La Mariposa	70° 2' 50.364" W	5° 30' 20,414" N
Vichada	La Primavera	La Gaviota	70° 33' 45.429" W	5° 16' 55,633" N
Vichada	Puerto Carreño	Cayure	70° 11' 20.624" W	4° 49' 12,283" N
Vichada	Santa Rosalia	Bet-El	70° 39' 59.843" W	5° 4' 40,076" N

Vichada	Puerto Carreño	La Soledad	70° 30' 33.609" W	4° 16' 24,527" N
Vichada	Cumaribo	Chaqueva	70° 23' 22.429" W	4° 15' 16,969" N
Meta	Mapiripan	Finca El Retiro	72° 35' 17.751" W	3° 16' 7,262" N
Vichada	Puerto Carreño	El Zafiro	68° 7' 31.276" W	5° 24' 42,918" N
Vichada	Puerto Vichada	Vista Hermosa	68° 8' 41.775" W	5° 27' 58,261" N
Vichada	La Primavera	Rnsc Matapalito	69° 59' 24.310" W	5° 33' 22,487" N
Vichada	Cumaribo	Constitucion	68° 52' 52.970" W	4° 57' 59,349" N
Vichada	La Primavera	Los Alcornocos	69° 1' 46.056" W	5° 24' 4,425" N
Vichada	La Primavera	Predio El Chaparral	68° 59' 3.618" W	5° 24' 13,934" N
Meta	Puerto Lopez	Hacienda Nuevo Mururito	72° 9' 46.262" W	4° 1' 50,278" N
Vichada	La Primavera	El Convento	69° 3' 9.551" W	5° 24' 40,866" N
Vichada	La Primavera	Los Algarrobos	68° 59' 51.781" W	5° 22' 6,275" N
Vichada	Santa Rosalia	Finca Las Brisas	70° 44' 25.143" W	5° 12' 11,578" N
Vichada	Santa Rosalia	Las Gaviotas	70° 44' 52.300" W	5° 12' 15,010" N
Vichada	Santa Rosalia	Control Reserva	70° 45' 42.295" W	5° 12' 53,150" N
Vichada	Santa Rosalia	El Control	70° 45' 28.722" W	5° 12' 35,093" N
Vichada	Santa Rosalia	La Orquidea	70° 45' 7.118" W	5° 12' 32,674" N
Vichada	Puerto Carreño	Luisyana I	68° 36' 26.290" W	6° 5' 58,973" N
Vichada	Cumaribo	Providencia	69° 27' 1.535" W	4° 58' 38,459" N
Vichada	La Primavera	Matalarga	69° 38' 23.890" W	5° 41' 3,272" N
Vichada	La Primavera	El Jobal	69° 37' 51.281" W	5° 38' 39,839" N
Vichada	Santa Rosalia	Lote (Fundacion La Esperanza)	70° 39' 15.290" W	5° 19' 50,874" N
Vichada	La Primavera	Laguna Grande	69° 40' 8.002" W	5° 16' 27,713" N
Vichada	La Primavera	El Progreso	70° 29' 13.107" W	5° 1' 40,835" N
Vichada	La Primavera	Villa Lorena	69° 40' 22.015" W	5° 18' 27,380" N
Vichada	La Primavera	La Sierra	69° 37' 42.493" W	5° 16' 56,724" N
Vichada	La Primavera	La Conquista	68° 6' 40.426" W	5° 29' 35,460" N
Vichada	La Primavera	Los Huerfanitos	70° 4' 27.756" W	4° 56' 33,957" N

Vichada	La Primavera	Brisas Del Lolo	70° 11' 14,300" W	4° 54' 45,188" N
Vichada	La Primavera	La Milagrosa	70° 13' 13.921" W	4° 54' 12,610" N
Vichada	Puerto Carreño	Maracana V	68° 38' 19.443" W	5° 51' 22,335" N
Vichada	Puerto Carreño	Matazul	68° 59' 40.535" W	6° 6' 20,776" N
Vichada	Primavera	El Rincon De Mata Azul	68° 57' 48.434" W	6° 5' 53,977" N
Vichada	La Primavera	Guaimarito	68° 59' 30.624" W	6° 9' 33,351" N
Meta	Puerto Gaitan	La Palmita	71° 57' 45.242" W	4° 18' 46,600" N
Meta	Puerto Gaitan	La Tigra	72° 0' 3.092" W	4° 18' 0,601" N
Vichada	Puerto Carreño	La Herradura	68° 6' 49.981" W	5° 28' 2,355" N
Vichada	Puerto Carreño	Las Palmas	68° 6' 19.637" W	5° 26' 37,459" N
Vichada	La Primavera	La Laguna	70° 9' 42.506" W	4° 54' 38,255" N
Vichada	Puerto Carreño	El Gran Marco Polo	69° 0' 53.731" W	6° 6' 42,884" N
Vichada	Puerto Carreño	Mata Mojada	68° 18' 55.257" W	5° 53' 15,330" N
Vichada	La Primavera	El Sinai	70° 32' 45.805" W	5° 4' 28,839" N
Vichada	Primavera	Las Delicias	70° 34' 21.080" W	5° 5' 29,810" N
Vichada	La Primavera	La Fortuna	70° 38' 16.146" W	5° 1' 11,017" N
Vichada	Puerto Carreño	La Provincia	70° 31' 14.980" W	4° 44' 9,259" N
Vichada	Cumaribo	El Caney	70° 34' 3.667" W	4° 21' 56,736" N
Vichada	Puerto Carreño	Las Guacamayas	68° 34' 29.241" W	5° 59' 50,387" N
Meta	Puerto Gaitan	La Esperanza	71° 6' 27.994" W	4° 12' 59,678" N
Vichada	Cumaribo	Oropel	70° 21' 3.064" W	4° 21' 46,825" N
Vichada	Cumaribo	Yacare	70° 28' 59.124" W	4° 14' 4,029" N
Meta	Puerto Gaitan	Finca El Olimpo	71° 56' 25.596" W	3° 32' 48,772" N
Vichada	Puerto Carreño	El Capricho	70° 13' 29.828" W	4° 48' 12,119" N
Meta	San Martin	Veracruz Iii	73° 35' 23.632" W	3° 30' 40,683" N
Meta	San Martin	Veracruz Ii	73° 34' 33.842" W	3° 30' 13,664" N
Meta	Puerto Lopez	El Boqueron	72° 31' 44.110" W	3° 46' 52,557" N
Meta	Puerto Lopez	Plantacion El Cedral	72° 31' 48.579" W	3° 47' 49,845" N

Vichada	La Primavera	La Victoria	70° 25' 53.266" W	4° 48' 28,142" N
Vichada	Cumaribo	La Loma	70° 18' 55.427" W	4° 21' 56,172" N
Vichada	Cumaribo	La Alegria	70° 17' 36.522" W	4° 15' 28,261" N
Vichada	Cumaribo	La Alegria 2	70° 18' 19.726" W	4° 14' 18,113" N
Vichada	Cumaribo	La Empresita	70° 15' 2.875" W	4° 15' 39,015" N
Vichada	Cumaribo	Victoria	70° 20' 22.479" W	4° 15' 13,982" N
Vichada	La Primavera	Congrial	69° 33' 39.778" W	5° 8' 6,855" N
Vichada	Santa Rosalia	Lagunitas	70° 23' 34.293" W	4° 48' 3,890" N
Vichada	La Primavera	Turuli	69° 32' 22.683" W	5° 8' 34,443" N
Vichada	Primavera	Versalles	70° 13' 18.138" W	4° 57' 5,686" N
Vichada	Rosalia	La Giralda Valle De Luna	70° 24' 33.680" W	4° 50' 34,231" N
Vichada	Santa Rosalía	Buenos Aires	70° 38' 20.442" W	5° 12' 4,822" N
Vichada	Puerto Carreño	Lote El Cachicamo	67° 44' 47.679" W	5° 51' 3,215" N
Vichada	Puerto Carreño	Los Venados	67° 44' 55.056" W	5° 51' 55,729" N
Vichada	La Primavera	Los Angeles	70° 23' 31.678" W	5° 2' 1,876" N
Vichada	La Primavera	La Laguna	69° 54' 57.634" W	5° 23' 58,066" N
Meta	Puerto Gaitan	Finca Lucitania	71° 53' 32.199" W	3° 30' 45,565" N
Vichada	Cumaribo	Brisas Del Tomo	69° 39' 36.464" W	4° 54' 40,255" N
Vichada	La Primavera	Arco Iris	68° 53' 58.391" W	6° 0' 30,061" N
Meta	San Martín	La Flor	72° 52' 17.887" W	3° 16' 17,152" N
Meta	Barranca De Upia	Cachipay	72° 54' 50.609" W	4° 21' 29,101" N
Meta	San Martín	Las Brisas	72° 51' 46.547" W	3° 16' 10,868" N
Meta	San Martín	Finca Samanes	72° 57' 3.666" W	3° 26' 38,422" N
Meta	San Martín	Finca Samanes 2	72° 55' 13.054" W	3° 26' 27,133" N
Meta	San Martín	La Gran Conquista	72° 56' 51.994" W	3° 23' 58,377" N
Meta	San Martín	La Castellana	72° 55' 25.958" W	3° 25' 4,627" N
Vichada	La Primavera	Angosturas	70° 16' 58.835" W	5° 1' 9,773" N
Vichada	La Primavera	Lucitania	70° 17' 40.954" W	5° 2' 41,098" N

Vichada	Cumaribo	El Machimbre	70° 24' 4.126" W	4° 40' 56,024" N
Vichada	Cumaribo	El Eden	68° 8' 10.181" W	4° 58' 5,397" N
Vichada	Cumaribo	El Yarumo	68° 1' 49.117" W	4° 56' 30,426" N
Vichada	Cumaribo	Valle Verde	67° 54' 30.588" W	5° 1' 50,523" N
Vichada	Puerto Carreño	Puerto Rico	70° 30' 7.354" W	4° 17' 40,642" N
Meta	Puerto Gaitán	La Esperanza	71° 14' 0.049" W	4° 14' 7,577" N
Meta	Puerto Gaitán	Buenavista	71° 12' 24.165" W	4° 14' 42,232" N
Vichada	Puerto Carreño	El Algarrobo	70° 27' 27.443" W	4° 17' 5,201" N
Vichada	La Primavera	Fi El Regreso	69° 26' 56.641" W	5° 13' 6,977" N

Source: Own elaboration.

The high plain of the departments of Meta and Vichada is presented as a favorable environment for the implementation of projects in the AFOLU sector, aimed at the reduction and removal of greenhouse gas emissions caused by deforestation, forest degradation and change in the land use.

Different carbon standards are present in this region, among which VERRA stands out.[3], COLCX[4], SEARCH FOR IT[5], GOLD STANDARD y BIOCARBON STANDAR[6]. The figure,Figure 2, provides geographic information about other projects that are developed in the vicinity of the geographic area of the project.

In order to ensure that project areas do not overlap with other projects within their boundaries, a rigorous process was carried out. Initially, cartographic information for each carbon project present in the area was downloaded directly from the website of the corresponding standard. Subsequently, this information was organized in Shapefile according to the standard to which each project belongs.

Next, the “Intersect” algorithm was implemented between the project areas and the areas defined by each carbon standard. The result obtained were empty shapefiles that conclusively indicate the absence of overlap between the project areas and other projects in the region.

3 https://verra.org/

4 https://colcx.com/

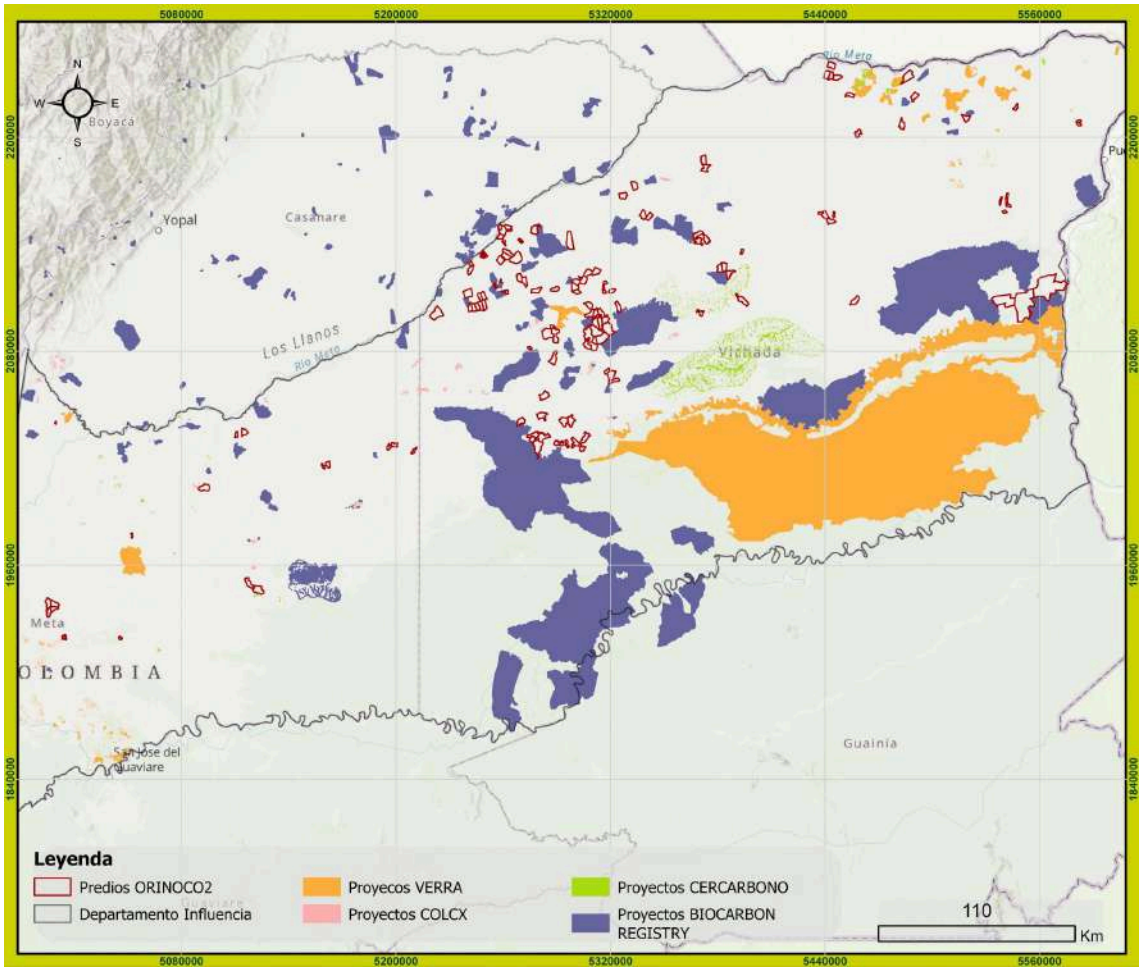
5 https://www.cercarbono.com/es/

6 https://biocarbonregistry.com/es_es/

All relevant cartographic data is properly stored and available in geospatial databases. Located on the route Gdb\carbon_projects. Likewise, a Map Package file entitled ORINOCO2_Standard_carbon, designed to be accessible in any version of ArcGIS Pro. This data set includes cartographic information from the geodatabase and the aforementioned results (For opening in any GIS software). Additionally, an Excel file containing the name of each project organized by standard is provided, providing additional, easily accessible documentation.

In summary, the departments of Meta and Vichada host a substantial presence of projects, totaling thirty-eight. These projects are distributed according to the following standards: VERRA with six projects, COLCX with seven projects, CERCARBONO with six projects, GOLD STANDARD with two projects (AR Projects, without geographical information) and BIOCARBON Standard with seventeen projects.

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



Source: Own elaboration.

1.5. Summary description of project implementation status

During the 2018–2022 monitoring period, sixteen of the seventeen project activities are in execution. Activity G-1 does not show progress in its compliance, considering that its start date is after the start of the commercialization of carbon certificates.

In the section *"Project implementation"* numeral 14 The status of implementation of the project activities is presented in detail. Below, the degree of implementation of each activity is generally related.

Table 2 Implementation status of project activities.

ID	description of the activity	Date of implementation	General progress of the activity
G1	Improved income of owners generated by the sale of carbon credits	Starts from the date of commercialization of the carbon certificates	0,0 %
G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	The activity is in execution. The operation of this activity begins in 2018 with the construction of the capacity strengthening plan.	30,0%
G3	Alliance management that financially allows generating the enabling conditions for the validation and first verification of the project	The progress status of the activity is running. Start in 2022 from Agreement No. 3051645.	64%
G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	The progress status of the activity is running. The design of the governance model begins in 2018.	10,0%
G5	Promote the delimitation and signaling in strategic ecosystems and natural protection areas	The activity is in execution. The identification of areas of importance for biological diversity begins in 2018.	25,0%
G6	Promote the recognition of conservation areas and figures for the sustainable management of ecosystems	The activity is in execution. The implementation of the activity begins with the initial characterization of the properties in 2018. Cronograma detallado …	1,3%
G7	Develop a Plan for Efficient Use and Saving of Water in Homes (PUEAA), linked in the project	The activity is in execution. The implementation of the activity begins with the characterization of the properties in 2018. The Efficient Use and Water Saving Plans for each property are presented.	24,8%

ID	description of the activity	Date of implementation	General progress of the activity
		Cronograma detallado …	
R1	Implementation of sustainable fire use management practices for the prevention of forest fires	The activity is in execution. The implementation of the activity begins with the initial characterization of the properties in 2018. The sustainable management practices implemented on the properties for the monitoring period are reported. Cronograma detallado …	83,7%
R2	Monitoring of hot spots as an early warning mechanism	The activity is in execution. The start date of the activity is 2018,	5%
R3	Promotion of the establishment of eco-efficient stoves and wood energy banks	The activity is in execution. The implementation of the activity begins with the initial characterization of the properties in 2018. The properties that have implemented the use of eco-efficient stoves and wood energy banks are reported. Cronograma detallado …	4,2%
S1	Implementation of landscape management tools in savannas	The activity is in execution. The implementation of the activity begins with the initial characterization of the properties in 2018. The properties that implement Landscape Management Tools for the monitoring period are reported. Cronograma detallado …	41,6%
S2	Implementation of sustainable productive practices in natural savannas	The activity is in execution. The implementation of the activity begins with the initial characterization of the properties in 2018. The	60,0%

ID	description of the activity	Date of implementation	General progress of the activity
		sustainable production practices implemented on the properties for the monitoring period are reported. Cronograma detallado …	
B1	Identification and monitoring of High Conservation Values (HCVs) present in the project area	The activity is in execution. Starting in 2018, the analysis of the High Conservation Values (HCVs) associated with the biodiversity component is carried out.	25,0%
B2	Monitoring the presence of globally threatened species and taking actions to conserve them	The activity is in execution. In 2018, the activity began with the design of the methodology for the development of participatory biodiversity monitoring.	25,0%
B3	Restoration actions in degraded ecosystems	The activity is in execution. The implementation of the activity begins with the initial characterization of the properties in 2018. The analysis of the properties that implement restoration actions for the monitoring period is reported. Cronograma detallado …	25%
EG1	Strengthening access and management of financial goods and services with a focus that achieves gender equity	The activity is in execution. The implementation of the activity begins with the characterization of access to financial goods and services carried out for the women owners of the properties in the year 2022. Cronograma detallado …	10,0%

Source: Cataruben Foundation, 2023.

For its part, for the period between 10/01/2018–12/31/2022, 320,747 tCO2e were recorded reduced by avoiding changes in land use in natural savannas, and 331,671 tCO2e by avoiding deforestation and forest degradation in the project areas. For a total of 652,418 tCO2e reduced in the first monitoring period.

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

Given that project activities seek to reduce emissions from deforestation, forest degradation and reduce emissions from land use change of natural savannas, two quantification methodologies are used in their most recent versions.

- AFOLU Sector Methodological Document / Quantification of GHG Emission Reductions from REDD+ Projects BCR0002. Version 4.0. May 2024.
- Sector Methodological Document AFOLU / BCR0005 Quantification of the Reduction of GHG Emissions and Removals - Activities that prevent land use change in natural savannas. Version 1.0 from October 21, 2022.

Likewise, the following tools provided by BCR are used:

- Tool for Monitoring, Reporting and Verification. Version 1.0 / February 2023
- Tool for determining contributions to the fulfillment of the Sustainable Development Goals (SDG) of Greenhouse Gas (GHG) projects. Version 1.0 / July 13, 2023
- Tool “Sustainable Development Safeguards (SDSs). Version 1.1 / July 2023
- Tool to demonstrate compliance with REDD+ safeguards. Version 1.1. / January 26, 2023
- Permanence and Risk Management Tool version 1.1 / March 2024
- Tool to avoid double accounting version 2.0 / February 7, 2024

3. Registration or participation in other GHG Programs/Registries

THE project has not been registered or registered in another GHG program

4. Contribution to the Sustainable Development Goals (SDGs)

In 2015, the main world leaders, in an attempt to eliminate extreme poverty, protect the planet and, in general, ensure prosperity for the world's population, set up the Global Goals. Each of them has specific goals that must be achieved by the year 2030. And for this, governments, the private sector and the population in general can make a contribution.

In this sense, and as provided by the Standard *BioCarbon Standard, Version 3.4*, the tool *Sustainable Development Safeguards (SDSs Tool)*, *Version 1.1 July 2024*, and the SDG Tool (2023) that determines contributions to the Sustainable Development Goals (SDG) or Global Goals. A set of activities was established within the framework of the project, the design of which is not restricted to the mitigation of constantly increasing climate change or the reduction and quantification of GHG emissions. In addition, criteria were defined on the scope of contributions achieved for the SDGs. This process consisted of an analysis of each of these activities or actions within the framework of the project, and as a result three global objectives were specifically chosen. Now, the approach, the percentage of contribution and the evidence are illustrated in the attached document. To see in: Annex 6.3. Tool-SDG-2023.

Below, each of the selected SDGs is described, in addition to their approach and compliance, according to the specific activity that relates to it within the framework of the project for the period 2018-2022:

4.1. SDG 6 (Clean Water and Sanitation)

“Guarantee the availability of water and its sustainable management and sanitation for all.”

Figure 3 **ODS 6 goal** (Water and sanitation).

Adapted from: https://www.isglobal.org/, 2023.

After using the SDG (2023) tool in the project, it was determined that Sustainable Development Goal 6, focused on the issue of Water and Sanitation, seeks to achieve goal 6.1.1 (*"Proportion of the population that has safely managed drinking water supply services"*) (Figure 4).

Figure 4 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	Verificacion (Periodo 2018 - 2022)
6.1 De aquí a 2030, lograr el acceso universal y equitativo al agua potable a un precio asequible para todos.	6.1.1 Proporción de la población que dispone de servicios de suministro de agua potable gestionados de manera segura	Desarrollar un Programa de Calidad, Uso Eficiente y Ahorro del Agua en los Hogares (PCUEAA)	Diagnosticar, diseñar, Implementar y hacer seguimiento de un plan de calidad, uso eficiente y ahorro del agua (PCUEAA) que permita ejecutar actividades de mejoramiento del uso del agua para consumo humano y el manejo de las aguas residuales.	Permanente	%	1. CARACTERIZACION PREDIAL (COMPONENTE AGUA) 2. DIAGNOSTICO GENERAL DEL USO Y MANEJO DEL RECURSO HIDRICO EN EL HOGAR

With the objective of achieving the stated purpose, a characterization of the linked properties was carried out, concentrating on the water component. This made it possible to identify the sources of water resources supply and subsequent water management. This process, in turn, contributes to the identification of the key needs of the community involved in the project.

Based on the information collected through this survey, the *Quality, Efficient Use and Water Savings Program (PCUEAA)* for each property. The objective is to raise awareness among the population involved in the project about the importance of sustainable management of the resource and promote activities and practices that promote its quality, conservation and efficient use. It is imperative to highlight that this project is essential to guarantee 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.

Several scientific studies demonstrate that the conservation of water sources is essential to maintain the biodiversity and health of aquatic ecosystems. Additionally, it allows addressing the challenges of water scarcity that affect communities. According to data reported by the United Nations, globally, one in three people lacks access to safe drinking water, two in five people do not have basic facilities to wash their hands with soap and water, and more than 673 million people continue to defecate in the open. In view of these global statistics, the project brings together efforts to confront this problem and generate a change in the quality and efficiency of water use over time.

The project adheres to compliance with SDG 6 through the application of the four methodological stages established in the project Design Document. To evaluate progress, the following equation is used:

$$\%\ Progress\ = \frac{(N°D*0.10)+(N°DI*0.15)+(N°I*0.55)+(N°S*0.20)}{n}$$

Equation 1. Calculation to determine the percentage of progress in terms of compliance with SDG 6 in the project ORINOCO2.

Where:

N°D = Number of Diagnosed properties

N°DI = Number of properties with Design

N°I = Number of properties implemented

N°S = Number of properties with monitoring.

n = Total number of properties

It is necessary to highlight that the present document is focused on the diagnosis and design of programs aimed at the quality, efficient use and saving of water in the **149** properties that make up the project.

To date, a total of 148 properties have been registered and 149 Individual Programs for Quality, Efficient Use and Saving of Water (PUEAA) have been developed. These programs are available in the section of the **SDG 6 (Sustainable Development Goals)**. Together with the diagnosis, it presents the statistical results obtained from the characterization of the properties in relation to the water component. It is important to highlight that the PUEAA documents corresponding to the remaining property (LA CHIRIPA) are still in the process of being prepared and are expected to be completed during the design phase.

In summary, to date, the project has made significant progress. The **14.8%** of the diagnostic phase, which represents an improvement of the 10% previously established (with the characterization of **149** properties). Furthermore, a solid **22,2%**, equivalent to the planned 15% (with **148** properties that have their respective Efficient Use and Water Saving Plans, PUEAA). These combined achievements reflect a global advance of the **24.8%** towards the general goal, as can be seen in the distribution of the stages in the equation.

$$\%\ Progress\ = \frac{(148*0{,}10)+(148*0{,}15)+(0*0{,}55)+(0*0{,}20)}{149} = 25$$

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

4.2. Progress of the indicator compared to the global goal

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

Table 3**.** Result of progress in compliance with SDG 6 (Water and sanitation), with respect to the global goal.

ODS	SDG Global Indicator	Approach and/or Compliance	Progress (%) Period 2018-2022 with respect to the global goal
6	6.4.1 Change in water use efficiency over time	Of the **149** linked properties, have been completed **148** diagnostics and have been created **148** PUEAA's. The main activities have included the characterization of the properties, the development of plans for the efficient use and saving of water, and the diagnosis of the project.	**24.8%**

Source: Cataruben Foundation, 2023.

4.1.1 Compliance with indicator 6.4.1

To check progress in 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 highlight that the use of all tokens will depend on the specific needs of each property.

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

Equation 3. Calculation to determine the percentage of compliance with indicator 6.4.1.

Where:

∑(i=1)^n x Imp. Tokens = Sum of the average implementation of the 3 management sheets per property

n P. Imp. = Number of properties implemented

n = Total number of properties

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

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

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

4.3. ODS 13: fight against climate change

Sustainable Development Goal (SDG) 13 aims to incorporate climate change-related measures into national policies, strategies and plans. Specifically, for this project an approach to reducing Greenhouse Gas (GHG) emissions is considered from the reduction of deforestation, degradation and change in land use in natural savannas as a result of the implementation of the project activities.

In this context, during the period between 10/01/2018 and 12/31/2022, greenhouse gas (GHG) emissions produced in the project area and the leakage area were monitored. This monitoring made it possible to compare the reduction of said emissions in relation to the reference value estimated through the baseline.

During the monitoring period, greenhouse gas (GHG) emissions were recorded, however, the figures are below the reference value, demonstrating a 98.66% reduction in GHG emissions compared to the annual average estimated in the baseline scenario. This represents a reduction of 656,798 tCO2e.

Likewise, compared to the global goal for the first quantification period of the project, progress of 42.64% is evident (Table 4).

Table 4. Result of progress in compliance with SDG 13 (Climate Action), with respect to the global goal.

ODS	SDG Global Indicator	Approach and/or Compliance	Progress (%) Period 2018-2022 with respect to the global goal
13	13.2.2 Total greenhouse gas emissions per year	GHG emissions were monitored for the period 2018-2022, which evaluated compliance with the objective in terms of reducing GHG emissions in relation to the baseline scenario.	**42,64%**

Source: Cataruben Foundation, 2024.

4.4. ODS 15: Life of Terrestrial Ecosystems

The identification of the activities that must be carried out to comply with SDG 15 was carried out, through three activities related to the SDG tool, which were:

- 15.1.1 Forest area as a proportion of the total area (ID-G-5.0).
- 15.1.2 Proportion of sites important for terrestrial and freshwater biodiversity that are part of protected areas, disaggregated by ecosystem type (ID-G-5.1).
- 15.5.1 Red List Index (ID-B-2.1).

The aforementioned activities were developed with the purpose of addressing critical processes within the project, with the objective of improving the conditions of terrestrial

ecosystems and promoting the protection, restoration and sustainable use of eligible project areas. In this sense, methodologies and activities have been generated that are detailed in the report contained in the annex. ODS 15. In this way, we guarantee that the development of activities focuses on the guidelines mentioned in the selection tool and that, within the project activities, the implementation of certain indicators that support continuous improvement in ecosystems was carried out.

Table 5 shows the progress in meeting SDG 15 in relation to the global goal proposed by the Cataruben Foundation.

Table 5. Result of progress in compliance with SDG 15 (Climate Action), with respect to the global goal.

ODS	SDG Global Indicator	Approach and/or Compliance	Progress (%) Period 2018-2022 with respect to the global goal
15	15.1.1 Forest area as a proportion of the total area	For the calculation and reporting, the guidelines defined in the environmental indicators of the Ministry of the Environment and Sustainable Development and IDEAM corresponding to the indicator were followed. Galindo et al., (2019). The indicator establishes a relationship between the area covered by natural forest and the total area of the region at a specific time. This information is extracted from forest cover maps generated from PDI on the Google Earth Engine platforms.	**10,0%**

	15.1.2 Proportion of sites important for terrestrial and freshwater biodiversity that are part of protected areas, disaggregated by ecosystem type	The methodology was implemented to identify areas of importance for biological diversity. In order to subsequently promote the signaling of strategic ecosystems. 20 properties were selected because they have large areas of key ecosystems for biological diversity.	**25%**
	15.5.1 Red List Index	The methodology for the development of participatory biodiversity monitoring to identify species in some threatened state is presented.	**25%**

Source: Cataruben Foundation, 2023

5. Compliance with Applicable Laws

The periodic updating of the normativity matrix demonstrates a proactive approach to legal compliance. This is especially crucial in the field of environmental projects, where regulations can be quickly modified to adapt to the changing needs of the environment and society. Furthermore, regular monitoring and adaptation to regulations are indicative of a solid risk management approach, which helps mitigate potential legal issues before they become significant barriers to the project led by Fundación Cataruben.

Furthermore, it is imperative to highlight that transparency and impartiality in the assignment of rights and responsibilities are essential to establish strong relationships between the parties involved in the project. Clearly defining these responsibilities from the beginning can help prevent conflicts and misunderstandings in the future, which is critical to the long-term success of the project.

The controls implemented by the Cataruben Foundation to strictly comply with the regulations that regulate the area of climate change and all the fields that arise from it, imply a responsible commitment in the planning and development of the Orinoco2 project. This commitment can be verified in the matrix that provides updates when necessary, in accordance with the procedures established for this purpose.

6. Adaptation to climate change

In tableTable 6 Compliance with the criteria is described and verification Evidence of how the project activities lead to actions for adaptation to climate change are attached.

Table 6. Adaptation to climate change

Criterion	Compliance	Project activity in which the adaptation action derives.	Progress of the activity in the monitoring period 2018 - 2022
Improves the conditions of conservation of biodiversity and its ecosystem services, in the areas of influence, outside the limits of the project (e.g. natural coverage in areas of special environmental interest, biological corridors, water management in basins, among others.	The project promotes and provides improvement actions for the conservation and safeguarding of biodiversity and its ecosystem services. In addition, it identifies and monitors High Conservation Values (HCVs) within the geographic limits of the project, and manages the improvement of water resources within the properties.	**G5:** Promote the delimitation and signaling in strategic ecosystems and natural protection areas.	**G-5.1:** 25% Evidence link: ID-G-5.1 (ODS15)
		G7: Develop a Plan for Efficient Use and Saving of Water in Homes (PUEAA), linked to the project.	**G-7.1:** 24,8% Evidence link: ID-G-7.1 (ODS 6)
		S1: Implementation of landscape management tools in savannas and sustainable productive practices.	**S-1.1:** 41,6% Evidence link: ID-S-1.1
		S2: Implementation of sustainable productive practices in natural savannas.	**S-2.1:** 60% Evidence link: ID-S-2.1
		B1: Identification and monitoring of High Conservation Values (HCVs) present in the project area.	**B-1.1:** 12,5% Evidence link: ID-B-1.1 (Cobeneficios)

Criterion	Compliance	Project activity in which the adaptation action derives.	Progress of the activity in the monitoring period 2018 - 2022
		B2: Monitoring the presence of globally threatened species and taking actions to conserve them.	**B-2.1:** 12,5% Evidence link: ID-B-2.1 (Co-benefit and SDG15)
		B3: Restoration actions in degraded ecosystems.	**B-3.1:** 17,64% Evidence link: ID-B-3.1 (Cobeneficios)
Implements activities that contribute to sustainable low-carbon productive landscapes.	Comply. The project promotes the implementation of sustainable production systems and practices. Providing strengthening of the capacities of project participants, with the purpose of achieving empowerment of communities in the development of responsible actions in the care and preservation of natural resources.	**G1:** Improvement of the owners' income generated by the sale of carbon credits.	No progress is reported, the implementation of the activity begins from the date of commercialization of the carbon certificates
		G2: Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	**G-2.1:** 30% Evidence link: ID-G-2.1 **G-2.2:** 10% Evidence link: ID-G-2.2 (Safeguards)
		R1: Implementation of sustainable fire use management practices for the prevention of forest fires.	**R-1.1:** 83,7% Evidence link: ID-R-1.1

Criterion	Compliance	Project activity in which the adaptation action derives.	Progress of the activity in the monitoring period 2018 - 2022
		S1: Implementation of landscape management tools in savannas and sustainable productive practices.	**S-1.1:** 41,6% Evidence link: ID-S-1.1
		S2: Implementation of sustainable productive practices in natural savannas.	**S-2.1:** 60% Evidence link: ID-S-2.1
It proposes areas with restoration processes in areas of special environmental importance.	Complies, within the geographical limits of the project there are areas of riparian forests that are fundamental for biodiversity and the environment. In this sense, the identification of potential areas to be restored and the actions necessary to carry out the restoration activities are included.	**B3:** Restoration actions in degraded ecosystems.	**B-3.1:** 24% Evidence link: ID-B-3.1 (Cobeneficios)
Design and execute adaptation strategies based on an ecosystem approach.	Comply. The project is based on the conservation, restoration 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 the conservation strategies of strategic ecosystems.	**G2:** Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	**G-2.1:** 30% Evidence link: ID-G-2.1 **G-2.2:** 10% Evidence link: ID-G-2.2 (Safeguards)
		G6: Promote the recognition of conservation areas and figures for	**G-6.1:** 1.3% Evidence link: ID-G-6.1

Criterion	Compliance	Project activity in which the adaptation action derives.	Progress of the activity in the monitoring period 2018 - 2022
		the sustainable management of ecosystems.	
Strengthens the local capacities of institutions and/or communities to make informed decisions that allow them to anticipate negative effects derived from climate change (recognition of vulnerability conditions	Comply. The project includes the development of training for the transfer of knowledge with the local community, with the purpose of providing the necessary tools for making informed decisions about the management of the properties. These trainings are aimed at climate change and conservation actions for strategic ecosystems.	**G2:** Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	**G-2.1:** 30% Evidence link: ID-G-2.1 **G-2.2:** 10% Evidence link: ID-G-2.2 (Safeguards)

Source: Cataruben Foundation, 2023.

7. Carbon ownership and rights

Identification of land tenure is essential to determine who owns the rights to the benefits derived from carbon capture. This verification is carried out both before the formal linking of the property to the project and during its implementation. This approach not only contributes to the conservation of the linked areas, but also promotes effective governance of real estate and ensures the successful continuity of the implementation of the environmental project. By ensuring that tenure rights are clear and respected, an enabling environment is created for the sustainability and long-term success of the project.

Given the existing legal vacuum in Colombian regulatory regulation regarding carbon ownership, exhaustive analyzes of laws that regulate private property are used to support real estate rights over the benefits from the results of environmental projects such as Orinoco2.

The support of private property is documented through legally recognized means, such as certificates of tradition and freedom, public deeds, adjudication resolutions, purchase and sale contracts, court rulings and certificates of sound possession, among others. These documents are essential to guarantee and accredit the owners' rights to the carbon certificates generated within the framework of these environmental projects. In addition to establishing ownership of the property, these documents facilitate the identification of the parties involved and committed to complying with the responsibilities and obligations derived from the binding contracts.

Once the meticulous process of documentary analysis of the previously mentioned documents has been completed, the relevant information is consolidated to allow for the precise identification of the property, its owner and the type of ownership it holds. This compilation is reflected in a document called Study of Titles in the Cataruben Foundation quality system, with the purpose of centralizing and clarifying the information related to the property. Once signed by the professional in charge, it is kept in the folder of each of the properties for periodic consultation and validation.

The signing and deposit of the one hundred and forty-six (146) Title Studies in the respective folders of each of the properties constitute a manifestation of the transparency and seriousness with which property management is approached within the framework of the Orinoco 2 Project. These documents become an integral part of each property's file, providing essential documentary Evidence for the operations and actions planned in the project.

7.1. Land tenure monitoring

In table 7, describes the changes in land ownership that have occurred within the project areas. These modifications may include successions and/or sales that are properly formalized and recorded in the corresponding document, in accordance with national regulations.

Table 7 Changes in land tenure 2018-2022

No	Property	Change	Evidence
1	La Reforma	None	Does not apply
2	El Morichal	None	Does not apply
3	Tierra Santa	None	Does not apply
4	La Conquista	None	Does not apply
5	El Amparo	None	Does not apply
6	Muzolandia	None	Does not apply
7	Santa Ana	None	Does not apply
8	Santa Paula	None	Does not apply
9	La Hermita	None	Does not apply
10	Lote El Ocarro	None	Does not apply
11	Lote Cacay	None	Does not apply
12	Boral	None	Does not apply
13	Saigon	None	Does not apply
14	La Cristalina	None	Does not apply
15	Palma Seca	None	Does not apply
16	La Pradera	None	Does not apply
17	Samaria	None	Does not apply
18	La Pradera	None	Does not apply

19	La Chumascada	None	Does not apply
20	Miami	None	Does not apply
21	Simaru	None	Does not apply
22	Costa Rica	None	Does not apply
23	Tamanaco	None	Does not apply
24	Venus	None	Does not apply
25	Villa Carolina	None	Does not apply
26	Bellavista	None	Does not apply
27	Cawinanay	None	Does not apply
28	Dos Diamantes	None	Does not apply
29	El Venado	None	Does not apply
30	Lote Tres Cielos Lote 2	Tenure Evidence update.	The Property was exploited by the current owners before the sale was formalized in 2019. For this reason, a new letter of intent was sent that attests to what was stated and documents that evidence it are attached.
31	Waykiky	None	Does not apply
32	Los Deseos San Andres	None	Does not apply
33	El Manguito	None	Does not apply
34	Lote 1	None	Does not apply
35	Mata Negra	None	Does not apply
36	El Milagro	None	Does not apply
37	Puerto Dabeiba	None	Does not apply
38	Lote 13	None	Does not apply
39	Costa Rica	None	Does not apply
40	Capijirito	None	Does not apply

41	La Macarena	None	Does not apply
42	La Esmeralda	None	Does not apply
43	Los Cocos	None	Does not apply
44	Los Laureles	None	Does not apply
45	Mi Conuco	None	Does not apply
46	La Bohemia	None	Does not apply
47	Yaguarama	None	Does not apply
48	Lote 2	None	Does not apply
49	Los Claveles	None	Does not apply
50	La Mariposa	Formalization of succession	The mother of the current owner died in 2021, the succession was formalized in 2021. Therefore, a new letter of intent was sent reaffirming the commitment to continue with the project.
51	La Gaviota	None	Does not apply
52	Cayure	None	Does not apply
53	Bet-El	None	Does not apply
54	La Soledad	None	Does not apply
55	Chaqueva	None	Does not apply
56	Finca El Retiro	None	Does not apply
57	El Zafiro	None	Does not apply
58	Vista Hermosa	None	Does not apply
59	Rnsc Matapalito	None	Does not apply
60	Constitución	None	Does not apply
61	Los Alcornocos	Formalization of property.	The property was awarded to the owner on November 30, 2012 by Incoder as stated in Resolution No. 3112 of 2012, however, the owner received a new resolution from the National Land Agency (ANT). Resolution

			No. 28060 of 2020, through which it is also awarded and registered with the latter's Office of Public Instruments. PTherefore, a new letter of intent was sent reaffirming the commitment to continue with the project
62	Predio El Chaparral	None	Does not apply
63	Hacienda Nuevo Mururito	Formalization of Change of company name.	They are the same owners since the year 2011. In 2021, the company transferred it to the other through “contribution to the company” to SAPAJU S.A.S. Therefore, they sent a new letter of intent, reaffirming their intention to be part of the project despite the change of company name.
64	El Convento	None	Does not apply
65	Los Algarrobos	None	Does not apply
66	Finca Las Brisas	None	Does not apply
67	Las Gaviotas	None	Does not apply
68	Control Reserva	None	Does not apply
69	El Control	None	Does not apply
70	La Orquidea	None	Does not apply
71	Luisyana I	None	Does not apply
72	Providencia	Property Formalization	The property was exploited and possession was exercised by the current owner. Once the purchase is formalized, send a new letter of intent reaffirming the commitment to continue with the project.
73	Matalarga	None	Does not apply
74	El Jobal	None	Does not apply
75	Lote (Fundación La Esperanza)	None	Does not apply
76	Laguna Grande	None	Does not apply
77	El Progreso	None	Does not apply
78	Villa Lorena	None	Does not apply

79	La Sierra	None	Does not apply
80	La Conquista	None	Does not apply
81	Los Huerfanitos	None	Does not apply
82	Brisas Del Lolo	None	Does not apply
83	La Milagrosa	None	Does not apply
84	Maracana V	None	Does not apply
85	Matazul	None	Does not apply
86	El Rincón De Mata Azul	None	Does not apply
87	Guaimarito	None	Does not apply
88	La Palmita	None	Does not apply
89	La Tigra	None	Does not apply
90	La Herradura	None	Does not apply
91	Las Palmas	None	Does not apply
92	La Laguna	None	Does not apply
93	El Gran Marco Polo	Formalization of succession	The father of the current owners died in 2018. The succession was formalized in 2019. They sent a new letter of intent reaffirming their intention to be part of the project
94	Mata Mojada	None	Does not apply
95	El Sinaí	None	Does not apply
96	Las Delicias	None	Does not apply
97	La Fortuna	None	Does not apply
98	La Provincia	Formalization of the purchase	The owner had been in possession since 2018. But in 2019 the purchase was formalized, and at that time he sent a new letter of intent updated to the date of formalization to reaffirm the intention to remain in the project.

99	El Caney	None	Does not apply
100	Las Guacamayas	None	Does not apply
101	La Esperanza	None	Ownership was exercised by the current owners since 2016. The letter of intent attached to the folder is dated August 2018.
102	Oropel	None	Does not apply
103	Yacare	None	Does not apply
104	Finca El Olimpo	None	Does not apply
105	El Capricho	None	Does not apply
106	Veracruz III	None	Does not apply
107	Veracruz II	None	Does not apply
108	El Boquerón	None	Does not apply
109	plantación El Cedral	None	Does not apply
110	La Victoria	None	Does not apply
111	La Loma	None	Does not apply
112	La Alegría	None	Does not apply
113	La Alegría 2	None	Does not apply
114	La Empresita	None	Does not apply
115	Victoria	None	Does not apply
116	Congrial	None	Does not apply
117	Lagunitas	None	Does not apply
118	Turuli	None	Does not apply
119	Versalles	None	Does not apply
120	La Giralda Valle De Luna	None	Does not apply
121	Buenos Aires	None	Does not apply

122	Lote El Cachicamo	None	Does not apply
123	Los Venados	None	Does not apply
124	Los Ángeles	None	Does not apply
125	La Laguna	None	Does not apply
126	Finca Lucitania	None	Does not apply
127	Brisas Del Tomo	None	Does not apply
128	Arco Iris	None	Does not apply
129	La Flor	Formalization of property	In 2018, the owner began the process of purchasing the property from the Sociedad Inversiones Ganaderas El Luque S.a.s. To be part of the project, they sent a letter of intent from the representative of the society. Later, in 2020, the legal business was formalized. To reaffirm your intention to continue with the project, send a new letter of intent.
130	Cachipay	None	Does not apply
131	Las Brisas	None	Does not apply
132	Finca Samanes	None	Does not apply
133	Finca Samanes 2	None	Does not apply
134	La Gran Conquista	None	Does not apply
135	La Castellana	Formalization of property	The property was operated by the current owners before the sale was formalized. Once the sale was formalized, they sent a letter of intent to reaffirm that they were still interested in being part of the project.
136	Angosturas	None	Does not apply
137	Lucitania	None	Does not apply
138	El Machimbre	None	Does not apply
139	El Edén	None	Does not apply
140	El Yarumo	None	Does not apply

141	Valle Verde	None	Does not apply
142	Puerto Rico	None	Does not apply
143	La Esperanza	None	Does not apply
144	Buenavista	None	Does not apply
145	El Algarrobo	Formalization of succession	The father and husband of the current owners died in 2022, the succession was formalized in 2022. Therefore, they sent a new letter of intent in 2022 to reaffirm their permanence in the project. The previous letter of Intent is uploaded.
146	Finca El Regreso	None	Does not apply

On each occasion in which a change occurs in the ownership of the properties, the submission of a letter of intent is formally requested. The objective of this letter is to corroborate that the interest in participating in the project continues. The updated letters are attached in the annex.2.1.1 letters of intent linked properties. While previous versions are found for traceability in the annex 2.1.1.1 previous letters of intent.

8. Environmental aspects

The environmental manager of the project has assessed the impacts generated by the implementation of its activities, following the guidelines of the “Sustainable Development Safeguards” (SDSs Tool), version 1.1 of July 4, 2024 of the BioCarbon Standard, as well as the Leopold matrix for rating impacts. This tool provides a complete guide to assess the environmental and social impact of projects. In the environmental component, areas such as efficiency in the use of resources such as land and water, protection of biodiversity and ecosystems, as well as climate change mitigation will be assessed.

In this context, a matrix was developed in which the environmental impacts of the project activities were assessed and reported during the period 2022-2023. The results indicate that no high-category negative impacts were recorded. However, a risk related to biodiversity conservation was identified, which is not a direct consequence of the implementation of the project activities, but rather comes from the cultural background of the region. Although this risk did not materialize, it is considered a potential that could generate a moderate negative impact on the progress of the project. To prevent

its materialization, specific actions have been established, (see Annex 3.1 Environmental Impact Assessment).

This absence of negative impacts is attributed to the project design, which prioritizes the conservation of ecosystems and biodiversity. The activities are based on sustainable practices and are complemented by training that promotes environmental awareness among managers. In addition, all project actions are oriented towards environmental protection and greenhouse gas (GHG) reduction, reflecting a favorable environmental perspective. Constant monitoring allows strategies to be adjusted in real time, ensuring that actions are aligned with sustainability objectives. The matrix also projected an assessment of potential environmental impacts for the next monitoring period.

9. Socioeconomic aspects

The project owner has assessed the socioeconomic impact generated by the implementation of the ORINOCO2 project activities. To do so, the criteria established in the Sustainable Development Safeguards Tool (SDSs Tool), version 1.1 (July 4, 2024), developed by BioCarbon Standard, have been applied, as well as the Leopold matrix for rating impacts.

In the social component, aspects such as human rights in relation to work and working conditions, gender equality and women's empowerment, land acquisition, restitution and use of land, displacement and involuntary resettlement, as well as the rights of indigenous peoples and the preservation of cultural heritage were considered. Issues related to corruption, the economy and forest governance were also assessed.

In this context, a matrix was developed in which the socioeconomic impacts of the project activities were assessed and reported during the period 2018-2023. The results indicate that no high-category negative impacts were recorded. However, a risk related to cultural barriers was identified, which is not a direct consequence of the implementation of the project activities, but rather stems from the cultural background of the region. Although this risk did not materialize, it is considered a potential risk that could generate a moderate negative impact on the progress of the project. To prevent its materialization, specific actions have been established, (see Annex 3.2. Socioeconomic Impact Assessment).

On the contrary, the ORINOCO2 project has played a crucial role in the socioeconomic development of communities, respecting human rights and promoting the generation of employment in decent conditions. It has promoted gender equality by encouraging the active participation of women in management and decision-making roles. In addition, the

project promotes respect for and appreciation of the traditional knowledge of local communities, integrating their knowledge into the framework of its activities.

This approach has allowed ORINOCO2 not only to respect but also to strengthen the social and economic rights of the communities involved, consolidating an inclusive and sustainable development model.

10. Stakeholder consultation

The project owner completed the socialization of the project with 68 actors identified for the departments of Casanare and Arauca; information that can be corroborated in section 10 of the DdP V2.6, given that the validation and the first verification of the project are presented simultaneously.

11. REDD+ Safeguards

According to the analysis carried out at the *Tool to Demonstrate Compliance with REDD+ Safeguards*, Version 1.1 of January 26, 2023, of the BioCarbon Registry Carbon Standard, REDD+ safeguards cover a broad spectrum of fundamental aspects. These include compliance with current legal regulations, the promotion of transparency and access to information, respect for the knowledge of communities and interest groups, full and effective participation, as well as the preservation of forests. and biodiversity. In addition, the prevention of reversal risks and the displacement of emissions is included.

Regarding the Social and Environmental Safeguards document for REDD+ in Colombia, fifteen specific operational elements were determined for the national territory. These elements are distributed among the seven safeguards of Cancún and are organized into three practical themes: Institutional, Social and Cultural, and Environmental and Territorial (Camacho A, Lara I & Guerrero, 2017).

To ensure compliance with these safeguards, the 6.2 Safeguards Monitoring Plan, which details how they were addressed during the period 2018-2022, following the guidelines established by *BioCarbon Standard, Version 3.4*, in conjunction with the National Interpretation Booklet of Colombia. In addition, the provisions of the tool were applied *Sustainable Development Safeguards (SDSs Tool*, July Version 1.1 *2024)*. Which provides a greater understanding to identify the potential impacts derived from the implementation of project activities, and how to mitigate these impacts through safeguards, thus contributing to sustainable development.

Next, a report on compliance with each of the REDD+ safeguards will be presented, following both the national interpretation of said safeguards and the guidance provided by BioCarbon Standard.

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. A1 Correspondence with national legislation

A compilation was made of the set of national laws and regulations, as well as current international commitments, especially regarding forest conservation, the preservation of biodiversity and the mitigation of climate change. Subsequently, an evaluation of the activities proposed for the project was carried out, with the objective of determining their compliance with the established regulatory framework.

All of this compliance was documented in 6.5.1.3.1.2. Legal Compatibility Matrix,. Matrix that exhaustively details each of the project activities. Its alignment with the international agreements signed by Colombia, as well as with the National Constitution, laws, decrees, policies and relevant programs, was meticulously verified.

Table 8 *Addressing safeguard A within the framework of the project.*

SAFEGUARD THEMATIC NATIONAL INTERPRETATION: INSTITUTIONAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	**Element National Interpretation**	**ID**	**Project Activity**	**Compliance**
1.1	On compatibility: Demonstrate that the project activities are in accordance with these policies and that they are not contrary to them.	A1 Correspondence with national legislation.	G1	Improve homeowner income generated from the sale of carbon credits.	A document called 6.5.1.3.1.2. Legal Compatibility Matrix, in which each of the project activities are listed and related to the international agreements
			G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	
			G3	Alliance management that financially allows generating the enabling conditions	

				for the validation and first verification of the project	signed by Colombia and national regulations; mainly in matters of forest conservation, biodiversity and climate change. Additionally, the document Report of 6.5.1.3.1.1. Compliance Safeguard A, which details how the process of aligning the project with national regulations and international agreements is carried out.
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	
			G5	Promote the delimitation and signaling in strategic ecosystems and natural protection areas	
			G6	Promote the recognition of conservation areas and figures for the sustainable management of ecosystems	
			R1	Implementation of sustainable fire use management practices for the prevention of forest fires	
			R2	Monitoring of hot spots as an early warning mechanism	
			R3	Promotion of the establishment of eco-efficient stoves and wood energy banks	
			B1	Identification and monitoring of High Conservation Values (HCVs) present in the project area	
			B2	Monitoring the presence of globally threatened species and taking actions to conserve them	
			B3	Restoration actions in degraded ecosystems	
			EG1	Strengthening access and management of financial goods and services with a focus that achieves gender equity	

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, the percentage of compliance with Safeguard A and its indicators is shown below, with respect to the global goal.

Table 9 *Progress in compliance with Safeguard A with respect to the global goal of the Safeguard Monitoring Plan.*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
A	1.1	Compatibility reports carried out	6%	**6%**

Source: *Cataruben Foundation, 2023.*

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 update it regularly. 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 guarantee compliance with this safeguard, we have established various communication channels that guarantee transparency and access to information. These channels include telephone, email, WhatsApp, website, social networks and the PQRS system. All these means are aligned with the requirements established in the standard "Empowering sustainability, redefining standards" version 3.4 of the BioCarbon Standard, as well as with the Tool to demonstrate compliance with REDD+ safeguards (V1. 1) and the national interpretation tool.

As part of these actions, we have collected 6.5.1.3.2.2.1. radial wedges, 6.5.1.3.2.2.4.8. videos, 6.5.1.3.2.2.4.2. flyers, 6.5.1.3.2.2.7. newsletters, 6.5.1.3.2.2.4.4. briefcase, and we have established communication through 6.5.1.3.2.2.2.1. email and 6.5.1.3.2.2.2.2. WhatsApp, among other means. Through these channels, we provide direct, clear and accessible information about the project. In addition, we have organized in-person and virtual meetings to strengthen forest governance structures, promote interaction, dialogue, transfer of experiences and knowledge, and resolve doubts and concerns. These actions have strengthened communication and participation among interested parties.

Likewise, we have implemented the PQRS system (6.5.1.3.2.2.6. PQRS) to address questions, complaints, suggestions and claims that arise during the project.

We would like to highlight that we are in the process of registering the project in the National Registry for the Reduction of Greenhouse Gas Emissions.(7.1 CLEANER), a platform of the Ministry of Environment and Sustainable Development that is used to record greenhouse gas reductions in Colombia. A platform from the Ministry of Environment and Sustainable Development that is used to record greenhouse gas reductions in Colombia. Despite our efforts, the platform is currently disabled and it has not been possible to move forward in this regard. We have sent requests for information to know when the platform will be accessible again, but a date has not yet been determined to restore its access and possibility of use.

In summary, this communication strategy not only meets regulatory standards, but also represents a conscious effort to eEstablish a solid and participatory relationship with the community and other key actors, thus promoting transparent and collaborative

management in the development of the project.

11.2.2. B3 Accountability

Accountability is a fundamental pillar that guarantees transparency and responsibility in all phases of the project. To comply with this safeguard, we have implemented various measures:

First of all, we make 6.5.1.3.2.2.7. Newsletters detailing the progress of Orinoco2, including activities, results achieved and challenges faced. These reports are delivered to the Ecosystem Managers through different communication channels.

Secondly, during the project socializations, we use a tool called a financial simulator (6.5.1.3.2.2.4.6.1. Financial Simulator) which provides a projected view of the economic benefits expected throughout the project. This simulator is based on the quantification of reductions and/or removals of greenhouse gases (GHG) and the monitoring of eligible areas.

Third, we have developed a carbon credit statement model (6.5.1.3.2.2.4.6.2. Economic Benefits Account Statement). QIt presents in a transparent and accessible manner the status of the economic benefits derived from the commercialization of verified carbon certificates. This report is presented once the verifications for each monitoring period are completed and is complemented by the Carbon Certificate Issuance Report, which informs the Ecosystem Managers about the initial stock of certificates issued during a specific verification.

Finally, we have organized virtual and in-person meetings, such as forums (6.1.4.1.2. forums) and socializations, where we account for our progress in the development of the project.

These initiatives not only ensure transparency, but also encourage active participation of Ecosystem Managers by providing them with detailed and up-to-date information on project management. Together, they contribute to more open, coherent forest governance, in line with the fundamental principles of transparency and access to information.

11.2.3. B4 Recognition of forest governance structures

Based on the above, it can be assured that the governance structures in the linked properties will be strengthened in the region, and this due to the link that is developed between the owners by having symmetrical access to the information, knowledge and benefits granted. for the project, thus enhancing the collaborative effort between neighbors. Now, the population targeted by this project is fundamentally peasants, that is, private land owners, mestizos and Spanish speakers (Camacho A, Lara I & Guerreo, 2017). This ensures the effectiveness of said proposed channels, most of

them being successful in bringing all the necessary information to those involved. An additional aspect to take into account is the PQRS system (6.5.1.3.2.2.6. PQRS). Strategy that is made available with the objective, not only of listening, but also to deal with questions, suggestions and complaints that arise during the life of the project.

11.2.4. B5 Strengthening capacities

The importance of strengthening the training of *ecosystem managers,* especially in the three pillars of knowledgeenvironmental, social and economic environment, creates the conditions for making conscious and, above all, informed decisions. This as a transversal effort in the consolidation of the governance model (ID-G-4.1 Governance Model). Model which represents the decision and agency space for Cataruben, ecosystem managers and allies, to join forces for the organic development of the project.

Additionally, we have carried out a series of trainings. These trainings create a forum for knowledge exchange and the formation of work groups. This implies that knowledge flows in both directions, meaning that traditional or local knowledge will be complemented by the technical knowledge provided by Cataruben and vice versa.

These spaces range from innovative strategies to manage environmental services, new sustainable forms of production and the reconsideration of gender roles in a society as markedly patriarchal as the Llanera. This last point should not be approached from a critical perspective or with the intention of demonizing the dynamics of landholding patriarchs, whose practices are deeply rooted in rural contexts. On the contrary, it is a space for ecosystem managers to obtain the necessary tools to reinterpret themselves, from everyday life, and reassign roles within the family. Undoubtedly, from the ethics of care, not only for the environment, but also for the social fabric.

Table 10*. Addressing safeguard B within the framework of the project.*

SAFEGUARD B THEMATIC NATIONAL INTERPRETATION: INSTITUTIONAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	**Element National Interpretation**	**ID**	**Project Activity**	**Compliance**

2.1	Spots and/or radio audios produced and broadcast within the framework of the project.	B2 Transfer and Access to Information.	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Compilation of the different spots that were broadcast on the radio. The purpose of which is to communicate and invite the community to participate in the different socialization spaces, where they can acquire information, to apply for their properties and interact with experts on the conservation and mitigation of climate change. Exhibit: 6.5.1.3.2.2.1. radial wedges Likewise, we have prepared the document 6.5.1.3.2.1. Safeguard B Compliance Report. ANDwhich allows us to see in more detail the approach to this safeguard.
2.2	Emails enviated and received that guarantee effective distribution and the right to information.	B2 Transfer and Access to Information	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Compilation of the different emails in which the sustained communication with the Ecosystem Managers is shown. The receipt of documents for the application of the properties to the Project is evident. The requests, doubts and concerns presented. The responses given to them are also evident. Annex: 6.5.1.3.2.2.2. Communications sent and received.
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	
			EG1	Strengthening access and management of financial goods and services with a focus that achieves gender equity	
2.3	Virtual and/or in-person socializations carried out to publicize the project, build the different aspects in a participatory manner and manage hectares	B2 Transfer and Access to Information	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Compilation of photographs and attendance records from the community to the different previously scheduled face-to-face spaces. A first meeting was the approach to meet and interact with the community and work together to consolidate the project. Then, meetings were held where the Project was socialized, showing its scope, objectives, connection requirements,

					and the commitments that are acquired with the connection. Annexes: 6.5.1.3.2.2.3. Socializations
2.4	Digital documents that were produced and disseminated within the framework of the initiative (brochures, billboards, illustrative documents, guides, among others).	B2 Transfer and Access to Information	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Compilation of the different flyers that were disseminated through social networks such as WhatsApp, Instagram and Facebook. These documents are intended to invite the community to attend the different scheduled meetings and to apply their properties to the project. Likewise, evidence of the other digital documents that were prepared to strengthen communication and access to information by the community is attached. Annex: 6.5.1.3.2.2.4. Digital documents.
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	
2.5	Registration in Renare of the climate change mitigation project.	B2 Transfer and Access to Information	G1	Improved income of owners generated by the sale of carbon credits	Attached is evidence of the progress made to register with the National Registry for the Reduction of Greenhouse Gas Emissions. Annex: 7.1 RENARE Registry
2.6	Activities or documents carried out with organizations, associations, community action boards or interest groups.	B2 Transfer and Access to Information	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Compilation of the activities carried out, in which there was support from important organizations such as USAID, the Casanare Chamber of Commerce, Latam Airlines, Luker Chocolate, USDA, among others. These meetings were intended to strengthen knowledge and interact with experts on conservation and climate change issues. Annex: 6.5.1.3.2.2.5. Activities with organizations.
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	
2.7	PQRS System	B2 Transfer and Access to Information	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest	Attached is evidence of the system of requests, complaints, claims and suggestions, as well as the procedure for managing

				fires, sustainable productive systems and landscape management tools.	PQRS. This tool was made available in order to efficiently address your requirements presented within the framework of the project. Attachment 6.5.1.3.2.2.6. PQRS System.
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally.	
			EG1	Strengthening access and management of financial goods and services with a focus that achieves gender equity.	
2.8	Iproject management reports	B3 Accountability	G1	Improved income of owners generated by the sale of carbon credits	A series of newsletters have been compiled (6.5.1.3.2.2.7 newsletters) that highlight the progress and current stage of the project. The purpose of these bulletins is to keep the Ecosystem Managers informed about the management carried out and the results obtained in this period of time. It has been prepared 6.5.1.3.2.2.4.7. Financial simulator. Which was shared with each Ecosystem Manager. This tool allows them to know a projection of the possible economic benefits that they will receive during the contractual relationship. At the same time, the document has been prepared 6.5.1.3.2.2.4.6.2. Financial Benefits Account Statement and the 6.5.1.3.2.2.4.6.3. Carbon Certificate Issuance Report. Which will be shared with the Ecosystem Managers once the carbon certificate commercialization process is carried out.
			G3	Alliance management that financially allows generating the enabling conditions for the validation and first verification of the project	
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	

2.9	Reports for the recognition of forest governance structures.	B4 Recognition of governance structures.	G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	Attached is evidence of 6.5.1.3.2.2.6 PQRS system. Which is a mechanism that allows the community to participate. Also presented is the ID-G-4.1 Governance Model. It is currently under construction. The purpose of this model is to strengthen recognition of forest governance structures and promote ownership of conservation.
2.10	Workshops and/or training developed within the framework of the initiative	B5 Capacity strengthening .	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Report that includes each of the topics addressed, attendance lists and photographic records, which demonstrate the captures carried out. Annex: Training report

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, below is the percentage of compliance with Safeguard B and its indicators, with respect to the global goal.

Table 11*. Advance of ccompliance with Safeguard B with respect to the global goal of the Safeguards Monitoring Plan.*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
B	2.1	Spots and/or radio audios produced and broadcast within the framework of the project.	43%	**24%**
	2.2	Communications sent by email and WhatsApp to disseminate information within the framework of the project.	20%	
	2.3	In-person and/or virtual socializations for property achievement	50%	
	2.4	Digital documents that were produced and disseminated within the framework of the initiative (brochures, billboards, illustrative documents, guides, among others)	20%	
	2.5	Registration in Renare of the climate change mitigation project.	0%	

	2.6	Activities or documents carried out with organizations, associations, community action boards or interest groups.	20%	
	2.7	PQRS system for addressing and responding to comments, questions, suggestions or complaints	16%	
	2.8	Project management reports	20%	
	2.9	Reports for the recognition of forest governance structures.	33%	
	2.10	Workshops and/or training developed within the framework of the initiative	20%	

Source: *Cataruben Foundation, 2023.*

11.3. Safeguard C

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

11.3.1. C6 Free prior and informed consent (FPIC)

Free, prior and informed consent is obtained through work tables with ecosystem managers, which allows their active participation in decision-making regarding the activities that will take place on their properties. These activities are aimed at reducing forest degradation and deforestation, as well as preventing the negative transformation of natural savannas. In other words, these scenarios create the conditions for articulated action in the different phases of the project, that is: the pre-feasibility phase, the formulation and implementation of conservation activities, etc.

In addition, to these work tables it is appropriate to add the issuance of two documents where the beneficiaries expressly express their will, not only to be part of ORINOCO2, but also to actively participate in the configuration and implementation of conservation activities, these are: 2.1.1 Letters of intent and the 6.5.1.2.2. Property Implementation Plans, these documents are signed by each of the beneficiaries and are filed for due completion with the express authorization of each of them.

11.3.2. C7 Regarding traditional knowledge

Colombia has a map that collects georeferenced information on the location of indigenous reservations or ancestral territories formed and legally accredited by the

National Land Agency.[7] (ANT). In addition, the Ethnic Affairs Directorate of the National Land Agency (ANT) is responsible for carrying out a technical, legal and cadastral study of the territories delimited and occupied by indigenous peoples recognized by the Ministry of the Interior. In this context, Cataruben's line of action is aligned with national policy regarding the regulation of land ownership. However, Cataruben's actions are limited or prioritize private property and not collective property, as is usual in conservation initiatives.

Therefore, the ORINOCO2 project is designed to intervene in private properties, which can demonstrate the right of ownership or possession of the land. In other words, the right to verified carbon credits or the right to benefits from the reduction and capture of greenhouse gases (GHG) is defined.

However, the above does not mean that the situation of the ethnic communities that live in the aforementioned region is not considered, which, in the specific case, is the territory comprised by the departments of Meta and Vichada. This respect for their customs and traditions, as well as for their territory, is evident in the approach carried out by Cataruben through two work tables scheduled in the municipalities of La Primavera and Cumaribo (Vichada). These spaces were attended by representatives of the indigenous government of four reservations (La Llanura, La Pascua, Ripialito and Kawanaruba) adjacent to some of the linked properties, in addition to the ethnic liaisons and municipal representatives of the two mayors' offices (as guarantors). . See 6.5.1.3.3.2.2 Ethnic community work tables.

The two aforementioned meetings had a main objective, which was to present the Cataruben Foundation as a promoter of projects whose purpose is the mitigation of climate change, and whose mission is essentially social and environmental. In this sense, the most relevant information about the project was provided, such as: its reference region, the reasons why it will not intervene in collective property and the approach to possible scenarios in which ancestral territories overlap with farms linked to the project. . In summary, these round tables were developed with the intention of not causing damage to the social fabric of the region and to state that the Cataruben Foundation will not represent, for these groups, any type of pressure or discomfort due to its presence in the territory.

[7] ¿https://data-agenciadetierras.opendata.arcgis.com/datasets/f84afb113d3b4512be65305fd09aa7ee_0/explore?location=-12.083585%2C-57.463495%2C3.26

11.3.3. C8 Profit distribution

The fair and equitable distribution of the economic benefits to which the ecosystem manager has access for the effort to strengthen conservation practices in strategic ecosystems constitutes a fundamental pillar for the success and durability of ORINOCO2. This is because the economic resource is necessary to strengthen, complement, update, etc., the different strategies translated as affirmative conservation actions. Therefore, it is in the Linking Contract document where the way in which the distribution of the economic benefits will be carried out after the commercialization of the carbon certificates is established through specific clauses, being defined in temporal and percentage terms according to the proportion of the ecosystems, that is, of its eligible area.. (to see 2.1.2. Linkage contracts),

11.3.4. C9 Territorial rights

Respect for the knowledge, customs and traditional practices of the ethnic communities present in the reference area (Meta and Vichada) must be addressed from the minimum standard of law and international declarations on the rights of these peoples. Even so, the project is designed exclusively for the rural peasant community that can demonstrate ownership or private possession of the land, through documentation. Likewise, it is necessary to develop economic activities linked to sustainable agroforestry or livestock practices.

However, respect and recognition of traditional knowledge and practices, and of course, the territory is addressed from the first approaches and socializations. And this is so, to create a bond of trust and the conditions that allow an exchange of thoughts and logic during the validity of ORINOCO2. In these spaces, articulated strategies focused on the conservation and restoration of strategic ecosystems will be configured and reconfigured. These activities and agreements are a crucial part of the linkage contracts, documents that record the informed consent and demonstrable agency of each of these farmers and their role as ecosystem managers.

One of the most precise actions that Cataruben takes in this regard is the request for Determination of Origin and Opportunity of the Prior Consultation (To see 2.2. Does not come from the consultation previous) in view of the Ministry of the Interior. This document is the first evidence that demonstrates that the project activities will not be developed in indigenous reservations, collective property or any ancestral territory. However, a periodic inquiry will be carried out before the National Land Agency (ANT) in the event that a reservation has filed a request to expand traditional territory, and a possible overlap with the project area (properties) will be addressed in a timely manner. , thus avoiding negative scenarios for the local community and the environment.

Table 12 *Addressing safeguard C within the framework of the project.*

SAFEGUARD C THEMATIC NATIONAL INTERPRETATION: SOCIAL AND CULTURAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	**Element National Interpretation**	**ID**	**Project Activity**	**Compliance**
3.1	Report showing the implementation of working groups with the communities and other mechanisms that allow their linkage to the Project from its pre-feasibility and structuring phase.	C6 Free, prior and informed consent	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Attached is evidence of the 2.1.1 Letters of intent, subscribed by the Ecosystem Managers, in which they express their interest in participating in the project. Also included the 6.5.1.2.2. Early Implementation Plansl. QThey reflect participation in the implementation and development of conservation activities. Finally, attached is the Training report. Through which the realization of the work tables with the different parties involved is evidenced.
3.2	Mapping of communities in the territory and prior consultation: Recognize and respect the rights of the communities present in the territory.	C7. Respect for traditional knowledge	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Attached is the 6.5.1.3.3.2.1 Inventory of Ethnic Communities, in which the existing communities in the territory are analyzed; accompanied by the maps corresponding to those applications that are in process and those already legislated. In addition, the report of the first 6.5.1.3.3.2.2 Ethnic community work tables Likewise, we have prepared the document 6.5.1.3.3.3 Safeguard Compliance Report C,

					which allows us to see in more detail the approach to this safeguard.
3.3	Conservation agreements: Propose new forms of sustainable use of the territory.	C8. Profit distribution *C9. Territorial rights*	G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally.	Complication of 2.1.2. Linkage contracts to the project, signed with the Ecosystem Managers

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, the percentage of compliance with Safeguard C and its indicators is shown below, with respect to the global goal.

Table 13*. Progress in compliance with Safeguard C with respect to the global goal of the Safeguards Monitoring Plan.*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
C	3.1	Work tables held with the communities.	43%	**54%**
	3.2	Analysis of developed community mappings	100%	
	3.3	Contracts and/or conservation agreements signed	20%	

Source: *Cataruben Foundation, 2023.*

11.4. Safeguard D

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

11.4.1. D10 Stake

Both the Instrument to Demonstrate Compliance with REDD+ Safeguards Version 1.1 and the Guide to Social and Environmental Safeguards for REDD+ in Colombia encourage the participation of multiple actors in decision-making. This means that the participation of all stakeholders must begin from the pre-feasibility stage and with a gender focus. To ensure conscious, effective and informed participation, Cataruben, in its capacity as project owner, was responsible for exhausting the greatest number of participation resources, including a variety of effective means of communication that are easy to access and use for beneficiaries.

During the pre-feasibility stage, they were divided into 4 key moments:

1. Initial call: It was carried out to measure the level of interest of the rural population, answer concerns, clarify preliminary doubts and create a bond of trust with potential beneficiaries. This call was carried out in the territory and was facilitated by the articulation and prior presentation with the local authorities.
2. In-person and virtual socializations: Once initial advanced work was achieved, the formal call to these meetings was made where the generalities and specifications of the project were presented. ORINOCO2. The complete presentation of the project was ensured, clarity was given about the requirements for the connection and all doubts and suggestions were answered.
3. Linking process: At this time, the beneficiary formally agreed to be part of the project and implement affirmative actions to reduce greenhouse gases.
4. Characterization: It consists of the "individualization" of each property in terms of environmental, social and economic value. This information was used to identify and map the needs, interests and concerns of the beneficiaries, and is used as input in the structuring of the activities of the Property Implementation Plan of each of the farms.

To ensure an equitable agenda, it is essential to ensure the full and effective participation of all parties involved in a project. In other words, by guaranteeing that the actors involved exercise their right to active, free, full and informed participation in the development of any REDD+ project, not only does the development of the project benefit, but it also fosters an ethical and respectful bond. between the community and the environment, recognizing and respecting the local structures of connection with the territory. (Camacho A, Lara and Guerrero, 2017).

Table 14 *Approach to safeguard D within the framework of the project.*

SAFEGUARD D THEMATIC NATIONAL INTERPRETATION: SOCIAL AND CULTURAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	**Element National Interpretation**	**ID**	**Project Activity**	***Compliance***

4.1	Information socialization and dissemination mechanisms: Evidence that you have disseminated, socialized and shared information with communities in a transparent, clear, complete, inclusive and effective manner through the corresponding media.	D10. Stake	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	A compilation was made of the different media or communication channels used to disseminate information of interest to the project to the ecosystem managers. See 6.5.1.3.2.2. Communications System
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	
4.2	Participation mechanisms used: Evidence that the community had the opportunity to participate, really and effectively, from the feasibility and structuring phase of the Project	D10. Stake	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Evidence of the different participation mechanisms used. As: 6.5.1.3.2.2.6. PQRS System, and ID-G-4.1 governance model
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, below is the percentage of ccompliance with Safeguard D and its indicators, with respect to the global goal. (see table 15

Table 15 *Advance of compliance with Safeguard D with respect to the global goal of the Safeguard Monitoring Plan.*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
D	4.1	Media for the transparent, clear, complete, inclusive and effective dissemination of information.	20%	**18%**
	4.2	Real and effective participation mechanisms from the feasibility and structuring phase of the project	16%	

Source: *Cataruben Foundation, 2023.*

11.5. Safeguard E

"The compatibility of the measures with the conservation of natural forests and biological diversity, [...] that serve, instead, to encourage the protection and conservation of these forests and the services derived from their ecosystems and to enhance other social and environmental benefits."

11.5.1. E11 Conservation of forests and their biodiversity

The project activities are aimed at preventing forest areas from being degraded and deforested, or from changing the use of land from natural savannas to non-native grass crops, extensive livestock farming or other activities not compatible with the conservation of ecosystems and their biodiversity. Since this would imply a loss of ecosystem services. From this scenario, the conservation of eligible areas includes actions configured in an articulated work for the sustainable use of soil and the progressive restoration of forests, and the life they contain.

Therefore, coordinated collaboration between interested parties is essential for the harmonious and comprehensive development of activities. This is because joint decision-making will expand and develop estate governance more clearly. This includes, of course, the care and monitoring of native biodiversity (animal and plant species). To achieve this, scenarios are created to strengthen capacities, exchange knowledge and new strategies that align with local, departmental and national conservation objectives. This allows, consequently, the identification of the particularities of each territory, the native species that comprise it and the prioritization of their monitoring. Among the configured strategies we can count: socio-environmental impact assessments, the establishment of compatibility and complementarity with the objectives of conservation and ecosystem services, the protection of habitats, the organizational capacity of the local population and, of course, the use responsible for soil and natural resources from a local perspective.

11.5.2. E12 Provision of environmental goods and services

From ORINOCO2 Conservation is explored through daily, coordinated and collaborative work between the local community, Cataruben and strategic allies. The result of this is the search for collective well-being, as well as a gradual improvement of productive and resource management practices. At this point, it is important to highlight that Cataruben, as the developer of the project, is aligned in this process with national environmental regulations. In this sense, the certificates issued by Cormacarena and Corporinoquia (See 6.5.1.3.5.2.1 Certifications), note that Cataruben has not acted

directly or indirectly in opposition or against said regulation, and has not caused any environmental violation nor has it been investigated for any of these reasons.

Table 16. *Addressing safeguard E within the framework of the project.*

SAFEGUARD AND THEMATIC NATIONAL INTERPRETATION: ENVIRONMENTAL AND TERRITORIAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	**Element National Interpretation**	**ID**	**Project Activity**	**Compliance**
5.1	Cycle of training given to the community	E11. Conservation of Forests and their Biodiversity	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	6.5.1.3.5.3. Safeguard E Compliance Report which were directed to Ecosystem Managers to encourage the conservation of ecosystems and their biodiversity.
5.2	Forest non-conversion	E11. Conservation of Forests and their Biodiversity	G5	Promote the delimitation and signaling in strategic ecosystems and natural protection areas	Evidence of 6.5.1.3.5.1. Satellite analysis. In which the non-conversion of forests within the properties linked to the project is evident.
			G6	Promote the recognition of conservation areas and figures for the sustainable management of ecosystems	
			R1	Implementation of sustainable fire use management practices for the prevention of forest fires	
			R2	Monitoring of hot spots as an early warning mechanism	
			R3	Promotion of the establishment of eco-efficient stoves and wood energy banks	
			B1	Identification and monitoring of High HCV conservation values present in the project area	
			B2	Monitoring the presence of globally threatened species and taking actions to conserve them	

			B3	Restoration actions in degraded ecosystems	
5.3	Compliance with environmental regulations	E12. Provision of Goods and Environmental services	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Folder containing the 6.5.1.3.5.2.1 certifications of non occurrence of violations and/or environmental investigations, issued by the Regional Autonomous Corporations of the area of influence of the Project.

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, the percentage of compliance with Safeguard E and its indicators with respect to the global goal is shown below.

Table 17. *Progress in compliance with Safeguard E with respect to the global goal of the Safeguards Monitoring Plan.*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
AND	5.1	Cycle of training given to the community	20%	**20%**
	5.2	Forest non-conversion	20%	
	5.3	Compliance with environmental regulations	20%	

Source: *Cataruben Foundation, 2023.*

11.6. Safeguard F

"The adoption of measures to address reversal risks."

11.6.1. F13 Environmental and territorial planning

Decisions made during the implementation of project activities focus on minimizing the risk of reversal. In other words, the durability of these activities over time is guaranteed from the beginning. It is essential to have the necessary measures to address the risks of reversal of greenhouse gas emissions in the long term and, consequently, increase their capture and storage.

In order to achieve this objective, in addition to being in compliance with the provisions of current national legislation regarding conservation and sustainable management of ecosystems, effective collaboration between the parties that constitute this project becomes essential. Therefore, through knowledge exchanges, capacity building and workshops, the commitment to the environment is reinforced. In addition to the above, the formation and consolidation of a Governance Board is essential.

In addition to what was previously mentioned, clauses that specifically address reversal risk are included in the contractual documents. These clauses link the permanence of the project over time with additional benefits, alternative strategies and changes in thinking regarding the territory, among others. In this way, the strengthening and reproduction of good production and conservation practices established in accordance with what is established by the Biocarbon Standard in its most recent version is ensured to a certain extent. This constitutes an endorsement so that conservation activities are maintained and gradually strengthened during the established period of validity.

11.6.2. F14 Sector planning

From ORINOCO2 they develop a series of additional tools that seek to reduce this risk of reversal (described above), but the most important is attention to the Territorial Planning Plans (POT), these play a relevant role because their reading allows the planning and distribution to be evident. territorial of each department, municipality and its surroundings. And with this information, a context can be more clearly defined so that the project activities have a greater scope and their effect results in the expected long-term impact. According to the above, the project activities will be adjusted to this territorial planning and distribution, this implies that they respond to the needs and urgencies of the territory and its population, taking into account the great social, cultural and environmental diversity.

Table 18 *Addressing safeguard F within the framework of the project.*

SAFEGUARD F THEMATIC NATIONAL INTERPRETATION: ENVIRONMENTAL AND TERRITORIAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	**Element National Interpretation**	**ID**	**Project Activity**	***Compliance***

6.1	Analysis of reversal risks carried out within the framework of the initiative	F13. Environmental and Territorial Planning F14. Sector Planning.	G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	We have developed a matrix to identify factors that could lead to project reversal. As well as to establish corresponding mitigation actions. To see 6.4 Reversal Risk Matrix Additionally, we have prepared the document 6.5.1.3.6.2 Safeguard Compliance Report F. Which provides a broader explanation about the approach to this safeguard.
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	
6.2	Actions so that the project is maintained over time		G2	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Within the linkage contract we have incorporated clauses that will allow us to guarantee the continuity of the project over time. These clauses are previously highlighted in the following document. 6.2 Contract minutes
			G4	Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally	

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, the percentage of compliance with Safeguard F and its indicators is shown below, with respect to the global goal.

Table 19*. Progress in compliance with Safeguard F with respect to the global goal of the Safeguards Monitoring Plan*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
F	6.1	Analysis of reversal risks carried out within the framework of the initiative	20%	**15%**

	6.2	Actions so that the project is maintained over time	10%	

Source: *Cataruben Foundation, 2023.*

11.7. G Safeguard

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

11.7.1. G15 Forest control and surveillance to avoid the displacement of emissions

According to the preliminary analysis carried out by the Cataruben foundation, the purpose of which is to identify the causes and main agents of degradation, deforestation and change in land use in natural forests and savannas. The expansion of the agricultural frontier and extensive livestock farming could be identified as the main causes. And as agents, to the owners of private properties themselves. Furthermore, this investigation was supported by national regulations linked to the management of native forests, which partially address the detection and management of deforestation and leaks that could occur in neighboring territories (Law 79 of 1986).

For this reason, the displacement of greenhouse gas (GHG) emissions is an unlikely scenario.inside them of the project area. However, and taking into account compliance with the methodological criteria of the Standard BCR, and as an initial and diagnostic measure, it was proposed to establish a buffer[8] 1 km distance from the limits of the eligible areas (strategic ecosystems). Said area will be monitored in order to quantify the increase in emissions that could occur outside the project area due to the possible displacement of deforestation or change in land use.

Likewise, the nation has institutional spaces that provide support in the administration of regional agreements and alliances to mitigate this risk in the interprovincial scenario, fine-tuning important cooperation between different actors, sectors and organizations at different levels of administrative decentralization.. In consideration of the above, the project will be presented al SNAP[9] and SIDAP[10].

This implies a complementary effort that adds to the previous analysis and the advance work to mitigate these displacements. Creating the conditions for the reproduction of the collective interest in conservation and this care of the territory, highlighting the material and symbolic benefits that this dedication implies, achieving the progressive inclusion of more properties to the project, through participatory spaces such as

[8] It is an area or ring that surrounds the reference region of the project (properties).
[9] National System of Protected Areas.
[10] Departmental System of Protected Natural Areas.

workshops and discussion tables. work aimed at ecosystem managers (and the civilian population interested in assisting) to identify and address the possible places where these leaks would travel.

Finally, these emissions (leaks) will be subtracted from the results obtained, as a complementary mechanism to identify and strategically minimize these potential leaks.

Table 20 *Addressing safeguard G within the framework of the project.*

SAFEGUARD G THEMATIC NATIONAL INTERPRETATION: ENVIRONMENTAL AND TERRITORIAL					
Item	**Requirement "BCR tool to demonstrate compliance with REDD+ Safeguards"**	***Element National Interpretation***	***ID***	**Project Activity**	**Compliance**
7.1	Analysis to identify leaks and their causes	*G15. Forest Control and Surveillance to avoid the displacement of emissions*	*G2*	Plan to strengthen the technical capacities of the community for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.	Document that shows the identification of leaks and their causes, monitoring methods and actions to minimize them. Annex: 6.5.1.3.7.1 Safeguard G Compliance Report
7.2	Response protocol to minimize such leaks				

Source: *Cataruben Foundation, 2023.*

Taking into account the boarding report, the percentage of compliance with Safeguard G and its indicators is shown below, with respect to the global goal.

Table 21. *Progress in Safeguard G compliance with respect to the global goal of the Safeguards Monitoring Plan*

Safeguard	Item	Indicators)	Advance (%) Period 2018-2022	Compliance (%) Global Goal
G	6.1	Analysis to identify leaks and their causes	20%	**20%**
	6.2	Response protocol to minimize such leaks		

Source: *Cataruben Foundation, 2023.*

12. Special categories, related to co-benefits

In accordance with the criteria model defined in the DdP, it is established that this criteria model is articulated with the model of project activities to achieve consistency and comprehensiveness in its monitoring. Next, in TableTable 22 The measurement and monitoring of actions that demonstrate co-benefits within the project are presented.

Table 22. Monitoring report Co-benefits Wax Palm for Orinoco2.

Activity ID	B1			
Description	Identification and monitoring of High Conservation Values HCVs present in the project area			
CO-Benefits Component	Biodiversity Conservation			
Description of the execution in the monitoring period.	The first identification of the HCVs associated with biodiversity present in the area of the properties linked to the project was carried out. Of the 4 HCVs that are made up, the presence of the HCV1 species, the HCV2 Landscape and the HCV4 Ecosystem services. All the results obtained are schematized by means of maps and in the annex ID-B-1.1. Both the methodologies and the results of the analysis carried out are described.			
Indicators to report the progress of the activity				
ID + Name	**Type**	**Meta**	**Unit of measurement**	**Indicator result in the analysis period.**
B-1.1. High Conservation Values identified	Product	4	Results report	**1 report with 4 strokes identified in the project area**
Activity ID	B2			
Description	Monitoring the presence of globally threatened species and taking actions to conserve them			
CO-Benefits Component	Biodiversity Conservation			

Description of the execution in the monitoring period.	Progress was made in planning the methodology for participatory bio-acoustic monitoring in order to identify species in some state of threat from recordings and subsequently propose mechanisms for maintaining the populations of these species. See Annex ID-B-2.1.

Indicators to report the progress of the activity				
ID + Name	**Type**	**Meta**	**Unit of measurement**	**Indicator result in the analysis period.**
B-2.1. Participatory wildlife monitoring to identify threatened species in the project area	Product	3	Methodological description or results report	**1 description of the methodology to be implemented**

Activity ID	B3
Description	Restoration actions in degraded ecosystems
CO-Benefits Component	Biodiversity Conservation
Description of the execution in the monitoring period.	The first report of restoration activities implemented by ecosystem managers (property owners) was presented; most of them active restoration was implemented, through the planting of species such as Acacia (*Acacia mangium),* Conger/Conger (*Acosmium nitens*), Saladillo (*Caribbean plains*), Moriche (*Mauritia flexuosa*). The document with detailed information and evidence is found in the following link ID-B-3.1

Indicators to report the progress of the activity				
ID + Name	**Type**	**Meta**	**Unit of measurement**	**Indicator result in the analysis period.**
B-3.1. Number of reports with restoration activities implemented by property managers	Numeric	4	number	**1 report of restoration activities implemented**

Activity ID	EG1

Description	Strengthening access and management of financial goods and services with a focus that achieves gender equity
CO-Benefits Component	Gender equality
Description of the execution in the monitoring period.	Progress was made in the formulation of the training plan that will focus on strengthen their knowledge on how to responsibly manage the economic benefits (assets) acquired by the conservation activities carried out, See Annex ID-EG-1.1 (Cobeneficios)

Indicators to report the progress of the activity				
ID + Name	**Type**	**Meta**	**Unit of measurement**	**Indicator result in the analysis period.**
EG1 Strengthening access and management of financial goods and services with a focus that achieves gender equity	Product	10	%	A plan for workshops and topics is presented that will focus on strengthening the agency and the recognized responsibility of ecosystem managers

Source: Cataruben Foundation, 2023.

13. Grouped projects

The project is not a groped project

14. Project implementation

14.1. Project implementation status.

Within the project activities, the monitoring of forest and natural savanna coverage is part of the most important indicators and is decisive when demonstrating the performance of the Project. For the first monitoring period, the changes in forest cover were monitored, as well as the other activities that have been defined to comprehensively address the problem of deforestation, forest degradation and the change in uses of the forest. land in natural savannas.

The conservation activities implemented by the project participants, in accordance with their intention to be part of the project, constitute an integral part of the execution of this report and are carried out from the start date, which corresponds to 1 October 2018, as established in the letters of intent. These letters are essential to define the start date of the project, since they demonstrate the intention of the main agent (the owners of each property) to reduce pressure on ecosystems with the incentive of participating in the carbon market. In this way, the economic and subsistence interests that drive land use change in natural ecosystems are addressed.

These activities are the result of the interest expressed by the community in participating in carbon markets, with the objective of accessing the economic benefits derived from this market. These activities are intended to generate mitigation results and the corresponding carbon certificates, as well as their commercialization and distribution of the economic benefits obtained. The above will contribute to the sustainability of the project during the accreditation period.

During the first monitoring period, activities have been implemented to facilitate the development of the social and technical conditions of the project in accordance with the interest of project participants. The activities have always been oriented towards the fulfillment of community objectives and interests.

14.1.1. Progress of project activities

For the current monitoring period, progress in project activities is presented.

Table 23. Progress of activity R1: Improvement of the owners' income generated by the sale of carbon credits.

Activity ID	R1: Improving the income of landowners generated by the sale of carbon credits obtained in the forest ecosystem					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-1.1	Percentage increase in average income derived from the sale of verified carbon credits	Impact	25	Percentage increase in average income	Annually after first verification	Economic benefits - Cataruben Foundation

R-1.2	Percentage of owners with improved income from the sale of verified carbon credits	Impact	100	Percentage of homeowners with improved income	Annually after first verification	Economic benefits - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
R-1.1	0 %	0 %		N/A	No progress reported. The implementation of the activity begins from the date of commercialization of the carbon certificates	
R-1.2	0 %	0 %		N/A	No progress reported. The implementation of the activity begins from the date of commercialization of the carbon certificates	

Source: Cataruben Foundation, 2023.

Table 24**.** Progress of activity R2: Implementation of sustainable fire use management practices.

Activity ID	R2: Implementation of sustainable fire use management practices for the prevention of forest fires					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-2.1	Number of properties that implement sustainable practices to prevent forest fires	Result	75	Percentage	Every four (4) years	Implementation - Cataruben Foundation
Activity progress						

Indicator ID	Indicator result in the monitoring period (2018-2022)	General Compliance	Documents to Evidence information	Observations
R-2.1	75	100%	Cronogr… ID-R-2.1	Attached is a report on the implementation of sustainable fire management practices. This taking into account the information collected for the monitoring period

Source: Cataruben Foundation, 2023.

Table 25**.** Advance activity R3: Monitoring of heat points.

Activity ID	R3: Monitoring of forest area under conservation within the project boundaries					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-3.1	ANumber of monitoring	Impact	35	Number of monitoring	Every five (5) years	Geospatial - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**	**Documents to Evidence information**			**Observations**
R-3.1	1	2.85%	ID-R-3.1			Heat point report for the monitoring period is attached.

Source: Cataruben Foundation, 2023.

Table 26**.** Progress of activity R4: Promotion of the establishment of eco-efficient stoves and wood energy banks.

Activity ID	R4: Promotion of the establishment of eco-efficient stoves and wood energy banks

Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-4.1	Number of properties implementing dendroenergy banks	Impact	10	Percentage of properties with established wood energy banks	Every five (5) years	Implementation - Cataruben Foundation
R-4.2	Number of properties with eco-efficient stoves	Impact	20	Percentage of eco-efficient stoves installed	Every five (5) years	Implementation - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**	**Documents to Evidence information**	**Observations**		
R-4.1	1	20%	ID-R-4.1 Cronog…	A report is attached showing the properties that implement wood energy banks. Those who don't and those who are interested in adopting this sustainable practice.		
R-4.2	7	35%	Cronog…	A report is presented with the percentage of properties that implement eco-efficient and traditional stoves, detailing the properties, whether legal, mixed or natural in nature.		

Table 27. R-5 activity progress: Design and implement a governance model.

Activity ID	R-5: Design and implement a project governance model that allows the sustainability of the project by linking the ecosystem managers, the project owner and the strategic ally
Indicators to report the progress of the activity	

Indicator ID	Indicator Name	Type	Meta global	Unit of measurement	Monitoring frequency	Responsible for measurement
R-5.1	Number of operational governance instances with effective participation of key actors	Impact	34	Number of participation spaces	Yearly	Economic benefits - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
R-5.1	1	2.9%		ID-R-5.1	The document under construction of the governance strategy is presented, prepared in collaboration with the project's strategic partner.	

Source: Cataruben Foundation, 2023.

Table 28**.** Advance activity R-6: Promote the delimitation and signaling in strategic ecosystems and natural protection areas.

Activity ID	R-6: Promote the delimitation and signaling in strategic ecosystems and natural protection areas					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-6.1:	Properties with strategic ecosystems identified, delimited and signposted	Product	20	Identified and marked properties	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	

R-6.1:	7	35%	ID-R-6.…	The methodology was developed to identify areas of importance for biological diversity, in order to subsequently promote the signaling of strategic ecosystems. 20 properties were selected because they have large areas of key ecosystems for biological diversity.

Source: Cataruben Foundation, 2023.

Table 29**.** Progress of activity R-7: Promote the recognition of conservation areas and figures.

Activity ID	R-7: Promote the recognition of conservation areas and figures for the sustainable management of ecosystems					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-7.1	Number of properties with declared conservation areas and/or figures	Impact	10	Percentage	Every three (3) years	Implementation - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
R-7.1	1	20%		ID-R-7.1	A report is presented detailing the properties with areas declared as conservation figures, and the resolutions issued by the Ministry of the Environment and Sustainable Development are also attached.	

Source: Cataruben Foundation, 2023.

Table 30. Progress of activity R-8: Plan to strengthen the technical capacities of the community.

Activity ID	R-8: Plan to strengthen the community's technical capacities for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
R-8.1	Progress in the execution of the Training Plan aimed at strengthening the community's capacities in ecosystem services and conservation of strategic ecosystems	Product	100	Percentage	Every two (2) years	Implementation - Cataruben Foundation
R-8.1	General training plan in Biodiversity	Impact	40	Percentage of completion	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
R-8.1	100%	30%		G-2.1	A detailed report of the training carried out for the monitoring report is attached; This report includes information on topics addressed, objectives, theoretical content, corresponding; Likewise, a matrix that relates is presented for each training session. Start date: 2018	
R-8.1	10%	10%		G-2.2	General biodiversity training plan is attached.	

				Start date: 2018.

Source: Cataruben Foundation, 2023.

Table 3131. Progress of activity S-1: Improvement of the owners' income generated by the sale of carbon credits.

Activity ID	S-1: Improving the income of landowners generated by the sale of carbon credits obtained in the forest ecosystem					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
S-1.1	Percentage increase in average income derived from the sale of verified carbon credits	Impact	25	Percentage increase in average income	Annually after first verification	Economic benefits - Cataruben Foundation
S-1.2	Percentage of owners with improved income from the sale of verified carbon credits	Impact	100	Percentage of homeowners with improved income	Annually after first verification	Economic benefits - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**	**Documents to Evidence information**	**Observations**		
S-1.1	0 %	0 %	N/A	No progress reported. The implementation of the activity begins from the date of commercialization of the carbon certificates		
S-1.2	0 %	0 %	N/A	No progress reported. The implementation of the activity begins from the date of commercialization of the carbon certificates		

Source: Cataruben Foundation, 2023.

Table 322**.** Progress of activity S-2: Implementation of landscape management tools in savannas.

Activity ID	S-2: Implementation of landscape management tools in savannas.					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
S-2.1	Number of properties that implement Landscape Management Tools in natural savannas	Result	103	Number of properties	Every five (5) years	Implementation - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**	**Documents to Evidence information**	**Observations**		
S-2.1	80	77%	ID-S-2.1	This report shows the percentages of properties that implement landscape management tools.		

Source: Cataruben Foundation, 2023.

Table 33**3.** Progress of activity S-3: Implementation of sustainable productive practices in natural savannas.

Activity ID	S-3: Implementation of sustainable productive practices in natural savannas
Indicators to report the progress of the activity	

Indicator ID	Indicator Name	Type	Meta global	Unit of measurement	Monitoring frequency	Responsible for measurement
S-3.1	Number of properties that implement sustainable production practices or conservation, soil management and conservation actions	Result	103	Number of properties	Every five (5) year	Implementation - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
S-3.1	70	67%		ID-S-3.1	A report is presented detailing sustainable production practices in natural savannas. Activity and the number of properties where they are implemented are included.	

Source: Cataruben Foundation, 2023.

Table 34. S-4 activity progress: Alliance management.

Activity ID	S-4: Alliance management that financially allows generating the enabling conditions for the validation and first verification of the project					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
S-4.1	Alliance or formalized agreement	Product	1	Agreement	Every three (3) years	Cataruben Foundation
Activity progress						

Indicator ID	Indicator result in the monitoring period (2018-2022)	General Compliance	Documents to Evidence information	Observations
S-4.1	1			Agreement between the Cataruben Foundation and Ecopetrol to generate the enabling conditions for the validation and verification of the project.

Source: Cataruben Foundation, 2023.

Table 3535. Progress of activity S-5: Plan to strengthen the technical capacities of the community.

Activity ID	S-5: Plan to strengthen the community's technical capacities for the sustainable management and conservation of strategic ecosystem services, fire management to avoid forest fires, sustainable productive systems and landscape management tools.					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
S-5.1	Progress in the execution of the Training Plan aimed at strengthening the community's capacities in ecosystem services and conservation of strategic ecosystems	Product	100	Percentage	Every two (2) years	Implementation - Cataruben Foundation
S-5.1	General training plan in Biodiversity	Impact	40	Percentage of completion	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
S-5.1	100%	30%		G-2.1	A detailed report of the training carried out for the monitoring report is attached; This report includes	

				information on topics addressed, objectives, theoretical content, corresponding; Likewise, a matrix that relates is presented for each training session. Start date: 2018
S-5.1	10%	10%	G-2.2	General biodiversity training plan is attached. Start date: 2018.

Source: Cataruben Foundation, 2023.

Table 36**6.** Progress of activity B1: Identification and monitoring of High Conservation Values (HCVs) present in the project area.

Activity ID	B1: Identification and monitoring of High Conservation Values (HCVs) present in the project area					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
B-1.1	Recognized High Conservation Values	Product	8	HCV presence report	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**	**Documents to Evidence information**	**Observations**		
B-1.1	1	12,5%	B-1.1	The analysis of the HCVs associated with the biodiversity component was carried out, where the presence of: HCV1, HCV2 and HCV 4 was identified.		

Source: Cataruben Foundation, 2023.

Table 37**.** Progress of activity B2: Monitoring the presence of globally threatened species and taking actions to conserve them

Activity ID	B2: Monitoring the presence of globally threatened species and taking actions to conserve them					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
B-2.1	Participatory monitoring of wildlife to detect threatened species within the project area	Product	8	Monitoring report on species in some threatened state	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**	**Documents to Evidence information**	**Observations**		
B-2.1	1	12,5%	B-2.1	The methodology for the development of participatory biodiversity monitoring is presented to identify species in some threatened state.		

Source: Cataruben Foundation, 2023.

Table 38 Progress of activity B3: Restoration actions in degraded ecosystems.

Activity ID	B3: Restoration actions in degraded ecosystems					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**

B-3.1	Total reports documenting restoration activities implemented by property managers	Product	40	Advance monitoring reports of the number of restoration activities	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**		**Observations**
B-3.1	3	17,64%		B-3.1		A report is presented with the restoration activities implemented by ecosystem managers

Source: Cataruben Foundation, 2023.

Table 39. Progress of activity B4: General training plan in Biodiversity

Activity ID	B4: General training plan in Biodiversity					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
B-4.1	Property with active restoration initiatives	Product	17	Monitoring reports of Number of restoration activities implemented	Every five (5) years	Biodiversity - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**		**Observations**
B-4.1	1	5,88%		ID-B-4.1		A report is

				presented with the restoration activities implemented by ecosystem managers

Source: Cataruben Foundation, 2023.

Table 40. Activity progress EG1: Strengthening access and management of financial goods and services with a focus that achieves gender equity.

Activity ID	EG1: Strengthening access and management of financial goods and services with a focus that achieves gender equity					
Indicators to report the progress of the activity						
Indicator ID	**Indicator Name**	**Type**	**Meta global**	**Unit of measurement**	**Monitoring frequency**	**Responsible for measurement**
EG-1.1	Training developed to strengthen access and management of financial goods and services	Product	10	Number of trainings	Every two (2) years	Implementation - Cataruben Foundation
Activity progress						
Indicator ID	Indicator result in the monitoring period (2018-2022)	**General Compliance**		**Documents to Evidence information**	**Observations**	
EG-1.1	1	10%		EG-1.1	A plan of workshops and topics is presented that will focus on strengthening the agency and the recognized responsibility of ecosystem managers	

4.1.2. Monitoring and Risk Management

During the monitoring period, mitigation actions were executed with risks initially classified as high and medium according to the BCR TOOL Permanence and Risk Management v 1.0. Likewise, risks were reassessed and mitigation actions were adapted within the framework of adaptive management. In the table 41 the analysis of the effect of mitigation actions can be observed

Table 41. Monitoring and Risk Management

Cod	Dimension	Risk	Qualification	Mitigation Actions	Effect of mitigation action	Observations according to lessons learned and current conditions
A1	Environmental	Catastrophic Fire Events, of natural or anthropogenic origin	High	1. Design of project activities involving fire management education 2. Execution of forest fire prevention measures, 3. Project activity preventive monitoring in summer (Early warnings)	Forest fires were mitigated	Due to the natural conditions of the areas, the probability of occurrence remains high.
A2	Environmental	Mass removal events, landslides or floods	Low			Due to the natural and edaphoclimatic conditions of the project areas, the probability is low.
F1	Financial	Emerging regulation, regulations or changes in the standards or methodologies established new conditions regarding the management of carbon projects	Half	1. Constant monitoring of applicable regulations, national regulations and standards. 2. Project design with an adaptive model involving the owners, Cataruben and the strategic ally in such a way that it can adapt to the circumstances.	Adaptation of the project to new versions of the standard and tools, as well as compliance with standards	National legislation regarding carbon markets is constantly adapting, so the probability of occurrence is medium.

Cod	Dimension	Risk	Qualification	Mitigation Actions	Effect of mitigation action	Observations according to lessons learned and current conditions
F2	Financial	Lack of resources to implement, validate and verify the project	Half	1. Design of a project activity based on seeking a strategic ally that allows generating the enabling conditions of the Monitoring, reporting and verification system	An agreement was reached with Ecopetrol to finance the enabling conditions for the validation and first verification of the project.	The financial support of the project now depends on the commercialization of carbon credits and the distribution of economic benefits
F3	Financial	Increase, or decrease, in the price of the carbon certificate that exceeds or is below the expected cost per ton in the future. (sensitivity in market prices).	Low			Current carbon credit prices are low and could affect the
F5	Financial	Possible overlaps not compatible with other climate change mitigation initiatives	Half	1. Realizar Registro en Renare 2. Search and monitoring of carbon program databases	La plataforma de RENARE It has been disabled since 2022. The review of carbon platforms and communication with the owners has made it clear that there are no non-compatible overlaps in the project areas.	Inactivation of RENARE maintains this probable risk. It is advisable to continue monitoring carbon platforms and transparent communication with project participants.
S1	Social	Lack of security of land tenure and consequently of property and rights over carbon	Half	1. Legal analysis of carbon ownership and rights prior to verifications	High security is maintained over carbon ownership and rights.	Important to keep the probability high, due to the legal nature of the project participants.

Cod	Dimension	Risk	Qualification	Mitigation Actions	Effect of mitigation action	Observations according to lessons learned and current conditions
S2	Social	Increase in conflicts between indigenous communities and private owners, due to compliance with project activities	Half	1. Generation of spaces for dialogue with indigenous communities near the project areas	No extra conflicts were generated, different from the historical ones	Due to the social and cultural conditions of the region where the activity takes place, it is important to maintain active mitigation actions.
S3	Social	Little active participation of property owners in project activities	Half	1. Responsibility agreements clearly established in the binding contracts	Thanks to the property implementation plans, the training plan and monitoring, the participation of the owners is high	It is important to continue monitoring property implementation plans and effective communication between owners and the Cataruben Foundation.
S4	Social	Dispute over land tenure or claims regarding participation mechanisms (guardianships, demands, prior consultations)	Low			
S5	Social	Forced displacement due to security conditions	Low			
S6	Social	Materialization of facts against ethics and compliance (bribery, deception, others) in the project.	Low			

Cod	Dimension	Risk	Qualification	Mitigation Actions	Effect of mitigation action	Observations according to lessons learned and current conditions
S7	Social	Loss of efficient communication between project participants	Half	1. Establishment of a project monitoring platform with access for all project participants. 2. Design of a governance model between the three main actors of the project	Until now, the impact of the platform or the governance model could not be evaluated; However, in general terms communication with project participants has been efficient and assertive.	The generation of credits is an important milestone as well as the future distribution of the first benefits of the project, therefore it is important to maintain the implementation of mitigation activities
S8	Social	Non-permanence of some properties in the project due to change in economic activity, sale, rental or transaction that generates more income or dissatisfaction with the project activities	Half	1. Establishment of permanence clauses within the binding contract 2. Strengthening the PQRS mechanism 3. Establishment of a governance model between the three project actors	The initial owners continue within the grouped project	The nature of the project by grouping multiple owners maintains the average probability

Based on this analysis and within the framework of adaptive management, the risks are reassessed and mitigation actions are established for the coming years. table 42

Table 42. Risk Reassessment

Cod	Dimension	Risk	Impact (I)	Probability (P)	Qualification (IxP)	Value	Qualification	Mitigation Actions	2024	2025
A1	Environmental	Catastrophic Fire Events, of natural or anthropogenic origin	3	3	9	3	High	1. Project activities involving fire management education 2. Execution of forest fire prevention measures, 3. Project activity preventive monitoring in summer (Early warnings)	x	x
A2	Environmental	Mass removal events, landslides or floods	1	1	1	1	Low			
F1	Financial	Emerging regulation, regulations or changes in the standards or methodologies established new conditions regarding the management of carbon projects	2	2	4	2	Half	1. Constant monitoring of applicable regulations, national regulations and standards. 2. Project design with an adaptive model involving the owners, cataruben and the strategic ally in such a way that it can adapt to the circumstances.	x	x
F2	Financial	Lack of resources to implement, validate and verify the project	2	2	4	2	Half	1. Project activity based on seeking a strategic ally that allows generating the enabling conditions of the Monitoring, reporting and verification system	x	x
F3	Financial	Increase, or decrease, in the price of the carbon certificate that exceeds or is below the expected cost per ton in the future. (sensitivity in market prices).	2	2	4	2	Half		x	x

F5	Financial	Possible overlaps not compatible with other climate change mitigation initiatives	3	2	6	2	Half	1. Register a cleaner 2. Search and monitoring of carbon program databases	x	x
S1	Social	Lack of security of land tenure and consequently of property and rights over carbon	2	2	4	2	Half	1. Legal analysis of carbon ownership and rights prior to verifications	x	x
S2	Social	Increase in conflicts between indigenous communities and private owners, due to compliance with project activities	2	2	4	2	Half	1. Generation of spaces for dialogue with indigenous communities near the project areas	x	x
S3	Social	Little active participation of property owners in project activities	3	2	6	2	Half	1. Responsibility agreements clearly established in the binding contracts	x	x
S4	Social	Dispute over land tenure or claims regarding participation mechanisms (guardianships, demands, prior consultations)	2	1	2	1	Low		x	x
S5	Social	Forced displacement due to security conditions	2	1	2	1	Low		x	x
S6	Social	Materialization of facts against ethics and compliance (bribery, deception, others) in the project.	3	1	3	1	Low		x	x
S7	Social	Loss of efficient communication between project participants	2	2	4	2	Half	1. Establishment of a project monitoring platform with access for all project participants.	x	x

								2. Implementation of a governance model between the three main actors of the project		
S8	Social	Non-permanence of some properties in the project due to change in economic activity, sale, rental or transaction that generates more income or dissatisfaction with the project activities	**3**	**2**	6	**2**	**Half**	1. Establishment of permanence clauses within the binding contract 2. Strengthening the PQRS mechanism 3. Establishment of a governance model between the three project actors	**x**	**x**

14.1.3. Monitoring and Management of leakage and Non-Permanence Risks

Within the framework of the monitoring and management of leakage and permanence risks for the current monitoring period, the leakage area was monitored in accordance with the applied methodologies (see section 15.3) Likewise, management is carried out to reduce the risk of leaks (section 11.7). Meanwhile, the permanence of the activities is evaluated with the progress in the implementation of the project (section 13.1.1) and the continuation of the project participants.

14.1.4. Uncertainty Management

In accordance with the guidelines established in the BCR 0002 (section 13.1) and BCR 0005 (section 12) methodologies, uncertainty management is conditioned by the accuracy of the maps used to calculate the activity data and the implementation of adjustments in the emission factors. In this context, during the present monitoring period, uncertainty management was applied to the data sources used to calculate activity data and emission factors as follows:

14.1.4.1. Uncertainty of activity data

The forest maps corresponding to the years 2018 and 2022 were generated using collections of images from the Landsat 5, 7 and 8 satellites using the Google Earth Engine (GEE) platform. During the construction of the mosaics, the start date of the project was considered, establishing specific filters for each year, the procedure is described in 3.9.1.1. REDD+ Eligible Areas. For 2022 (09/01/2022–03/31/2023), 53 scenes were obtained, and a mosaic was generated on which training samples were taken from in situ observations, and interpretation of images with which ran the Random Forest algorithm. Subsequently, quality control was carried out through the PIAO method (Supervised Classification Procedure).

For the REDD+ component, the validation of the 2018 and 2022 non-forest maps was developed through ACATAMA, a QGIS plugin designed specifically for this purpose (See Instructions ACATAMA).

For each year evaluated, ACATAMA generated a confusion matrix that facilitates the calculation of various classification evaluation metrics, including Accuracy, which determines the level of precision achieved in the classification of each of the identified coverages. The precision results for the forest-non-forest maps for the years evaluated were: 95% and 96% for the years 2018 and 2022, respectively. The cartographic information is found in the spatial database Geodatabase REDD+ / ACATAMA.

The accuracy of the inputs used to determine eligible areas, with a confidence level of 95%, directly influences the reduction of uncertainty in forest degradation data. This is because the MSPA spatial algorithm stratifies eligible forest into edge and core forest, which is then used to conduct the degradation analysis.Geodatabase REDD+ / Area Proyecto

For the component savannas, especially in the 2022 land cover map, because the 2012 and 2018 inputs (used to determine eligibility) come from the 2012 and 2018 national land cover maps (Matrix Confusion; Coverage validation.gdb). The Computer-assisted interpretation was contrasted with in situ observations and high-resolution images from sensors such as WorldView 2 (Spatial resolution 0.30 m/pixel) and Sentinel 2 (Spatial resolution 10 m/pixel). The accuracy result was 93.6%. The table 43 describes the characterization of the cartographic inputs for the interpretation of 2022 coverage.

Table 43. Characterization of cartographic inputs

Vector (satellite or plane)	Sensor	Resolution		Coverage	Acquisition date	Screen the Identification point
		Spatial	Spectral	(Km^2)	(DD/MM/AAA)	Tile Number
S2A_MSIL1C_20221215T151803_A030081_R125_T18NXJ.tiff	MSI	10 meter bands (2 to 3 and 8); Panchromatic (band 8) 10 m, 20 meter bands (5 to 7 and 9); Panchromatic	7 -10 bands	9.698,0	15/12/2022	T18NXJ
S2A_MSIL2A_20221223T151016_N0301_R082_T19NCF.tiff'				12.093,0	23/12/2022	T18NCF
S2A_MSIL2A_20221225T145721_N0509_R039_T19NFF.tiff'				12.093,0	25/12/2022	T19NFF
S2A_MSIL2A_20221228T150835_A039_R082_T19NCG				11.675,4	28/12/2022	T19NCG
S2B_MSIL1C_20221223T150719_N0509_R082_T19NDG				12.093,0	23/12/2022	T19NDG

S2B_MSIL1C_20221226T151709_N0509_R125_T18NYJ.tiff'		(band 8A) 20 m		12.026,4	26/12/2022	T19NYJ
S2B_MSIL1C_20221226T151709_N0509_R125_T18NYK.tiff'				12.027,2	26/12/2022	T19NYK
S2B_MSIL1C_20221226T151709_N0509_R125_T18NZK.tiff'				12.014,1	26/12/2022	T19NZK
S2B_MSIL1C_20221226T151709_N0509_R125_T18NZL.tiff'				12.014,03	26/12/2022	T19NZL
S2B_MSIL1C_20221226T151709_N0509_R125_T19NBE.tiff'				8.417,7	26/12/2022	T19NBE
'S2B_MSIL2A_20221218T150839_A039118_R082_T19NEF.tiff'				8.663,3	18/12/2022	T19NEF
'S2B_MSIL2A_20221223T150719_N0509_R082_T19NDF.tiff'				12.092,8	23/12/2022	T19NDF
S2B_MSIL2A_20221223T150719_N0509_R082_T19NEG.tiff'				11.102,9	23/12/2022	T19NEG
S2B_MSIL2A_20221226T151709_N0509_R125_T19NBF.tiff'				10.885,2	26/12/2022	T19NBF
S2B_MSIL2A_20221230T145729_N0509_R039_T19NFG.tiff'				12.146,8	23/12/2022	T19NFG
'S2B_MSIL1C_20221223T150719_N0509_R082_T19NCE.tiff'				12.100,0	23/12/2022	T19NCE

Source: Cataruben Foundation

In this sense, the BCR 0002 and BCR 0005 methodologies indicate that the precision of the maps used must be greater than 90%. Consequently, the maps used for the forest and savannah component meet the precision requirement, since values of 95% and 96% are obtained for forest and 93.6%.

14.1.4.2. Uncertainty of Emission factors

According to what is established in the project DoP, section 3.5, in forests the information is in accordance with the national emissions scenario, in addition the calculations made for the Orinoquía biome register an uncertainty of less than 10% (Ministry of Environment and Sustainable Development – IDEAM, 2024).

In the case of sheets,The estimation of the uncertainty in the emission factors was carried out according to what is established in the Inventory Design ProcedureO, for which the formula was applied based on the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities [11]:

$$\mu_{\Delta C} = \frac{t_{VAL}\, x \sqrt{\sum_{i=1}^{M} IN_i^2 x \frac{S_i^2}{n_i}}}{b_{TREE}}$$

Where:

$\mu_{\Delta C}$ Uncertainty in ΔC_{ARB}

t_{VAL} Two-tailed t-student value for a 90% confidence level and degrees of freedom equal to n-M, where n is the total number of sampling plots within the biomass estimation strata and M is the total number of biomass estimation strata

S_i^2 Variance of biomass per hectare in stratum i; $(t\ d.m.\ ha^{-1})^2$

IN_i Relationship between the area of stratum i and the sum of the areas of the biomass estimation strata (i.e. $IN_i = A_i / A$)

n_i Number of sampling plots in stratum i

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

In this way, the total biomass emission factor for savannas was 9% (See Quality Control Report - savannas, section 4.6 Uncertainty Value Calculation and Annex Data savannas, Sheet 1. Summary).

For soil carbon emission factors in savannas, reference data consistent with the national context was used, having as a source the study developed by CIAT and AGROSAVIA, for natural savannas (Hyman et. al, 2022). In this way, uncertainty is not calculated, assuming that they correspond to a conservative scenario.

[11] https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-14-v4.2.pdf

14.2. Deviation request applied to this monitoring period

No methodological deviations were applied.

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 leaks, which were recorded during the first monitoring period, are presented.

15.2. Data and parameters to quantify emissions reduction

Quantification of baseline, project, and leakage emissions requires the definition of activity data and emission factors. In this way, the data and parameters used for its estimation are described below:

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.* *It is estimated from the sum of the aboveground biomass (BA) and the underground biomass (BS)*
Data source used	*Ministry of Environment and Sustainable Development – IDEAM (2020)*
Values	*106,47*
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	*Definition of the carbon emission factor in total biomass (REDD+ Activities)* *Calculation of emissions in forest ecosystems in baseline.* *Calculation of emissions in forest ecosystems in project areas.* *Calculation of emissions in forest ecosystems in leakage areas.*
Justification of the choice of data or	*The value is taken from NREF, therefore it represents a conservative value, in accordance with the national context for*

description of the measurement methods and procedures applied	*estimating GHG emissions.*
Additional comments	

Data/Parameter	*Soil organic carbon in forests*
data unit	*tC/ha*
Description	*Carbon content in soils in forest ecosystems*
Data source used	*Ministry of Environment and Sustainable Development – IDEAM (2020)*
Values	*64,51*
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	*Definition of the soil carbon emission factor (REDD+ Activities)* *Calculation of emissions in forest ecosystems in baseline* *Calculation of emissions in forest ecosystems in project areas* *Calculation of emissions in forest ecosystems in leakage areas*
Justification of the choice of data or description of the measurement methods and procedures applied	*The value is taken from NREF, therefore it represents a conservative value, in accordance with the national context for estimating GHG emissions.*
Additional comments	*N/a*

Data/Parameter	*Total biomass in natural savannas*
data unit	*t/ha*
Description	*Plant biomass contained in natural savanna ecosystems.* *It is estimated from the sum of the aboveground biomass (BA) and the underground biomass (BS)*
Data source used	*Own data*
Values)	*3,78*
Indicate what the data is used for (Baseline/Project/leakage Emissions	*Definition of the carbon emission factor in the total biomass of natural savannas*

Calculations)	*Calculation of emissions in forest ecosystems in baseline* *Calculation of emissions in forest ecosystems in project areas* *Calculation of emissions in forest ecosystems in leakage areas*
Justification of the choice of data or description of the measurement methods and procedures applied	*Sampling was carried out according to nationally validated methodologies and was carried out in eligible project areas.* *The statistical and technical aspects that were taken into account for its development are described in the section 3.7.3.2.3 of the PD.*
Additional comments	*N/A*

Data/Parameter	*Soil organic carbon in natural savannas*
data unit	*tC/ha*
Description	*Soil carbon content in natural savanna ecosystems*
Data source used	*Hyman et al., 2022. Soil carbon storage potential of acid soils of Colombia's Eastern High Plains*
Values	*65,94*
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	*Definition of the carbon emission factor in the soil of natural savannas* *Calculation of emissions in forest ecosystems in baseline* *Calculation of emissions in forest ecosystems in project areas* *Calculation of emissions in forest ecosystems in leakage areas*
Justification of the choice of data or description of the measurement methods and procedures applied	*The study is regional, which is why it was developed in areas with ecosystems and environmental characteristics similar to the project areas.*
Additional comments	*N/A*

15.2.2. Monitored data and parameters

Complete the table with all the data and parameters monitored during the project quantification period. Copy this table for each data and parameter.Quantification of the reduction/absorption of GHG emissions

Emission factor deforestation

Data/Parameter	Total biomass in forests
data unit	t/ha
Description	Plant biomass contained in forest ecosystems. It is estimated from the sum of aboveground biomass (BA) and belowground biomass (BS).
Data source used	Ministerio de Ambiente y Desarrollo Sostenible – NREF Colombia
Values	106,47
Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)	Definition of the carbon emission factor in total biomass (REDD+ Activities). Calculation of emissions in forest ecosystems in baseline. Calculation of emissions in forest ecosystems in project areas. Calculation of emissions in forest ecosystems in leakage areas.
Justification of the choice of data or description of the measurement methSDG and procedures applied.	The value is taken from the NREF, so it represents a conservative value, according to the national context for the estimation of GHG emissions.

Emission factor deforestation

Data/Parameter	Soil organic carbon in forests
data unit	tC/ha
Description	Carbon content in soils in forest ecosystems
Data source used	Ministerio de Ambiente y Desarrollo Sostenible – NREF Colombia
Values	64,51
Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)	Definition of the soil carbon emission factor (REDD+ Activities) Calculation of baseline emissions in forest ecosystems Calculation of emissions in forest ecosystems in the project area.
	Calculation of emissions in forest ecosystems in leakage areas
Justification for the choice of data or description of the methSDG and	The value is taken from the NREF, so it represents a conservative value, according to the national context for the estimation of GHG emissions.

measurement measurement methSDG and procedures applied	

Emission factor forest degradation

Data/Parameter	Emission factor of forest degradation
data unit	t/ha
Description	Loss of carbon content when a core forest is degraded to a border forest in the orinoquia Biome.
Data source used	Ministerio de Ambiente y Desarrollo Sostenible – NREF Colombia
Values	98,74
Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)	Definition of the carbon emission factor in forest degradation (REDD+ Activities). Calculation of emissions in forest ecosystems in baseline. Calculation of emissions in forest ecosystems in project areas. Calculation of emissions in forest ecosystems in leakage areas.
Justification of the choice of data or description of the measurement methSDG and procedures applied.	The value is taken from the NREF, so it represents a conservative value, according to the national context for the estimation of GHG emissions.

Emission factor natural savanna

Data/Parameter	Total biomass in natural savannas
data unit	t/ha
Description	Plant biomass contained in natural savanna ecosystems. It is estimated from the sum of aboveground biomass (BA) and belowground biomass (BS).
Data source used	Own data from sampling
Values	3,78
	Definition of the carbon emission factor in the total biomass of natural savannas

Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)	Calculation of baseline emissions in forest ecosystems Calculation of emissions in forest ecosystems in the project area.
	Calculation of emissions in forest ecosystems in leakage areas
Justification of the choice of data or description of the measurement methSDG and procedures applied.	Sampling was conducted according to nationally validated methodologies and was carried out in eligible areas of the project.

Emission factor natural savanna

Data/Parameter	Soil organic carbon in natural savannas
data unit	tC/ha
Description	Carbon content in soils in natural savanna ecosystems
Data source used	Hyman et al., 2022. Soil carbon storage potential of acid soils of Colombia's Eastern High Plains
Values	65,94
Indicate what the data is used for (Baseline/Project/Leakage Emission Calculations)	Definition of the carbon emission factor in the soil of natural savannas Calculation of emissions in forest ecosystems at baseline Calculation of emissions in forest ecosystems in project areas Calculation of emissions in forest ecosystems in leakage areas leakage
Justification of the choice of data or description of the measurement methSDG and procedures applied.	The study is regional, so it was developed in areas with ecosystems and environmental characteristics similar to the project areas.

Data activity Reference Region

Data/Parameter	REDD+ Reference Region forest area
data unit	ha

Description	Areas in the reference region that correspond to the forest category, years 2005, 2017,
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System
Monitored parameter value(s)	Forest area Reference region 2005: 217.936 ha Forest area Reference region 2017: 196.312 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of change in forest cover in baseline.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	ArcGISV3.1 y QGIS V3.28 National data on the area covered by natural forest Forest area 2005 95,0 % Forest area 2017 94,0% Thematic precision is achieved through ACATAMA
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity Reference Region Fragmentation

Data/Parameter	REDD+ Reference Region forest area - fragmentation classes
data unit	ha
Description	Areas in the reference region that correspond to the category of forest subjected to the fragmentation process MSPA algorithms years 2005, 2017,
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System - MSPA Algorithms.

Monitored parameter value(s)	Forest area Reference region 2005: Core Forest: 40.229 ha Edge Forest: 177.707 ha Forest area Reference region 2017: Core Forest: 33.112 ha Edge Forest: 163,199 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of fragmentation in the reference region
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	MSPA Version 2,3. National data on the area covered by natural forest Forest area 2005 Forest area 2017 Thematic precision is achieved through ACATAMA The level of uncertainty is determined by the inputs, that is, the maps of the area covered by natural forest.
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity Reference Region Degradation

Data/Parameter	Forest area of the REDD+ Reference Region that went from Core Forest to Edge Forest.
data unit	ha
Description	Areas in the reference region that correspond to the Core forest category and were transformed into Edge Forest 2005, 2017.
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System -, fragmented forest (Core Forest - Edge Forest) MSPA Algorithms.

Monitored parameter value(s)	Reference region Degradation 2005 - 2017 B Core Forest 2005 —- Edge Forest, 2017: 6666 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of degradation in the reference region
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	MSPA Version 2,3. ArcGIS Pro v2.3, QGIS. National data on the area covered by natural forest Forest area 2005 Forest area 2017 Thematic precision is achieved through ACATAMA The level of uncertainty is determined by the inputs, that is, the maps of the area covered by natural forest.
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects The NREF procedure, carried out by IDEAM, presents the third Reference Level of Forest Emissions of Colombia for the period 2023-2027,
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity REDD Leakage Area Baseline

Data/Parameter	REDD+ Leakage Area Baseline
data unit	ha
Description	Areas in the leakage belt that correspond to the forest category, years 2005, 2017,

Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System.
Monitored parameter value(s)	Forest area 2005: 21,617 ha Forest area 2017: 19,876 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of change in forest cover in the leak area.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	ArcGISV3.1 y QGIS V3.28 National data on the area covered by natural forest Thematic precision is achieved through ACATAMA
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Procedure Supervised forest classification Geospatial Procedure for the implementation of Carbon projects
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity REDD Leakage Area Project Limits

Data/Parameter	REDD+ Leakage Area
data unit	ha
Description	Areas in the leakage belt that correspond to the forest category, years 2017, 2022,
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System - PDI Processing - Google Earth Engine
Monitored parameter value(s)	Forest area 2017: 25,593 ha Forest area 2022: 25,405 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of change in forest cover in the leak area.

Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	ArcGISV3.1 y QGIS V3.28 National data on the area covered by natural forest Forest area 2017: 94.0% Forest area 2022: 96.0% Thematic precision is achieved through ACATAMA
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Procedure Supervised forest classification Geospatial Procedure for the implementation of Carbon projects
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity REDD Leaks Area Fragmentation Lb and Project Limits

Data/Parameter	REDD+ Leakage Area Fragmentation Baseline and project limits.
data unit	ha
Description	Areas in the leak belt that correspond to the forest category, and were analyzed through MSPA. years 2005, 2017, 2022,
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System - fragmented forest (Core Forest - Edge Forest) MSPA Algorithms
Monitored parameter value(s)	Forest area leaks 2005: Core Forest: 4853 ha Edge Forest: 15573 ha Forest area leaks 2017: Core Forest: 4303 ha Edge Forest: 20613 ha Forest area leaks 2022: Core Forest: 4961 ha Edge Forest: 20444 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of fragmentation in the leak area

Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	MSPA Version 2,3.ArcGISV3.1 y QGIS V3.28 National data on the area covered by natural forest Forest area 2017: 94.0% Forest area 2022: 96.0% Thematic precision is achieved through ACATAMA The level of uncertainty is determined by the inputs, that is, the maps of the area covered by natural forest.
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Procedure Supervised forest classification Geospatial Procedure for the implementation of Carbon projects
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity REDD Leakage Area Baseline Degradation

Data/Parameter	Forest area in the Fuga area, which has changed category, going from Core Forest to Edge Forest.
data unit	ha
Description	Areas in the escape zone that correspond to the category of Core forest and were transformed into Edge Forest 2005, 2017.
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System -, fragmented forest (Core Forest - Edge Forest) MSPA Algorithms.

Monitored parameter value(s)	Core forest 2005 —-> Edge Forest 2017: 630 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of degradation in the leak area.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	MSPA Version 2,3. ArcGIS Pro v2.3, QGIS. National data on the area covered by natural forest Forest area 2005 Forest area 2017 Forest area 2022 Thematic precision is achieved through ACATAMA The level of uncertainty is determined by the inputs, that is, the maps of the area covered by natural forest.
Measurement/reading/recording frequency	Yearly
Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects The NREF procedure, carried out by IDEAM, presents the third Reference Level of Forest Emissions of Colombia for the period 2023-2027
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity REDD Project Area Degradation

Data/Parameter	Degradation of project areas
data unit	ha

Description	Areas in the project area that correspond to the category of core forest and were transformed into Edge Forest, in the period 2017, 2022.
Measured/Calculated/Default:	Calculated
Data source	Area covered by natural forest - Forest and Carbon Monitoring System -, fragmented forest (Core Forest - Edge Forest) MSPA Algorithms.
Monitored parameter value(s)	Eligible forest area 2017 Core Forest: 9089 ha Edge Forest: 20767 ha Forest area Monitoring 2022: Core Forest: 9087 ha Edge Forest: 20701 ha Degradation Project Areas 2017 - 2022 Core forest 2017 —-> Edge Forest 2022: 0 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of degradation in the leak area.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	MSPA Version 2,3. ArcGIS Pro v2.3, QGIS. National data on the area covered by natural forest Forest area 2005 Forest area 2017 Forest area 2022 Thematic precision is achieved through ACATAMA The level of uncertainty is determined by the inputs, that is, the maps of the area covered by natural forest.
Measurement/reading/recording frequency	Yearly

Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects The NREF procedure, carried out by IDEAM, presents the third Reference Level of Forest Emissions of Colombia for the period 2023-2027
Quality control procedures applied	Formats of in situ observations, field coverage Procedure ACATAMA

Data activity Savanna Areas Reference Region

Data/Parameter	Savannah cover in the reference region
data unit	ha
Description	Areas in the reference region that correspond to the category of sheets in the period 2012 - 2018.
Measured/Calculated/Default:	Calculated
Data source	National map of land covers, Corine Land Cover methodology.
Monitored parameter value(s)	Savannah cover 2012: 3,046,769 ha Savannah cover 2018: 2,293,288 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Estimation of the transformation of natural savannahs in the reference region - Baseline.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	ArcGIS Pro v2.3, QGIS. National land cover map, Corine Land Cover methodology. Validation matrix 2012 Validation matrix 2018 Thematic precision is achieved through Validation Matrix
Measurement/reading/recording frequency	Yearly

Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects FC-GOG-29. Instructions for Interpretation of Clc - Scale 100,000 FC-GOG-23. Confusion Matrix GOP-13. Procedure in Geographic Information Systems.docx
Quality control procedures applied	Formats of in situ observations, field coverage Characterization of cartographic inputs for the generation of the Corine Land Cover.

Data activity Savanna Areas in Project Areas

Data/Parameter	Eligible savanna areas and monitoring
data unit	ha
Description	Eligible savanna areas in accordance with the BCR0005 methodology definition and their respective monitoring.
Measured/Calculated/Default:	Calculated
Data source	National map of land covers, Corine Land Cover methodology.
Monitored parameter value(s)	Eligible Savannah: 2012 - 2018: 87396 ha Savannah Monitoring 2022: 86791 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Eligible natural savanna areas.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	ArcGIS Pro v2.3, QGIS. National land cover map, Corine Land Cover methodology. Validation matrix 2022 Thematic precision is achieved through Validartion Matrix
Measurement/reading/recording frequency	Yearly

Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects FC-GOG-29. Instructions for Interpretation of Clc - Scale 100,000 FC-GOG-23. Confusion Matrix GOP-13. Procedure in Geographic Information Systems.docx
Quality control procedures applied	Formats of in situ observations, field coverage Characterization of cartographic inputs for the generation of the Corine Land Cover.

Data activity Savanna covers in leak areas

Data/Parameter	Natural savannah covers in the fuas areas
data unit	ha
Description	Eligible savanna areas in accordance with the BCR0005 methodology definition and their respective monitoring.
Measured/Calculated/Default:	Calculated
Data source	National map of land covers, Corine Land Cover methodology.
Monitored parameter value(s)	Savannah Area 2012: 2012 - 2018: 84973 ha Savannah Area 2012 - 2018: 76577 ha Savannah Area 2018 - 2022: 74,501 ha
Indicate what the data is used for (Baseline/Project/leakage Emissions Calculations)	Areas of savannas in leaks
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	ArcGIS Pro v2.3, QGIS. National land cover map, Corine Land Cover methodology. Validation matrix 2022 Thematic precision is achieved through Validation Matrix
Measurement/reading/recording frequency	Yearly

Calculation method (if applicable)	Geospatial Procedure for the implementation of Carbon projects FC-GOG-29. Instructions for Interpretation of Clc - Scale 100,000 FC-GOG-23. Confusion Matrix GOP-13. Procedure in Geographic Information Systems.docx
Quality control procedures applied	Formats of in situ observations, field coverage Characterization of cartographic inputs for the generation of the Corine Land Cover.

15.3. Reference emissions

The calculation of reference emissions was carried out based on the procedures and equations related to the BCR 0002 (section 13) and BCR 0005 (section 11) methodologies.

Sections 3.7.3 to 3.7.4 of the DdP The project describes the step-by-step calculations carried out. Therefore, the formulas and values used are presented in a general way below.

15.3.1. Reference emissions from forest deforestation

The quantification of GHG emissions from forest deforestation for the reference period was carried out by applying the following equations:

$$CSB_{R,year} = (\frac{1}{t_2 - t_1})\ x\ (A_{R1} - A_{R2})$$

Where:

CSB_{year} Annual change in the area covered by forest in the reference region; ha
t_1 Start year of the reference period; year
t_2 Final year of the reference period; year
A_{R1} Forest area in the reference region, at the initial time; ha
A_{R2} Forest area in the reference region at the final time; ha

$$CSB_{A,year} = \left(\frac{CSB_{R,year}}{A_{R1}} x100\right) x\left(A_{At}\right)$$

Where:

$CSB_{A,year}$	Annual change in the area covered by forest in the project area; ha
$CSB_{R,year}$	Annual change in the area covered by forest in the reference region; ha
A_{R1}	Forest area in the reference region, at the initial time; ha
A_{R1}	Forest area in the project area, at time t; ha

and,

$$EA_{lb} = CSB_{A,year}\, x\, CT_{eq}$$

Where:

EA_{lb}	Annual emission in the baseline scenario; tCO_2/ha
$CSB_{A,lb}$	Annual historical deforestation in the baseline scenario; ha
CT_{eq}	Total equivalent carbon dioxide; tCO_{2e}/ha

The emission factor was established taking as a reference the national reference level for the period 2018-2022 (Ministry of Environment and Sustainable Development – IDEAM, 2020). Given the location of the project, the value described for forests of the Orinoquía biome was taken into account; that is, 195.32 tCO2e/ha.

On the other hand, to calculate the annual change in forest areas in the reference scenario, a deforestation rate of 0.78% was estimated based on the historical average recorded in the reference region. Likewise, the adjustment was made for national conditions, according to the values estimated in the NREF for the period 2018-2022 (Ministry of Environment and Sustainable Development – IDEAM, 2020).

In this sense, Table 44 presents the projection of changes in the scenario without a project and the calculation of reference GHG emissions due to forest deforestation, for the period 2018-2022.

Table 44. Reference emissions from forest deforestation, during the monitoring period.

Year	Adjustment for national circumstances (%CN)	CSBlb,year + %CN	CTeq (tCO2e/ha)	GHG emissions in the baseline scenario (tCO2e/year)
2018	31,77%	325,30	195,32	15.884,3
2019	38,58%	341,96		66.790,0
2020	44,59%	356,61		69.652,7
2021	49,62%	368,83		72.039,2
2022	53,55%	378,32		73.892,6

Source: Cataruben Foundation, 2024.

Step-by-step calculations can be reviewed in the Annex 1.2.1. Emissions_Project */ Point 1. Deforestation_LB.*

15.3.2. Reference emissions from forest degradation

To define the activity data for degradation, the guidelines of the national reference level proposal were followed - NREF (Ministry of Environment and Sustainable Development – IDEAM, 2024), which contemplates two categories of forest: Core (Intact) and Edge (Degraded), so degradation is determined as the transition between these two categories (core areas that pass to edge) for the monitoring period.

Under this premise, the quantification of GHG emissions due to forest degradation for the reference period is based on the procedures established in the BCR 0002 methodology, section 13.4.2, making an adjustment in the transition according to what is proposed in the NREF, applying the following equation:

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

Where:

$DFP_{lb,year}$ Historical annual primary degradation at baseline; ha

t_1 Start year of the reference period; year

t_2 Final year of the reference period; year

$A_{core,lb}$ Area of the reference region in core class in the year of the beginning of the reference period; ha

$A_{core-edge,lb}$ Area of the reference region that moves from core to edge in the final year of the reference period; ha

and,

$$EA_{d,lb,year} = (DFP_{lb,year} \, x \, DCBT_{DP})$$

Where:

$EA_{d,lb,year}$ Annual emission due to degradation, in the baseline scenario; tCO_2/ year

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

$DCBT_{DP}$ Equivalent carbon dioxide contained in the difference in total biomass per hectare in the primary degradation class; tCO_{2e}/ha

The emission factor was defined from the loss of total biomass in the transition from core to edge forest (ΔBTbn-bb), calculated by the National Forest Inventory (IFN) for the Orinoquía biome (Ministry of Environment and Sustainable Development – IDEAM, 2024), with a value of 98.75 tCO2e/ha.

For its part, the activity data for forest degradation were estimated from the historical average that occurred in the reference region in the period 2005-2017. In order to avoid overestimations, for the purposes of calculating a conservative scenario, the value of $A_{core-edge,lb}$ It was estimated as the areas in the Core category in t1 minus the areas that went from Core to Edge between periods t1 and t2.

In this sense, in Table 45 The calculation of reference emissions due to forest degradation is related.

Table 45. Reference emissions due to forest degradation, during the monitoring period.

Year	Degradation type	DFP,lb,year (ha)	DBTi (tCO2e/ha)	GHG emissions in the baseline scenario (tCO2e/year)
2018	D. primaria (Núcleo-Borde)	31,38	98,75	3.098,3
2019	D. primaria (Núcleo-Borde)	125,50		12.393,2
2020	D. primaria (Núcleo-Borde)	125,50		12.393,2

2021	D. primaria (Núcleo-Borde)	125,50		12.393,2
2022	D. primaria (Núcleo-Borde)	125,50		12.393,2

Source: Cataruben Foundation, 2024.

Step-by-step calculations can be reviewed in Annex 1.2.1. Emissions_Project */ Motion 2. Degradación_forestal_LB.*

15.3.3. Baseline emissions from land use changes in natural savannas

To calculate reference emissions, the historical changes in the scenario without project and the defined emission factors are related, taking into account the following equations:

$$CSCN_{a\{p} = \left(\frac{1}{t_2 - t_1} ln \frac{A_2}{A_1}\right) x\, A_p$$

Where:

$CSCN_{year}$ Change in the area with natural vegetation cover in the baseline scenario, in the reference region; ha/ year

t_1 Start year of the reference period in which the changes are analyzed

t_2 Final year of the reference period in which changes are analyzed

A_1 Area in natural vegetation cover in the reference region at t1; ha

A_2 Area in natural vegetation cover in the reference region at t2; ha

A_p Eligible area; ha

and,

$$EA_{lb} = CSCN_{lb}\, x \left(CBF_{eq} + COS_{eq}\right)$$

Where:

EA_{lb} Annual emission in the baseline scenario; tCO_{2e}/ha/ year

$CSCN_{lb}$ Historical changes in the scenario without a project; ha/ year
CBF_{eq} Equivalent carbon dioxide contained in the total biomass; tCO_{2e}/ha
COS_{eq} Carbon dioxide equivalent contained in soils; tCO_{2e}/ha

The emission factors were established from own data obtained by surveying plots in eligible areas of natural savannah, in the case of biomass; and regional reference data for the 0-40 cm layer, for soils (Hyman et al., 2022). Therefore, the value defined for the equivalent carbon dioxide contained in the total carbon was 18.60 tCO2e/ha.

For its part, based on the historical average of land use changes in natural savannas, a transformation rate of 4.73% was calculated. In this way, the projection of changes in the scenario without a project and the calculation of reference GHG emissions for the period 2018-2022 are presented in Table 46.

Table 46**.** Reference emissions for change in land use in natural savannas.

Year	CSCNlb (ha/year)	CTeq (tCO2e/ha)	GHG emissions in the baseline scenario (tCO2e/year)
2018	1.034,53	18,60	19.245,6
2019	4.138,13		76.982,4
2020	4.138,13		76.982,4
2021	4.138,13		76.982,4
2022	4.138,13		76.982,4

Source: Cataruben Foundation, 2024.

Step-by-step calculations can be reviewed in the *Annex 1.2.1. Emissions_Project / 3. LB_savannas_transformation.*

15.4. Project emissions/removals

The estimation of project emissions in the monitoring period was carried out in accordance with the guidelines for emissions monitoring established in the BCR 0002 (section 14.5) and BCR 0005 (sections 13.1.4) methodologies.

In this way, only activity data was monitored. While, the emission factors applied correspond to those initially validated and that were used for the baseline calculations.

Given that the start date of the project was 10/01/2018, the emissions that occurred during the first year are adjusted to 3 months. Step-by-step calculations can be

reviewed in the annex *1. Emissions / 1.2. Emissions quantification / Annex 1.2.1. Emissions_Project / 4. Emissions monitoring.*

15.4.1. Emissions from forest deforestation

The estimate of deforestation in the project area in the monitoring period was calculated with the following equation:

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

Where:

$CSB_{project,\,year}$ Annual change in the area covered by forest in the project area; ha / year

t_1 Start year of the monitoring period; year

t_2 Final year of the monitoring period; year

$A_{REDD+proy,1}$ Surface in forest, in the project area at the beginning of the monitoring period; ha

$A_{REDD+proy,2}$ Surface in forest, in the project area at the end of the monitoring period; ha

and,

$$EA_{REDD+project,\,year} = DEF_{REDD+project,\,year}\, x\, TCO_{2eq}$$

Where:

$EA_{REDD+project,\,year}$ Annual emission in the project area; tCO_2 / ha

$DEF_{REDD+project,\,year}$ Annual deforestation in the project area; ha

TCO_{2eq} Total equivalent carbon dioxide; tCO_{2e}/ha

For the period 2018-2022, an average annual deforestation in the project areas of 13.66 ha/year was recorded. Which corresponds to 2,668 tCO2e emitted each year into the atmosphere (Table 47).

Table 47. Emissions of the project due to forest deforestation, in the period 2018-2022.

Year	CSBproject, year (ha/year)	CTeq (tCO2e/ha)	Project GHG Emissions (tCO2e)
2018	3,45	195,32	673,8
2019	13,80		2.695,4
2020	13,80		2.695,4
2021	13,80		2.695,4
2022	13,80		2.695,4

Source: Cataruben Foundation, 2024.

15.4.2. *Emissions from forest degradation*

The calculation of emissions due to forest degradation in the project area during the monitoring period was carried out based on the following equations:

$$DFP_{REDD+project,\,year} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{core} - A_{core-edge}\right)$$

Where:

$FP_{REDD+project,\,year}$ Annual primary degradation in the project area; ha/ year

t_1 Start year of the monitoring period; year

t_2 Final year of the monitoring period; year

A_{core} Project area in core class, in the year of the beginning of the monitoring period; ha

$A_{core-edge}$ Project area changing from core to edge, in the final year of the monitoring period; ha

and,

$$EA_{REDD+project,\,year} = \left(DFP_{REDD+project,\,year}\, x\, DTBCO_{2eq,1}\right)$$

Where:

$EA_{REDD+project,\,year}$	Annual emission in the project area for the monitoring period; tCO_2/ha
$DFP_{REDD+project,\,year}$	Annual primary degradation in the project area; ha
$DTBCO_{2eq,1}$	Equivalent carbon dioxide contained in the difference in total biomass per hectare in the primary degradation class; tCO_{2e}/ha

For the monitoring period, in the project area, there were no changes in the forest surface as a result of primary degradation. In this way, the annual emissions for the period 2018-2022 are established as zero (0).

Table 48. Project emissions due to forest degradation, in the period 2018-2022.

Year	Degradation type	DFP project, year (ha/year)	DBTi (tCO2e/ha)	Project GHG Emissions (tCO2e)
2018	D. primaria (Núcleo-Borde)	0,00	98,75	0,00
2019	D. primaria (Núcleo-Borde)	0,00		0,00
2020	D. primaria (Núcleo-Borde)	0,00		0,00
2021	D. primaria (Núcleo-Borde)	0,00		0,00
2022	D. primaria (Núcleo-Borde)	0,00		0,00

Source: Cataruben Foundation, 2024.

In the project areas, the core forest areas were monitored until 2022 using a multitemporal analysis to evaluate forest degradation and deforestation. The results indicate that there was no degradation in these areas, i.e., there was no conversion from core forest to edge forest during the period analyzed. However, deforestation did occur, with some areas of core forest becoming “non-forest”.

The resulting geographic information is stored in the REDD+ geodatabase, within the feature dataset “Project Area”. There are two feature classes: “Core Forest Fragmentation Monitoring”, which reflects the state of the core forest until 2022, and “Core Forest Fragmentation Loss”, which documents the deforestation in the evaluated period.

15.4.3. Emissions from changes in land use in natural savannas

The calculation of emissions due to changes in land use in natural savannas during the monitoring period, in the project area, was carried out by applying the equations:

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

Where:

$CSCN_P$	Change in the surface with natural vegetation cover in the project area; ha/ year
t_1	Start year of the monitoring period
t_2	Final year of monitoring period
A_1	Surface in natural vegetation cover in the project area at the beginning of the monitoring period; ha
A_2	Area of natural vegetation cover in the project area at the end of the monitoring period; ha

and,

$$EA_P = CSCN_P \, x \left(CBF_{eq} + cos_{eq}\right)$$

Where:

EA_P	Annual emission in project area; tCO_{2e}/ha/ year
$CSCN_P$	Change in the surface with natural vegetation cover in the area of the project; ha/ year
CBF_{eq}	Equivalent carbon dioxide contained in the total biomass; tCO_{2e}/ha
COS_{eq}	Carbon dioxide equivalent contained in soils; tCO_{2e}/ha

For the monitoring period (2018-2022), an average of changes in land use in natural savannas of 121.00 ha per year was recorded. Which corresponds to 2,252 tCO2e emitted each year into the atmosphere (Table 49).

Table 49. Project emissions due to changes in land use in natural savannas, in the period 2018 - 2022.

Year	CSCNp (ha/year)	CTeq (tCO2e/ha)	Project GHG Emissions (tCO2e)
2018	30,25	18,60	562,75
2019	121,00		2.250,99
2020	121,00		2.250,99
2021	121,00		2.250,99
2022	121,00		2.250,99

Source: Cataruben Foundation, 2024.

15.5. Leaks

In order to establish the limits of the leakage areas, a spatial proximity analysis was carried out, which allows determining the distribution of deforestation and the transformation of coverage in the territory.

The establishment of the leakage area was determined through a spatial proximity analysis where the relationships between deforestation and land-use transformation agents were evaluated for each methodology. Mobility distances of the agents were established to define the leakage belt for both activities (BCR0005 and BCR0002), and these were analyzed using statistical tests (Tukey). Additionally, an analysis was conducted with the "average nearest neighbor ratio" algorithm in the GIS software ArcGIS Pro, determining that the spatial distribution of the agents follows a dispersed pattern, and the distance that captures the spatial interactions between deforestation and degradation agents is 1,000 meters.

This approach made it possible to identify hotspots of deforestation and cover transformation and their range of mobility. This displacement of emissions is linked to the different agents of deforestation and degradation.

The range of mobility resulting from deforestation/transformation made it possible to determine the direction of emissions, as well as the distance to the edge of the REDD+ properties. Additionally, to comply with the criteria of the methodologies, areas with restricted access to conservation agents are excluded deforestation, degradation, transformation.

Monitoring of plant and forest cover is carried out through digital processing of satellite images - PDI periodically with annual reports on cover changes. For Forest, monitoring will be carried out through the non-forest forest map generated by the SMB&C, in

addition to relying on supervised classifications using the Google Earth Engine process engine, where forest samples will be taken that will be used to represent the spectral signature of the forest and represent a map of it. To calculate the precision and uncertainty of the classifications, the Plugin will be used ACATAMA.

While for monitoring the savannas It was carried out through the Visual interpretation method, also called PIAO.[12] using the satellite images with the best spatial resolution available for free, (Twin Sentinel 2A, Sentinel 2B, spatial resolution 10 m*10 m). In areas that are difficult to identify, high resolution images were used as long as they are available from the Maxar constellation[13]. To calculate the precision and uncertainty of the model, the cross-validation matrices or error matrix were used, a complement designed specifically for this purpose and continuously used by the IDEAM forestry team.

15.5.1. *Emissions from deforestation of forests in the leakage area*

The calculation of emissions from deforestation of forests in the leakage area was carried out, taking into account the following equations:

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

Where:

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

t_1 Start year of the monitoring period; year

t_2 Final year of the monitoring period; year

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

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

and,

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

[12] PhotoInterpretation Assisté Par Ordinadeur. Visual Interpretation. It consists of delimiting the coverage units directly on the screen using a GIS program.
[13] https://discover.maxar.com/

Where:

$EA_{f,year}$ Annual emission in the leakage area ; tCO_2/ha

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

TCO_{2eq} Total equivalent carbon dioxide; tCO_{2e}/ha

$EA_{lb,f,year}$ Annual emission from deforestation in the leakage area in the baseline scenario; tCO_{2e}

For the period 2018-2022, an average deforestation of forests of 37.6 ha per year was recorded in the leakage area , which represents 7343,9 tCO2e emitted annually. However, this scenario does not represent an increase in GHG emissions due to the implementation of the activities. REDD+, since it does not exceed the values presented in the baseline.

Table 50. Emissions from deforestation of forests in the leakage area , during the period 2018-2022.

Year	CSBproject, year (ha/year)	CTeq (tCO2e/ ha)	GHG emissions in the leak area (tCO2e)	GHG emissions in the leak area in baseline (tCO2e)	GHG emissions attributable to leaks due to project activities (tCO2e)
2018	9,40	195,32	1.835,98	7.084,30	-5.248
2019	37,60		7.343,91	28.337,22	-20.993
2020	37,60		7.343,91	28.337,22	-20.993
2021	37,60		7.343,91	28.337,22	-20.993
2022	37,60		7.343,91	28.337,22	-20.993

Source: Cataruben Foundation, 2024.

15.5.2. Emissions due to forest degradation in the leakage area

The calculation of emissions due to forest degradation in the leakage area was carried out, taking into account the following equations:

$$DFP_{f,year} = (\frac{1}{t_2 - t_1}) \, x \, (A_{core,f} - A_{core-Edge,f})$$

Where:

$DFP_{f,year}$ Annual primary degradation in the leakage area ; ha/ year

t_1 Start year of the monitoring period; year

t_2 Final year of the monitoring period; year

A_{core} Area of leaks in core class, in the year of the beginning of the monitoring period; ha

$A_{core-edge}$ Leakage area that changes from core to Edge, in the final year of the monitoring period; ha

and,

$$EA_{f,year} = (DFS_{f,year} \, x \, DTBCO_{2eq,1})$$

Where:

$EA_{f,year}$ Annual emission in the leakage area for the monitored period; tCO_2/ha

$DFP_{f,year}$ Annual historical primary degradation in the leakage area ; ha

$DTBCO_{2eq,1}$ Equivalent carbon dioxide contained in the difference in total biomass per hectare in the primary degradation class; tCO_{2e}/ha

As in the project area, no forest degradation was recorded in the leakage area for the period 2018-2022. Therefore, GHG emissions are established as zero (0) for this period.

Table 51. Emissions due to forest degradation in the leakage area , during the period 2018-2022.

Year	Degradation type	DFi f, year (ha/year)	DBTi (tCO2e/ha)	GHG emissions attributable to leaks (tCO2e)
2018	D. primaria (Núcleo-Borde)	0,00	98,75	0
2019	D. primaria (Núcleo-Borde)	0,00		0
2020	D. primaria (Núcleo-Borde)	0,00		0
2021	D. primaria (Núcleo-Borde)	0,00		0
2022	D. primaria (Núcleo-Borde)	0,00		0

Source: Cataruben Foundation, 2024.

15.5.3. Emissions from land use changes from natural savannas in the leakage area

The quantification of GHG emissions that took place in the area of leaks in natural savanna ecosystems, due to the implementation of project activities during the monitoring period, were calculated by applying the following equations:

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

Where:

$CSCN_f$	Change in the surface with natural vegetation cover in the leakage area ; ha/ year
t_1	Start year of the monitoring period
t_2	Final year of monitoring period
$A_{f,1}$	Surface in natural vegetation cover in the leakage area at the beginning of the monitoring period; ha
$A_{f,2}$	Surface in natural vegetation cover in the leakage area at the end of the monitoring period; ha

and,

$$EA_f = \left[CSCN_f \, x \left(CBF_{eq} + cos_{eq}\right)\right] - EA_{f,lb}$$

Where:

EA_f	Annual emission in leakage area ; tCO_{2e}/ha/ year
$CSCN_f$	Change in the surface with natural vegetation cover in the leakage area ; ha/ year
CBF_{eq}	Equivalent carbon dioxide contained in the total biomass; tCO_{2e}/ha
COS_{eq}	Carbon dioxide equivalent contained in soils; tCO_{2e}/ha
$EA_{f,lb}$	Annual emission in the leakage area in the baseline scenario; tCO_{2e}

As a result, for the monitoring period, changes in land use were recorded with an average of 415.20 ha, which represents 7,724.05 tCO2e emitted annually into the atmosphere. However, when compared to the baseline values, they do not represent an increase in GHG emissions in the leakage area (Table 52).

Table 52. Emissions due to changes in land use of natural savannas in the leakage area , during the period 2018-2022.

Year	CSCNf (ha/year)	CTeq (tCO2e/ha)	GHG emissions in the leak area (tCO2e)	GHG emissions in the leak area in baseline (tCO2e)	GHG emissions attributable to leaks due to project activities (tCO2e)
2018	103,80	18,60	1.931,01	6.175,35	-4.244
2019	415,20		7.724,05	24.701,41	-16.977
2020	415,20		7.724,05	24.701,41	-16.977
2021	415,20		7.724,05	24.701,41	-16.977
2022	415,20		7.724,05	24.701,41	-16.977

Source: Cataruben Foundation, 2024.

15.6. Net GHG emissions reductions/eliminations

The calculation of net emissions reduction is estimated from the relationship between baseline GHG emissions, project emissions and emissions due to leaks, taking into account the following equation:

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

Where:

RE	Net reduction of GHG emissions; tCO_{2e}
t_2	Final year of the monitoring period; year
t_1	Start year of the monitoring period; year
$EA_{lb,year}$	Annual emission in the baseline scenario; tCO_{2e}
$EA_{project,year}$	Annual emission in the project area for the monitored period; tCO_{2e}

$EA_{f,year}$ Annual emission in the leakage area for the monitored period; tCO_{2e}

For the monitoring period, there was no significant increase in GHG emissions in the area of leaks due to deforestation and forest degradation, and changes in land use in savannas, so to avoid overestimation when applying equation, values recorded as negative were taken as zero (0) in the final calculations.

In this way, in the Table 53 it summarizes the emissions' reduction for the first monitoring period of the project. With a report of **339.475 tCO2e** reduced by avoided deforestation and forest degradation, and **317.607 tCO2e** by avoided transformation of natural savannas. For a total of **657.082 tCO2e** as a result of the implementation of project activities.

Table 53**.** Amount of GHG emissions reduction for the period 2018-2022.

Verification	Year	GHG emissions in the baseline scenario (tCO2e)	GHG emissions in the scenario with Project (tCO2e)	GHG emissions attributable to leaks (tCO2e)	Estimated Net GHG Reduction (tCO2e)
FIRST	01/10/2018 - 31/12/2018	38.228	1.237	-	36.991
	01/01/2019 - 31/12/2019	156.165	4.946	-	151.219
	01/01/2020 - 31/12/2020	159.028	4.946	-	154.082
	01/01/2021 - 31/12/2021	161.414	4.946	-	156.468
	01/01/2022 - 31/12/2022	163.268	4.946	-	158.322
	Total	**678.103**	**21.022**	**-**	**657.082**
	Annual Average	**159.554**	**4.946**	**-**	**154.608**

Source: Cataruben Foundation, 2024.

15.7. Comparison of actual emissions reductions with project document estimates

The reduction in actual net emissions recorded in the 2018-2022 monitoring period presented differences compared to the emissions estimate in the baseline scenario, with an annual average of 4.2% higher than initially projected.

These differences are mainly influenced by the emissions scenario in the leakage area , compared to what was initially projected for this monitoring period.

Table 54. Comparison of estimated and reported GHG emissions reductions in the monitoring period (2018-2022).

Year	Estimated net GHG reduction (tCO2e)	Observed net GHG reduction (tCO2e)	Difference
2018	35.504	36.991	4,19%
2019	145.135	151.219	4,19%
2020	147.876	154.082	4,20%
2021	150.161	156.468	4,20%
2022	151.936	158.322	4,20%
Total	**630.612**	**657.082**	**4,20%**

Source: Cataruben Foundation, 2024.

15.8. Comments on the difference with the estimated value in the registered project document

The differences presented between the baseline scenario and the monitoring are mainly influenced by the behavior of GHG emissions for the leakage area . Taking into account that, a 10% increase in emissions had been projected due to the project; However, monitoring shows that in the period 2018 - 2022, changes in land use in natural savannas and forests in the leakage areas did not intensify.

Thus, in these cases they presented negative values, which indicates that there was no increase in emissions in the leakage area due to the implementation of the project activities, which is why they are assumed to be zero (0).