REDD+ EMBERÁ WOUNAAN MONITORING REPORT

Document prepared by CO2CERO S.A.S.

Date of issue (*Version 9 23/02/2024*)

Monitoring Report Template (Version 1.0)[1]	
Name of project	*REDD+ Emberá Wounaan*
BCR Project ID	*BCR-PA-CO-14-002*
Registration date of the project activity	*20/10/2022*
Project holder	*Emberá Wounaan Comarca*
Contact	*Cacique Leonides Cunampia* [2]

[1] The instructions in this form are a guide. Do not represent an exhaustive list of the information the preparer shall provide under each section of the template.

[2] Es importante resaltar que el celular de contacto del Cacique vigente Leonides Cunampia es un dato de contacto temporal teniendo en cuenta que es un cargo sujeto a cambios de acuerdo con las estructuras de gobernanza de la Comarca Emberá Wounaan.

Monitoring Report Template (Version 1.0)[1]	
	Cellphone: +507 6900-7584 *Office Address in Emberá Wounaan Comarca: Plaza Bal Harbour, Local 23 Upper Floor, Panama City.*
Version number of the Project Document applicable to this monitoring report	*Version 9 (23/02/2024)*
Applied methodology	*This project has been developed based on the BioCarbon Registry Standard version 3.2 released on 23th September, 2023 and the methodology "Quantification of GHG emissions in REDD+ projects BCR 0002 version 3.1".*
Project location (Country, Region, City)	*Darién Province in eastern Panama, Capital: Unión Chocó*
Project starting date	20/04/2018
Quantification period of GHG reductions/removals	(20/04/2018 to 19/04/2048)
Monitoring period number	*This is the first monitoring period of the project.*
Monitoring period	(20/04/2018 to 31/12/2022)
Amount of emission reductions or removals achieved by the project in this monitoring period	*The total amount of emission reductions achieved by this monitoring period is 10.554.217 tCO2e.*
Contribution to Sustainable Development Goals	*2. Zero hunger* *4. Quality education.* *5. Gender equality.*

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	6. Clean water and sanitation. *13. Climate action.* *15. Life on land.*
Special category, related to co-benefits	*N/A*

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1 General description of project

The REDD+ Emberá Wounaan project is an initiative that promotes governance, culture, sustainable economic development, and environmental conservation through the enhancement of social, economic, and ecological capital. Throughout the initiative, governance and resource management involve capacity building and the design of governance structures, transparency includes learning and leadership management, and planning and foresight encompass activities that aid in the recognition of culture and social dynamics while creating strategies that revive ancestral knowledge. Additionally, support is provided for sustainable agricultural and livestock models and productive chains. On the other hand, training covers theoretical elements about a REDD+ project, socio-environmental safeguards, Conservation and Sustainable Forest Management (SFM), and identification of reforestation and restoration areas available for plantation establishment.

REDD+ Emberá Wounaan Project is located in the Darién Province (Panama), encompassing 41 communities with approximately 10,000 inhabitants to be benefited and 436,551 hectares distributed in two sectors. The Cémaco Region includes three townships: Cirilo Guaynora, Manuel Ortega, and Lajas Blancas, corresponding to 72% of the total area, while the Sambú Region includes two townships, Río Sabalo and Jingurudó, covering 28% of the total area. In Cémaco, the topography consists of undulating plains with elevations ranging from 50 to 500 meters above sea level (masl) up to the foothills of the Darién Mountain range, where mountainous areas reach elevations between 500 to 1,700 meters above sea level, with the highest point being Cerro Tacarcuna at 1,850 meters above sea level. In the case of Sambú, located southeast of Darién, approximately 35% of the area consists of undulating plains in the Sambú river valley, with the highest point reaching 830 masl. The temperature in valleys and plains ranges between 27°C to 30°C with an annual average precipitation of 3,000 mm, with December, January, and February being the driest months. In mountainous and foothill areas, precipitation can reach up to 8,000 mm annually, with no dry season, and temperatures ranging between 17°C and 25°C.

The objective of REDD+ Emberá Wounaan project is to reduce deforestation and degradation of natural forests owned by the Comarca through conservation and restoration strategies involving all groups within indigenous communities, including women, elders, and youth, ensuring gender equality, participation, forest governance, and the application of skills that enhance rural development. Education and training on topics related to individual development and community management are a focal point in this project, understanding that deep learning is the best tool for implementing successful activities, achieving the continuity and stability of the initiative. Over 30 years, REDD+ Emberá Wounaan will prevent the emission of 65,475,497 tCO2e with an annual average of 2,112,113 tCO2e, estimated from an emission factor of 766.71 tCO2e/ha for

Mature Mixed Broadleaf Forest cover and 466,61 tCO2e/ha for Secondary Mixed Forest cover. These emission factors were generated from the methodological reconstruction of Panama's National Reference Level through the establishment of monitoring plots, which are consistent with the ecosystem's reality. This project is built upon multiple activities, including emission reduction from deforestation and degradation.

1.1 Sectoral scope and project type

Table 1. BCR standard scope.

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

Source: BioCarbon Registry, 2023.

Their main activity is the Reduction of Emissions from Deforestation and Forest Degradation, consolidated under the Quantification of Greenhouse Gas Emission Reduction for REDD+ Projects methodology BCR 0002 version 3.1 by BioCarbon Registry.

1.1.1 Project type

The REDD+ Emberá Wounaan project falls under the category of projects in the AFOLU sector (Agriculture, Forestry, and Other Land Use), within sectoral scope 14 Forest. Its main activity is the Reduction of Emissions from Deforestation and Forest Degradation.

The project includes only the Emberá Wounaan community, which consists of two sectors, Cémaco and Sambú, and does not require the inclusion of new instances and/or parameters in its development.

Table 2. Type of Project.

Activities in the AFOLU sector, other than REDD+	
REDD+ Activities	x
Activities in the energy sector	
Activities in the transportation sector	
Activities related to Handling and disposing of waste	

Source: BioCarbon Registry, 2023.

1.1.2 Project scale

Not applicable for the current project according to the REDD+ category under which it is designed.

1.2 Project start date

The project's start date corresponds to April 20, 2018, which is linked to Law 69 of October 30, 2017, promoting the conservation, restoration, and preservation of natural ecosystems. This law was embraced by local communities for the protection of forest cover under the forest incentive program alliance of one million hectares (*7_Fecha de inicio\Ley69_2017.pdf*). In this manner, community leaders of the 41 communities comprising the Emberá Wounaan Comarca determined within their forest protection areas the restriction of use and consolidated boundary protection under verbal agreement.

This determination was ratified through Administrative Resolution 07 of April 20, 2018, defined as the official support for the start date of this project. In this resolution, the Emberá Wounaan General Congress reaffirms the commitment to forest conservation within the Comarca, confirming awareness of the REDD+ project concept in the territory and the possibility of directing it within this scheme through future negotiations (see

7_Fecha de inicio\ResAdm_07_2018.pdf). Additionally, through Administrative Resolution 15 of 2018, as a mechanism for territorial boundary protection, the congress board resolved to demand the expulsion of settlers invading Comarcal lands in accordance with the decision of the plenary of the Supreme Court of Justice on April 8, 2018 (see *7_Fecha de inicio\ResAdm_15_2018.pdf*).

Within the Comarca, this issue has been addressed since 2013 through the approval of the Forest Governance Strategic Plan, by Administrative Resolution 15 of June 21, 2013, by its general congress and corresponding internal consultation bodies. This plan encompasses the conservation, protection, and sustainable use of natural resources see *7_Fecha de inicio\ResAdm_15_2013.pdf*. Subsequently, the Emberá Wounaan General Congress authorized the Planning Directorate through Resolution 09 of July 2015 to update the strategic development plan of the Comarca, focusing on the conservation of natural forests in the territory (see *7_Fecha de inicio\ResAdm_09_2015.pdf*).

Later, in 2016, according to Administrative Resolution 12 of April 19, 2016, the Emberá Wounaan General Congress reiterated the existence of the governance strategic plan, with the responsibility of being guided through the Directorate of Natural Resources and Environment (DIRENA) of the General Congress of the Comarca (see *7_Fecha de inicio\ResAdm_12_2016.pdf*).

1.3 Project quantification period

The quantification of emissions reduction for the project will be carried out from the start date of the initiative, which is April 20, 2018, until April 19, 2048, covering an accreditation period of 30 years.

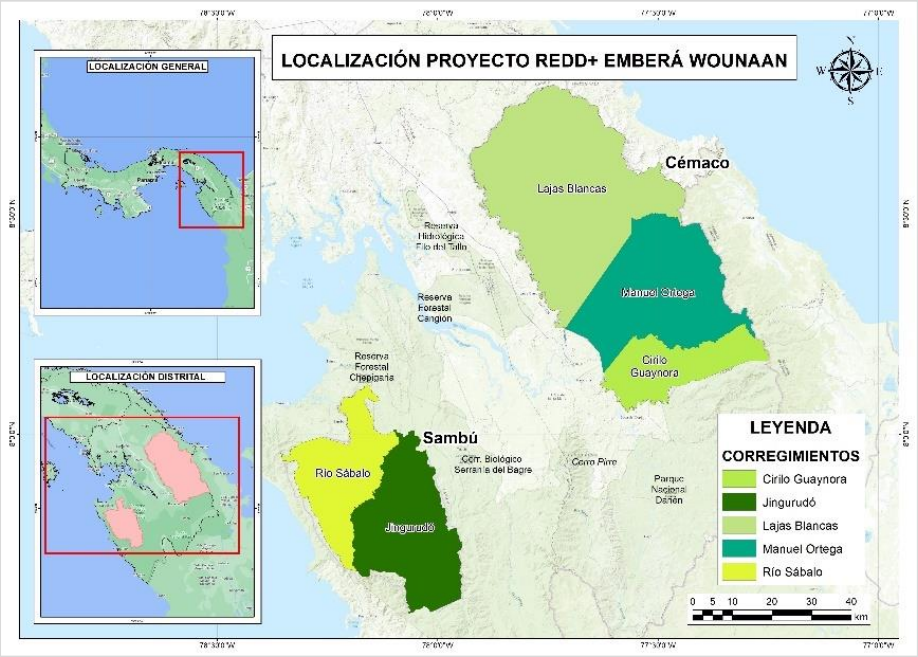
1.4 Project location and project boundaries

The total area of the REDD+ Emberá Wounaan project corresponds to the territories of the Emberá Wounaan indigenous communities, located in the Darién Province in eastern Panama in Central America, with its capital being Unión Chocó. According to the country's political-administrative organization, these territories correspond to the Emberá Wounaan Comarca, created by Law 22 of 1983, which defines a total extension of 436,551.48 hectares.

The Emberá Wounaan Comarca is composed of two territories: the Cémaco district and the Sambú district. The former is located in the northeastern part of the province in the Darién Mountain range, with an extension of 305,852 hectares, divided into the townships of Lajas Blancas, Manuel Ortega, and Cirilo Guaynora. The Sambú district is located in the southwestern part of the Darién Province and consists of the townships of

Jingurudó and Río Sábalo, comprising the Pirre, Jungurudo, El Bagre, and El Sapo mountain ranges, with an extension of 130,699 hectares.

Figure 1. REDD+ Emberá Wounaan location.



Source: CO2CERO S.A.S., 2023.

The Cémaco and Sambú districts and the Darién Province are located within the Chocó Biogeographic region, also known as the Chocó-Darién ecoregional complex. Ecoregions are relatively large units of land composed of multiple communities and species, with boundaries closely resembling those of the predominant areas prior to more abrupt land use changes, and they are commonly used in conservation activities. This ecoregion extends from eastern Panama through the Colombian Chocó to the city of Guayaquil in Ecuador. It lies between the Pacific Ocean and the eastern Andes Mountain range andes (Olson , y otros, 2001), (WWF Colombia, Fundación Ecotróopico y Cecoin, 2008) and is divided into several subregions. For the present project, the focus is on the Darién Province of Panama.

The REDD+ Emberá Wounaan Project is the first initiative to be developed in Panama. Therefore, there is no evidence that the project or the community is part of another registry and certification program for AFOLU sector projects, as shown in **Table 3**.

Table 3. REDD+ projects registered in certifying programs.

N°	Certification program	ID Proyect	Name	Location
1	Biocarbon Registry	N/A	Not registered	N/A
2	Verra	2578	Panama forests conservation project reduction of ghg emissions through deforestation and avoided degradation. - alliance of indigenous peoples and rural communities of Panama	Inactive Provincia Veragua
3		1881	Conservation of Panama forests - reduction of ghg emissions from deforestation. Grouped project	Provincias: Bocas del Toro, Chiriquí, Coclé, Colón, Panamá, Los Santos and Veraguas
4	Cercarbono	N/A	Not registered	N/A
5	COLCX	N/A	Only registered in Colombia	N/A
5	Gold Standar	N/A	Not registered	N/A

Source: Compiled by CO2CERO S.A.S., 2023.

1.5 Summary Description of the Implementation Status of the Project

1.5.1 Project activities

The REDD+ Emberá Wounaan project aims to strengthen socio-cultural, economic, and natural capital by involving activities for the conservation, restoration, and preservation of natural forests within the project boundaries. Additionally, it directs the improvement of productive activities towards more sustainable and efficient models, reduces the trend in deforestation and forest degradation, and enhances territorial governance. Moreover, the project aims to enhance soft skills and education within the community, achieving an integration of capacity building with on-the-ground implementation activities, empowering communities with fundamental concepts and criteria to foster self-management. The REDD+ activities of the project are classified into four (4) strategic lines, nine (9) investment lines translating into 21 activities; each activity is linked to goals

and indicators (See 2_Cobeneficios\3_Actividades REDD+). Below are the REDD+ activities according to the designed lines.

Table 4. Strategic line of governance and sense of belonging.

Strategic line of governance and sense of belonging.	
1. **Governance and sense of belonging:** REDD+ Emberá Wounaan aims to establish a governance framework that ensures equity and transparency during the execution of conservation activities, highlighting the importance of natural resources for the communities and their inhabitants. At the same time, it's crucial for individuals to enhance their sense of belonging regarding their territory and resources, preserving the defense and recognition of natural, cultural, and social values. This strategic line focuses on governance and transparency, preventing phenomena of corruption and destruction of collective well-being.	
1.1 Goverment and administration.	1.1 Goverment and administration.
	1.1.2. Capacitación en gestión de proyectos, finanzas y administración de recursos.
1.2 Transparency and participation.	1.2 Transparency and participation.
	1.2.1. Capacitación en buenas prácticas de liderazgo

Table 5. Strategic line of culture and society.

Strategic line of culture and society	
2. **Culture and society:** This strategic line promotes social and territorial development through current and prospective plans, which will guide the use and management of natural and non-natural resources to support the community's social, economic, and cultural well-being. These activities aim to involve development and planning tools within the community, enhancing welfare, participation, and management of sustainable goods and services.	
2.1 Planning and foresight	2.1.1. Development of community planning and development tools.
	2.1.2. Design of strategies for the conservation of indigenous ancestral knowledge.

Strategic line of culture and society	
	2.1.3. Assessment of provision and availability status of basic services, sanitation, health and education.
2.2 Boundaries and territory	2.2.1. Identification of territorial boundaries.
	2.2.2. Strategies for protecting territorial boundaries.

Table 6. Strategic line of sustainable economic development.

Strategic line of sustainable economic development.	
3. **Sustainable economic development:** This strategy aims to provide the necessary elements and tools to enhance economic activities by adjusting existing production chains, which involve ancestral knowledge and respect the cultural value of the Emberá Wounaan people. These activities include technical support, training, and verification of effectiveness in economic development, health, and food security within the community's daily activities. Ultimately, it consolidates inclusive spaces hand in hand with women and youth.	
3.1 Indigenous productive improvement.	3.1.1. Technical support in sustainable family production models.
	3.1.2. Design of economic alternatives and sustainable production chains.
3.2 Strengthening of productive capacities.	3.2.1. Trining in Good production practices.
	3.2.2. Improvement of tools and work materials.
	3.2.3. Institutionalization of Good practices for economic development and well-being.

Table 7. Strategic line of environmental conservation.

Línea estratégica de conservación y medio ambiente	
4. **Environmental conservation:** This line is directly involved with the REDD+ project, with recognition, protection, and management of natural resources being fundamental. The forest is the most important source, including carbon reservoirs and resources used by communities and their customs. Forest conservation includes Sustainable Forest Management (SFM), forest restoration, and reforestation, promoting the REDD+ activities scenario defined at the international level while strengthening the economic and cultural values of communities.	
4.1 Resources management	4.1.1. Training in REDD+ and socio-environmental safeguards.
	4.1.2 Monitoring of vegetation and biodiversity.
	4.1.3. Training in sustainable forest management (SFM).
4.2 Enhancement of carbon reservoirs.	4.2.1. Establishment of the Emberá Wounaan forest nursery.
	4.2.2. Forest restoration.
	4.2.3 Reforestation.
4.3 Forest-based economic alternatives.	4.3.1. Non-timber forest product production.

Source: B-Terra Corp and CO2CERO S.A.S., 2022.

Over time, REDD+ Emberá Wounaan project has developed activities for which its objectives, benefits, and expected results are analyzed. In the folder "2_Cobeneficios\3_Actividades REDD+", the indicators defined for each of these activities and their results in the evaluation are presented.

1.5.2 Total GHG emission reductions achieved in this monitoring period

The present monitoring report quantifies the reduced greenhouse gas emissions within the project boundaries of the Emberá Wounaan Comarca, from the project start date of April 20, 2018, until December 31, 2022, equivalent to 4 years, 8 months, and 11 days.

The reduction of emissions generated by the project was quantified annually during the years of project implementation up to the present date. It should be noted that the risk buffer value of 20% of emission reductions was applied.

1.5.2.1. Deforestation

Based on the monitored data year by year and the quantification of forest changes in the project area, showing the loss of forest cover, which is consistent with the reduction in deforestation compared to the baseline, (See AUD_VV_2022\3_Carbono\MonitoreoAreas_REDDEmberaWounaan_V5.xlsx). The monitoring of the project area during the verification period is summarized in the following table.

Table 8. Monitoring of forest areas within the project boundaries.

Year	Mature mixed broadleaf forest (ha)	Secondary mixed broadleaf forest (ha)	Total (ha)
2018	394,559.85	30,005.17	424,565.02
2019	394,291.47	28,914.01	423,205.48
2020	394,031.07	28,523.84	422,554.91
2021	393,735.82	28,306.88	422,042.70
2022	393,568.06	28,085.44	421,653.49

Source: CO2CERO S.A.S., 2023.

For the estimation of Ex-Post emissions reduction due to deforestation, the annual decrease for the given project activities was determined, with yearly periods covering the years of the initiative, evaluated for both the project area and the Leakage Area. The reduction in emissions in the Leakage Area occurred when the deforested area exceeded the scenario without the project (See AUD_VV_2022\3_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx).

In this way, the Ex-post emissions reduction of the project due to deforestation was obtained, taking into account the annual gross emissions generated by the project's implementation. During the evaluated monitoring period (5 years), a total of 10,116,348 tCO2e reduced emissions were evidenced within the project area (**Table 9**).

Table 9. Reduction of net emissions due to deforestation in the project area.

Año	Ealb (tCO2e)	Eim,m (tCO2e)	EAf (tCO2e)	RE Totales (tCO2e)	Buffer 20%	Net RE (tCO2e)
2018	2,187,113	287,254	155,591	1,880,225	376,045	1,504,180
2019	3,130,574	411,168	222,708	2,691,303	538,261	2,153,042
2020	3,130,574	411,168	222,708	2,691,303	538,261	2,153,042
2021	3,130,574	411,168	222,708	2,691,303	538,261	2,153,042
2022	3,130,574	411,168	222,708	2,691,303	538,261	2,153,042
TOTAL	**14,709,409**	**1,931,926**	**1,046,423**	**12,645,437**	**2,529,089**	**10,116,348**

Source: CO2CERO S.A.S., 2023.

Donde:

- *Ealb:* CO2e emissions from deforestation for the baseline scenario.
- *Eim,m:* CO2e emissions from deforestation in the project scenario.
- *EAf:* CO2e emissions from deforestation in the leakage area.
- *RE Totales:* Total CO2e emissions reduction from deforestation in the monitoring period.
- *Buffer:* Reserve for the risk of non-permanence during the monitoring period.
- *RE Totales*: Net CO2e emissions reduction from deforestation in the monitoring period.

1.5.2.2. Forest degradation

- For the estimation of Ex-Post emissions reduction due to degradation, the annual decrease for the given project activities was determined, in accordance with the determination of the transition area for each type of degradation, with yearly periods covering the years of the initiative, evaluated for both the project area and the Potential Leakage Area, as shown in **Table 10** and Net CO_2e emission reductions from degradation during the monitoring period.

Figure 2. The reduction in emissions in the Potential Leakage Area occurred when the degraded area exceeded that without the project, understanding that if there was a real positive increase since the start of the initiative, for those with lower values, no subtraction was performed (See AUD_VV_2022\3_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx).

Table 10. Degradation data from the fragmentation analysis for the ex-post scenario.

Period	Type of area	Degradation type	Mature Mixed Broadleaf Forest Area (ha)	Secondary Mixed Broadleaf Forest (ha)
2017-2018	Project area	Primary	0.18	0.18
		Secondary	5.32	19.68
	Potential leakage area	Primary	0.14	1.84
		Secondary	1.97	15.42
2018-2019	Project area	Primary	1.37	4.97
		Secondary	16.75	56.80
	Potential leakage area	Primary	0.74	6.73
		Secondary	0.69	33.06
2019-2020	Project area	Primary	0.27	0.82
		Secondary	2.40	14.53
	Potential leakage area	Primary	0.35	0.78
		Secondary	0.62	22.81
2020-2021	Project area	Primary	0.31	0.33
		Secondary	2.58	5.78
	Potential leakage area	Primary	0.53	0.83
		Secondary	1.26	18.46

Period	Type of area	Degradation type	Mature Mixed Broadleaf Forest Area (ha)	Secondary Mixed Broadleaf Forest (ha)
2021-2022	Project area	Primary	0.10	0.37
		Secondary	8.02	28.72
	Potential leakage area	Primary	0.34	0.47
		Secondary	2.81	13.81

Source: CO2CERO S.A.S., 2023.

In this way, the ex-post emissions reduction of the project due to degradation was obtained, taking into account the net annual emissions generated by the project as a result of its implementation. During the evaluated monitoring period (5 years), a total of 437,869 tCO_2e reduced within the project area is evidenced (see **Table 11**).

Table 11. Reduction of net emissions due to degradation in the project area.

Year	*tCO_2e*										
	EAlbdeg	Eim,mdeg		EAfdeg		Total RE deg		*Buffer*		Net RE deg	
	Annual	Annual	Acum	Annual	Acum	Annual	Acum	Annual	Acum	Annual	Acum
2018	65,520	5,573	5,573	415	415	59,533	59,533	11,907	11.907	47,626	47,626
2019	133,716	25,652	31,225	29	444	108,034	167,567	21,607	33.513	86,427	134,053
2020	133,716	5,503	36,728	0	444	128,213	295,779	25,643	59.156	102,570	236,623
2021	133,716	3,046	39,774	212	657	130,458	426,237	26,092	85.247	104,366	340,989
2022	133,716	11,695	51,469	920	1,576	121,101	547,338	24,220	109.468	96,880	437,869

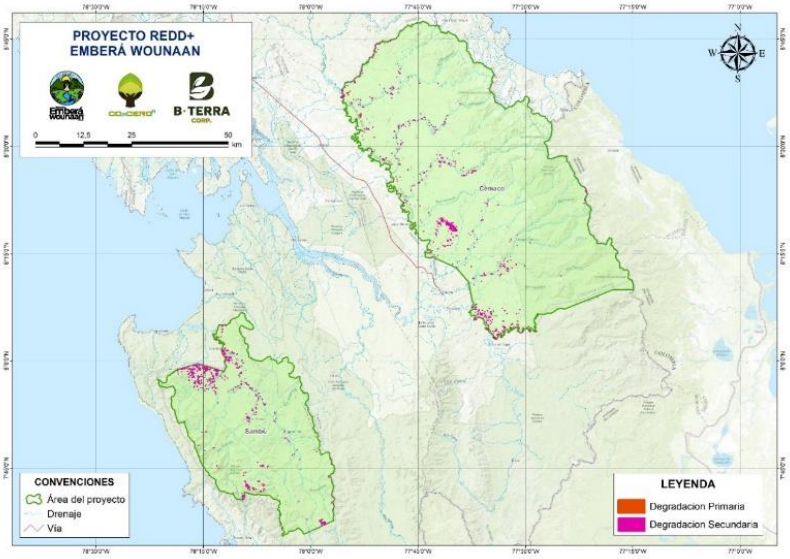
Year	tCO_2e											
	EAlbdeg	Eim,mdeg		EAfdeg		Total RE deg		*Buffer*		Net RE deg	
	Annual	Annual	Acum	Annual	Acum	Annual	Acum	Annual	Acum	Annual	Acum
TOTAL	**600,383**	**51,469**		**1,576**		**547,338**		**109,468**		**437,869**	

Source: CO2CERO S.A.S., 2023.

Where:

- *EAlbdeg:* CO_2e emissions from degradation for the baseline scenario.
- *Eim,mdeg:* CO_2e emissions from degradation in the project scenario.
- *EAfdeg:* CO_2e emissions from degradation in the leakage area.
- *RE Totales deg:* Total CO_2e emission reductions from degradation during the monitoring period.
- *Buffer:* Reserve for risk of non-permanence during the monitored period.
- *RE Netas deg*: Net CO_2e emission reductions from degradation during the monitoring period.

Figure 2. Degradation map for the monitoring period within the project area.



Source: CO2CERO S.A.S., 2023.

1.5.3 Total GHG emission reductions

Taking into account the selected activities in the project (deforestation and degradation), as explained earlier, a total of 13,192,775 tCO_2e is obtained for the project for the initial verification period (5 years) within the project area, with reductions due to the risk of non-permanence (buffer). It should be noted that the net reductions of the project amount to 10,554,217 tCO_2e (see **Table 12** and AUD_VV_2022\3_Carbono\Carbono_Total_EmberaWounaan_V8.xlsx).

Table 12. Net reductions in the project area.

tCO2e											
Year	***Ealb***	***Eim,m***		***EAf***		***Total RE***		***Buffer***		***Net RE***	
	Annual	**Annual**	**Acum**	**Annual**	**Acum**	**Annual**	**Acum**	**Annual**	**Acum**	**Annual**	**Acum**
2018	2,252,634	292,827	292,827	20,049	20,049	1,939,758	1,939,758	387,952	387,952	1,551,806	1,551,806
2019	3,264,290	436,820	729,648	28,132	48,181	2,799,337	4,739,095	559,868	947,819	2,239,469	3,791,275
2020	3,264,290	416,671	1,146,319	28,103	76,284	2,819,516	7,558,610	563,904	1,511,723	2,255,612	6,046,887
2021	3,264,290	414,214	1,560,532	28,315	104,599	2,821,761	10,380,371	564,353	2,076,075	2,257,408	8,304,295
2022	3,264,290	422,863	1,983,395	29,023	133,622	2,812,404	13,192,775	562,481	2,638,557	2,249,922	10,554,217
TOTAL	**15,309,793**	**1,983,395**		**133,622**		**13,192,775**		**2,638,557**		**10,554,217**	

Source: CO2CERO S.A.S., 2023.

Where:

- *Ealb:* CO_2e emissions from deforestation and degradation for the baseline scenario.
- *Eim,m:* CO_2e emissions from deforestation and degradation in the project area.
- *EAf:* CO_2e emissions from deforestation and degradation in the leakage area.
- *Total RE:* Total CO_2e emissions reductions from deforestation and degradation during the monitoring period.
- *Buffer:* Reserve for risk of non-permanence for the ex-post deforestation and degradation emissions reduction scenario.

- *Net RE:* Net CO_2e emissions reductions from deforestation and degradation during the monitoring period.

1.5.4 Overlap of activities

To avoid double counting for quantifying deforestation and degradation within the REDD+ Emberá Wounaan project area, the "Avoiding Double Counting" tool version 1.0 proposed by the BioCarbon Registry was utilized. In this case, a series of geoprocessing steps were carried out to ensure the consistency and transparency of emissions reductions during the current certification period. The various geoprocessing steps employed by the project are described below:

1. The layers of forest non-forest within the project's eligible area and the leakage area were intersected (see AUD_VV_2022\4_SIG\1_GDB\B_NB_EmberaV4.gdb), along with those degraded areas year by year during the monitoring period, to avoid degraded areas occurring in non-forest areas (see AUD_VV_2022\4_SIG\1_GDB\Degradacion_V2.gdb).

2. Subsequently, all monitored areas corresponding to each activity (deforestation and degradation) throughout the monitoring period were intersected. This was done in two steps:

    a. Each monitored deforested and degraded area was independently evaluated to ensure that no overlap occurred between two or more areas presenting the same type of degradation (primary or secondary) or that the same deforested areas were presented throughout the monitoring period. This ensures that a degraded or deforested area is not counted more than once during the monitoring period and that double accounting of CO2 emissions is avoided (see "AUD_VV_2022\4_SIG\4_SHP\Deforestacion" and "4_SIG\1_GDB\Degradacion_V2.gdb").

    b. Subsequently, the total degraded areas for the entire monitoring period for each type of degradation were intersected to prevent transitions between inconsistent classes (e.g., transition from areas with secondary degradation in the early years of monitoring that were subsequently reported as areas with primary degradation). This ensures that degradation is consistent with the definition of each class defined by the country, so only transitions from primary degradation to secondary degradation in subsequent years are valid. For the REDD+ Emberá Wounaan project, there is a transition in the degraded areas of the project, which is of insignificant size (see **Table 13**).

Table 13. Areas with gradual degradation.

Area	Initial Degradation Type	Initial Degradation Year	Final Degradation Type	Final Degradation Year	Area (ha)
Leakage	Primary	2018	Secondary	2020	0.01
Total					0.01

Source: CO2CERO S.A.S., 2023.

1. It was ensured that there were no overlaps year by year between the two activities included in the project, meaning that there were no areas that were degraded and deforested simultaneously in the same year. This was achieved through an annual intersection between deforested and degraded areas.
2. Finally, all reported and monitored deforested and degraded areas during the monitoring period were consolidated, and the corresponding areas for each activity were intersected. Taking into account the steps described previously, only degraded areas that are deforested in the immediately following years are obtained (see **Table 14**, AUD_VV_2022\4_SIG\4_SHP\Areas_Traslapadas and AUD_VV_2022\4_SIG\Areas_translapadas v1.0.xlsx").

Table 14. Areas degraded and subsequently deforested.

Area	Type of degradation	Degradation year	Deforestation year	Area (ha)
Leakage	Primary	2018	2019	0.20
			2022	0.06
		2019	2020	0.14
			2022	1.69
		2020	2022	0.64
		2021	2022	0.46
	Secondary	2018	2019	10.22

Area	Type of degradation	Degradation year	Deforestation year	Area (ha)
			2020	0.22
			2021	0.34
Leakage	Secondary	2018	2022	2.63
		2019	2020	0.85
			2021	0.75
			2022	20.36
		2020	2021	0.09
			2022	9.01
		2021	2022	4.91
Subtotal Leakage Area				52.57
Project	Primary	2018	2019	0.42
			2022	0.12
		2019	2020	0.05
			2021	0.05
			2022	1.77
		2021	2022	0.79
	Secondary	2018	2019	7.05

Area	Type of degradation	Degradation year	Deforestation year	Area (ha)
			2021	0.00
			2022	1.19
		2019	2020	0.24
			2021	0.69
			2022	5.39
		2020	2021	0.27
			2022	8.46
		2021	2022	6.12
Subtotal Project Area				**32.60**
General total				**85.17**

Source: CO2CERO S.A.S., 2023.

The areas presented previously were taken into account in the calculation of CO2e emissions during the respective year when each type of forest cover disturbance occurred. Initially, emissions were calculated (expressed in tCO_2e) with their respective emission factors for the different types of degradation. Subsequently, CO_2e emissions resulting from deforestation of forest cover were quantified using the total emission factor employed by the project. This allows the REDD+ Emberá Wounaan project to comply with the principles of conservatism by quantifying the total emissions due to the gradual transition from forest to non-forest cover, which occurs in a small area of the project, and contrasting them with the emissions delineated for each activity in the baseline for different time periods. This is based on the understanding that deforestation dynamics can be gradual (degradation to deforestation), resulting in a gradual decrease in forest characteristics, or total (transition from forest to non-forest).

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

The REDD+ Emberá Wounaan Project was developed following the guidelines of the BCR standard version 3.2, applying the BCR 0002 methodology version 3.1 of the BioCarbon Registry. Additionally, the tools suggested by the standard were used to address topics such as compliance with safeguards, alignment with the Sustainable Development Goals (SDGs), no net harm, baseline and additionality, monitoring reporting, risk and permanence, and avoiding double counting. In the table below, the names are related to the respective version used to build the current monitoring report.

Table 15. Tools of the BCR standard used for the current monitoring period.

Tool	Version
Tool to demonstrate compliance with the REDD+ SAFEGUARDS	Version 1.1
Sustainable Development Goals (SDGs)	Version 1.0
Avoiding double counting	Version 1.0
Monitoring, Reporting, and Verification (MRV) Tool	Version 1.0
Not net harm environmental and social safeguards	Version 1.0
Baseline and Additionality	Version 1.2
Permanence and risk management	Version 1.0

Source: CO2CERO S.A.S., 2023

3 Registry or participation under other GHG Programs/Registries

The REDD+ Emberá Wounaan Project has not been registered under another climate change mitigation program because this is its first monitoring period subject to validation and verification by a conformity assessment body, and it is the first initiative of this kind registered in Panama.

4 Contribution to Sustainable Development Goals (SGD)

In **Table 16**, a summary of the Sustainable Development Goals (SDGs) indicators applicable to the initiative is presented. These indicators are aligned with the National Strategic Plan with a State Vision "Panama 2030" developed by the National Development Consultation Council in conjunction with the United Nations Development Programme (UNDP). It is important to clarify that some of these indicators are applied with restrictions in their manifestation, given the scale at which they are proposed by the tool (International) and their relationship with the scale at which the project is implemented (Regional). To review the REDD+ activities, refer to 2_Cobeneficios/3_Actividades REDD+_Emberá Wounaan.

Table 16. Indicators of Sustainable Development Goals (SDGs) related to the initiative.

SDG	Indicator	Variable	Strategic axis according to the National Strategic Plan
2. Zero hunger	2.a.2	Total official flows of resources (official development assistance plus other official flows) allocated to the agricultural sector	Good life for all
4. Quality education	4.1.1	Completion rate (primary education, first cycle of secondary education, and second cycle of secondary education)	Good life for all
	4.3.1	Rate of participation of youth and adults in formal and non-formal education and training in the last 12 months, disaggregated by sex	Good life for all
5. Gender equality	5.1.1	Determine whether there are legal	Good life for all

SDG	Indicator	Variable	Strategic axis according to the National Strategic Plan
		frameworks to promote, enforce, and monitor gender equality and non-discrimination	
	5.5.2	Proportion of women in managerial positions	Good life for all
6. Clean wáter and sanitation	6.1.1	Proportion of the population using safely managed drinking water services	Environmental sustainability
13. Climate action	13.2.1	Number of countries that have communicated the establishment or implementation of an integrated policy, strategy, or plan that increases their capacity to adapt to adverse effects of climate change and promotes climate resilience and low greenhouse gas emissions development without compromising food production (e.g., national adaptation plan, nationally determined contribution, national communication, or biennial update report)	Environmental sustainability

SDG	Indicator	Variable	Strategic axis according to the National Strategic Plan
15. Life on land	15.1.1	Forest area as a proportion of total land area	Environmental sustainability
	15.1.2	Proportion of important sites for terrestrial and freshwater biodiversity included in protected areas, disaggregated by ecosystem type	Environmental sustainability
	15.2.1	Progress towards sustainable forest management	Environmental sustainability
	15.3.1	Proportion of degraded land compared to total land area	Environmental sustainability
	15.4.1	Important biodiversity sites in mountains included in protected areas	Environmental sustainability
	15.4.2	Mountain green cover index	Environmental sustainability
	15.5.1	Red List Index	Environmental sustainability

Source: Compiled by CO2CERO S.A.S., 2022.

By implementing REDD+ activities, the Emberá Wounaan project has aimed to promote climate action and has assessed its contribution to the Sustainable Development Goals (SDGs) using the Biocarbon Registry's tool for determining contributions to the achievement of the SDGs version 1.0. This tool presents relevant criteria and indicators

applicable to the project context (See "AUD_VV_2022\2_Cobeneficios\4_SDG-Tool-2023_Emberá Wounaan_V3.xlsx"). In **Table 17**, the indicators for the SDGs applicable to the initiative and their results are presented. For a review of the REDD+ activities, refer to "AUD_VV_2022\2_Cobeneficios\3_Actividades REDD+" and section 14. Implementation of the project.

Table 17. Alignment of project activities with the SDGs.

Indicator	Variable	Compliance	Evidence
ODS 2 Zero hunger			
2.a.2	Total official resource flows (official development assistance plus other official flows) allocated to the agricultural sector.	To comply with the provisions of this indicator, the percentage allocated for the development of the agricultural sector is established in relation to the income to be obtained from the sale of carbon credits through the implementation of the project. This ensures the full and effective participation of all inhabitants of the communities belonging to the REDD+ Emberá Wounaan project (See *AUD_VV_2022\11_Anexos y complementarios\Anexo_DistribuciónBeneficios.pdf*). Additionally, compliance with goal 2.a.2. is achieved through the REDD+ 1.1.2. activity, as it is envisaged to provide tools for the management of development alternatives at the community level, focusing on health, education, and housing, as well as strengthening skills in budget management, finance, and economic resource administration at the community level. (See AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados.pdf and AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Asistencia_CongresoGeneral_22 11 2022.pdf; AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.1 Gobierno y	1) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados.pdf 2) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Asistencia_CongresoGeneral_22 11 2022.pdf 3) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.1 Gobierno y administración\Acta_CongresoGeneral_22 11 2022.pdf.

Indicator	Variable	Compliance	Evidence
		administración\Acta_CongresoGeneral_22 11 2022.pdf.	
ODS 4 Quality education			
4.3.1	Participation rate of youth and adults in academic and non-academic education and training in the last 12 months, disaggregated by gender.	Initially, training sessions are conducted focusing on sustainable forest management, good production practices, leadership skills, REDD+ and socio-environmental safeguards, and project management, finance, and resource administration. Information is collected on the number of trained individuals disaggregated by gender. The goal is to leverage the acquired knowledge in the future to implement non-formal educational programs. Below are some of the objectives outlined in the development of these activities: - Improve production levels within the indigenous territory. - Enhance the productive capacities and skills of community members. - Increase formal and non-formal education levels within the region.	1) AUD_VV_2022\1_Acuerdos\01_Acuerdo comunidad\AprobacionRegional_Cemaco.pdf 2) AUD_VV_2022\1_Acuerdos\01_Acuerdo comunidad\AprobacionRegional_Sambu.pdf 3) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.1 Gobierno y administración\Acta_PlanQuinquenal_13 08 2022.pdf; 3) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Asistencia_PlanQuinquenal_13 08 2022.pdf. 4) AUD_VV_2022\2_Cobeneficios\3_Actividades REDD+\SoporteActividades\1.1 Gobierno y administración\1.1.1 Resolucion003_ConsejoNokoraChiPorNaan.pdf" 5) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados.pdf

Indicator	Variable	Compliance	Evidence
		- Build capacities in women, youth, and adults for leadership in cultural, social, and economic domains. - Increase education levels in soft skills. Finally, the number of individuals trained in the conducted activities is presented: - Training in project management, finance, and resource administration: 1) 7 trainings on project management, benefit distribution, and resource management: 2 men 2) Definition of agreements for resource management and understanding of the REDD+ project: 8 men. - Leadership training in good practices: 1) Training on the implications of the REDD+ project in the region, community development, and governance: 2 men. 2) Resolution of conflicts and territorial differences: 2 men and 9 women. - Training in REDD+ and socio-environmental safeguards: 1) Socialization on REDD+ initiatives and carbon capture: 5 men.	6) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Asistencia_CongresoGeneral_22 11 2022.pdf 7) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.1 Gobierno y administración\Acta_CongresoGeneral_22 11 2022.pdf.

Indicator	Variable	Compliance	Evidence
		2-4) Socialization on REDD+ and analysis of deforestation and degradation factors: 32 women and 70 men. 5) Definition of safeguards indicators: 2 men. 6) Basic concepts training on Climate Change: 8 women and 53 men 7-18; 20) Training on Climate Change, REDD+, and Carbon Market for residents and Nokora Council: 117 women, 286 men, and 4 illegible. 19) Socialization on the REDD+ project, its scope, and objectives at the regional level: 5 men.	
ODS 5 Gender equality			
5.1.1	To determine whether legal frameworks exist to promote, enforce, and monitor gender equality and non-discrimination based on sex	In Panama, regulations exist for the promotion, enforcement, and monitoring of this indicator, as evidenced by the verification of compliance in the implementation of the REDD+ Emberá Wounaan project. The current applicable regulations are described, mainly the Public Policy for Equality of Opportunities for Women (2012), Law No. 4 (1999), Executive Decree No. 53 (2002), Belém do Pará Convention (1994), CEDAW Convention (1979), Beijing Platform for Action (1995), and National Women's Mechanism (2017). On the other hand, through the implementation of the REDD+ 1.2.2. activity, efforts are made to build capacities in women,	1) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados.pdf\Pg. 8 2) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Asistencia_Cirilo Guainora_12 09 2021.pdf 3) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.2 Transparencia y participación\1.2.2 Acta_Cirilo Guainora_12 09 2021.pdf

Indicator	Variable	Compliance	Evidence
		youth, and adults for leadership in cultural, social, and economic spheres.	
5.5.2	Proportion of women in leadership positions	Within activity 1.1.2 Training in project management, finance, and resource administration, and its corresponding indicator, it is possible to identify the number of women involved in training processes and whether they hold a direct or leadership role within them. Additionally, on-site information gathering is consolidating data from each respondent regarding their role within the Region (Activity 2.1.3 assessment of the state of provision and availability of basic services, sanitation, health, and education).	1) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados.pdf 2) AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Asistencia_CongresoGeneral_22 11 2022.pdf 3) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.1 Gobierno y administración\Acta_CongresoGeneral_22 11 2022.pdf.
ODS 6 Clean water and sanitation			
6.1.1	Proportion of the population using safely managed drinking water supply services.	Activity 2.1.3 assesses the state of provision and availability of basic services, sanitation, health, and education. Its objective is to identify focal points for individual and community development planning, as evidenced by the number of households evaluated annually regarding the provision of basic services and the initiatives aimed at improving the provision of essential public services in the communities. Water is one of the elements involved in the analysis.	1) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\2.1 Planeación y prospectiva\2.1.3 Mejoramiento agua potable.PNG. 1 iniciativa desarrollada.

Indicator	Variable	Compliance	Evidence
ODS 13 Climate action			
13.2.1	Number of countries that have reported the establishment or implementation of a policy, strategy, or integrated plan to enhance their capacity to adapt to the adverse effects of climate change, promoting climate resilience and low-emission development without compromising food production. This may include a national adaptation plan, nationally determined contribution, national communication, or	The Panamanian National Climate Change Policy establishes the principle of recognizing the commitment to implementing actions for adaptation and mitigation of the adverse effects of climate change, taking into account areas of poverty, conservation and recovery of natural resources, and preservation of ecosystems. Within its objective 3, the policy aims to promote actions related to climate change mitigation that are compatible with the sustainable economic and social development established in the Kyoto Protocol. This involves promoting the implementation of development projects in the forestry sector, supported by the Clean Development Mechanism (CDM), including a REDD+ climate change mitigation project (See *AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\4.3 REDD+ en el contexto nacional).* Additionally, Panama has the 2050 National Climate Change Strategy from the Ministry of Environment, where adjustments to the nation's environmental regulations are consolidated, and mechanisms for climate change mitigation, such as the National REDD+ Strategy, are outlined (See *AUD_VV_2022\9_Legislación ambiental\2_Documentos legales\Estrategia Nacional de Mitigación del Cambio Climático de Panamá.pdf*).	1) AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\4.3 REDD+ en el contexto nacional. 2) AUD_VV_2022\9_Legislación ambiental\2_Documentos legales\Estrategia Nacional de Mitigación del Cambio Climático de Panamá.pdf. 3) AUD_VV_2022\9_Legislación ambiental\2_Documentos legales\CDN1_República de Panamá_2020.pdf

Indicator	Variable	Compliance	Evidence
	biennial update report.	Similarly, Panama has updated its Nationally Determined Contribution (NDC), involving ten (10) economic sectors, presenting operational climate scenarios resulting from designed policy instruments (See *AUD_VV_2022\9_Legislación ambiental\2_Documentos legales\CDN1_República de Panamá_2020.pdf*).	
ODS 15 Life on land			
15.1.1	Forest area as a proportion of total land area.	Cartographic analysis is conducted to establish the eligibility of the project area, defining forest and non-forest areas in relation to the total land area. For the year 2022, a total of 421,653.49 hectares of forest have been identified (See *AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\3.6.1 Eligible areas within GHG Project boundaries (AFOLU sector projects).* Additionally, REDD+ Activity 4.2.3 aims to increase carbon reservoirs, involve new production and conservation activities in the territory, and restore degraded areas and their ecosystem services."	AUD_VV_2022\2_Cobeneficios\4_Soportes Actividades\4.2 Mejoramiento de reservorios de carbono\4.2.3 Reforestación Sambú.jpeg
15.1.2	Proportion of important sites for terrestrial and freshwater	For the identification of important biodiversity sites, a cartographic analysis is conducted by ecosystem type, using the Holdridge climatic classification within the protected areas located in the Cémaco and	*AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\ 2.5.1.5.1 Ecosystem types in protected areas*

Indicator	Variable	Compliance	Evidence
	biodiversity included in protected areas, disaggregated by ecosystem type.	Sambú regions. It is identified that the very humid tropical forest presents a higher proportion of the area, accounting for 32.54% across all protected areas, followed by pre-montane rainforest (30.09%), very humid pre-montane forest (28.26%), tropical humid forest (8.21%), and low montane rainforest (0.90%).	
15.3.1	Proportion of degraded land compared to the total land area.	Compliance is achieved through the implementation of REDD+ Activity 4.2.2, which outlines forest restoration strategies aimed at reducing the impacts generated by forest degradation and increasing carbon reservoirs within the region. This is achieved through the engagement of the entire community in climate change mitigation activities. Additionally, an analysis is conducted on the annual historical degradation of the project area, highlighting the proportion of degraded land in the total area and the leakage area, under both baseline and project scenarios.	1) AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\ 3.6.4.1.2 Forest degradation 2) AUD_VV_2022\2_Cobeneficios\4_Soportes Actividades\4.2 Mejoramiento de reservorios de carbono\4.2.3 Reforestación Sambú.jpeg
15.4.1	Important sites for mountain biodiversity included in protected areas.	As part of the development of REDD+ Activity 4.1.2, information is expected to be generated on the current state of the natural resources owned by the region, along with an increase in knowledge associated with biodiversity and the richness of flora. Additionally, an assessment of the area is conducted. For the delimitation of the mountain landscape, a cartographic analysis was performed, identifying areas with slopes	AUD_VV_2022\2_Cobeneficios\Soportes Actividades\4.1 Gestión de recursos\4.1.2 AnalisisdeFauna_Metití.pdf

Indicator	Variable	Compliance	Evidence
		greater than 30% within the total protected areas. It was determined that 13.85% (19,413.41 ha) of this landscape belongs to important sites for biodiversity, mainly located in the Darién National Park (See AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\ 2.5.1.5.2 Zonas montañosas dentro de áreas protegidas).	
15.4.2	Mountain Green Cover Index	The area of stable forest within the project corresponds to 421,653.49 hectares, representing identified stable forest for the year 2022.	AUD_VV_2022\03_Carbono\MonitoreoAreas_REDD EmberaWounaan_V5.xlsx
15.5.1	Red List Index	To meet this indicator, Activity 4.1.2 is carried out, which monitors vegetation and associated biodiversity, including relevant faunal groups if applicable. Additionally, workshops are conducted to identify actors involved in deforestation and forest degradation, along with significant events in the community's history. This helps in understanding primarily the specimens of commercially traded flora originating from illicit trafficking and some of the wild fauna (See AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\7 Causes and agents of deforestation and forest degradation). In the analysis conducted for biodiversity contributions, it is possible to identify each faunal group and species determined to be in some state of	1) AUD_VV_2022\2_Cobeneficios\Soportes Actividades\4.1 Gestión de recursos\4.1.2 AnalisisdeFauna_Metití.pdf 2) AUD_VV_2022\12_Reporte de monitoreo\01_Inventario forestal\Bitácora - REDD+ COMARCA EMBERÁ WOUNAN_F.pdf

Indicator	Variable	Compliance	Evidence
		threat according to the regulations of the Ministry of Environment, resolution DM-0657 of 2016.	

Source: CO2CERO S.A.S., 2023.

5 Compliance with Applicable Legislation

In order to comply with the legislation regarding the collective rights of indigenous peoples in Panama, particularly in the management and use of their lands, the REDD+ Emberá Wounaan project adheres to a series of Indigenous norms and jurisprudence. These are integrated into the design, implementation, and execution of REDD+ activities determined by the indigenous region, while respecting their rights, autonomy, customs, and cultures.

Furthermore, initiatives to reduce emissions from deforestation and forest degradation within Panamanian territory are related to a regulatory context involving Executive Decree No. 84 of 1999, Executive Decree No. 35 of February 26, 2007, Law 22 of 1983, and Law 41 of 1998 proposed for the level of reference for emissions from deforestation of natural forests. Additionally, all regulatory frameworks associated with the greenhouse gas mitigation initiative are presented comprehensively. Additionally, the document of the management system allowing for tracking of each of the legal requirements presented is available in AUD_VV_2022\13_Gestión de información\GI-P04_Procedimiento_para_la_identificación_de_requisitos_legales[1].docx.

5.1 Regulatory Framework Related to the Rights of the Emberá Wounaan Indigenous Peoples

Below is a mention of the regulatory framework that regulates the rights of the Emberá Wounaan indigenous peoples in Panama, providing a description of its foundation and how it is articulated in the different stages of the project, especially in the REDD+ activities. See in **Table 18**.

Table 18. Regulatory framework related to the rights of the Emberá Wounaan indigenous peoples.

Legislation	Year	Regulatory framework	Description
Constitution of Panama	1972	Article 5	The law may create other political divisions subject to special regimes, meaning that special laws will apply in indigenous territories and national laws will apply subsidiarily.
		Article 88	Indigenous languages will be the subject of special study, conservation, and dissemination, and the State will promote bilingual literacy programs in indigenous communities.

Legislation	Year	Regulatory framework	Description
		Article 90	The State recognizes and respects the ethnic identity of national indigenous communities, will carry out programs aimed at developing the material, social, and spiritual values of each of their cultures, and will create an institution for the study, conservation, dissemination of these cultures and their languages, as well as for the promotion of the integral development of these human groups.
		Article 104	The State will develop education and promotion programs for indigenous groups, as they possess their own cultural patterns, in order to achieve their active participation in civic functions.
Law N° 34 Education	1995	Article 10	Education for indigenous communities is based on their right to preserve, develop, and respect their identity and cultural heritage.
Ley N° 17 Salud- Medicina tradicional	2016	Article 1	This law establishes a special regime to protect and promote respect for the knowledge of traditional indigenous medicine and to create mechanisms for the protection of traditional knowledge through the special system of collective intellectual property. It also guarantees the full and effective participation of indigenous congresses, councils, or traditional authorities at their different levels.
Law N° 42 Family, women and adolescence	1997	Article 13	The National Directorate of Social Promotion and Community Action is the technical body for planning, promotion, and execution through which the Ministry organizes, directs, develops, coordinates, executes, and monitors policies, programs, and standards related to social welfare and community action.

Legislation	Year	Regulatory framework	Description
		Article 14	To plan, develop, and execute programs and projects for the prevention, guidance, care, and protection of indigenous groups, peasants, and other ethnicities.
Law No. 27 Protection, Promotion, and Development of Handicrafts	1997	Article 10	In order to preserve national traditions and cultures, it prohibits the importation of products or goods that imitate Panamanian indigenous and traditional pieces or garments such as molas and naguas.
		Article 17	It covers handicrafts as an industrial expression; therefore, it includes the handicrafts produced by these peoples.
Law No. 35 Board of Fairs of the Indigenous Peoples of the Republic of Panama	2000	Article 2	Trust of Indigenous Peoples' Fairs of the Republic of Panama, its purpose is to organize and carry out national and international agroforestry, handicraft, cultural, educational, touristic, maritime, traditional medicine, and general trade fairs and exhibitions, in order to highlight the cultural and national richness of Panama's indigenous peoples.
Law No. 3 Commission of Indigenous Affairs	1995	Article 64	Its functions include studying, proposing draft laws, and issuing opinions to create or modify indigenous territories.
Decree No. 1 National Council for Indigenous Development	2000	Article 2 item 1	One of its objectives is to promote effective actions to support indigenous peoples and their development. In the Executive Decree that creates this Council, the first consideration states "that the Panamanian State is of a multi-ethnic, pluricultural, and multilingual nature"; therefore, the existence of indigenous peoples is recognized.

Legislation	Year	Regulatory framework	Description
		Article 7	Promote, coordinate, supervise, and evaluate policies, plans, programs, and projects with a gender perspective for the development of indigenous peoples, respecting their ethnic and cultural identity, and their forms of organization.
Law No. 27 Fund for the Development of Indigenous Peoples of Latin America and the Caribbean	1993	Article 1	The purpose of the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean, hereinafter referred to as the "Indigenous Fund," is to establish a mechanism aimed at supporting the self-development processes of indigenous peoples, communities, and organizations in Latin America and the Caribbean, hereinafter referred to as "Indigenous Peoples.
Universal Declaration of Human Rights	2015	Article 27	Every person has the right to freely participate in the cultural life of the community, to enjoy the arts, and to participate in scientific progress and the benefits derived from it.
Convention 169 ILO on Indigenous and Tribal Peoples	2014	Article 1	It corresponds to tribal peoples in independent countries, whose social, cultural, and economic conditions distinguish them from other sectors of the national community, and who are governed wholly or partly by their own customs or traditions or by special legislation.
		Article 2 item 2-c	To assist the members of the indigenous peoples concerned in eliminating socio-economic differences that may exist between indigenous members and other members of the national community in a manner compatible with their aspirations and ways of life, as outlined in Convention No. 169 concerning Indigenous and Tribal Peoples in Independent Countries.

Legislation	Year	Regulatory framework	Description
		Article 4 item 1	Special measures shall be taken as may be necessary to safeguard the persons, institutions, property, labour, cultures, and environment of the peoples concerned.
		Article 5	Measures shall be taken with the participation and cooperation of the peoples concerned to address the difficulties experienced by these peoples in facing new conditions of life and work.
		Article 6	Consultations shall be carried out with the peoples concerned, through appropriate procedures and particularly through their representative institutions, whenever legislative or administrative measures may affect them directly.
		Article 7	The peoples concerned shall have the right to determine their own priorities with regard to the development process, insofar as it affects their lives, beliefs, institutions, and spiritual well-being, as well as the lands they occupy or use in any way, and to control, to the extent possible, their own economic, social, and cultural development.
		Article 23	Crafts, rural and community industries, and traditional activities related to the subsistence economy of the peoples concerned, such as hunting, fishing, trapping, and gathering, shall be recognized as important factors in maintaining their culture and self-sufficiency and in their economic development.

Source: Compiled by CO2CERO S.A.S., 2023.

With the above, we highlight the importance of generating co-benefits for the social well-being of indigenous communities and the conservation of their culture and customs. It is essential to recognize that indigenous peoples hold fundamental value for society and the nation. Furthermore, they are communities that, from their ancestral essence, still preserve the sense of and care for their natural environments.

Therefore, for the REDD+ Emberá Wounaan project, it is crucial to promote actions or initiatives from REDD activities that are aligned and articulated with the laws, decrees, and articles mentioned, thus providing formality and legal regulation without causing harm or prejudice to both the inhabitants and the territory. All of this is done under the participation of the community and their own collective decisions. The documents related to this information are attached in 9_Legislación\2_MatrizlegalDerechosFundamentales_REDD+EmberaWounaan_V1.xlsx.

5.2 Law and land use

In Panama, the rights of indigenous communities to collective land ownership are recognized in the 1972 Constitution, established in Article 127, declaring the State as the guarantor of indigenous communities in the reservation of their lands and their collective ownership for the achievement of their economic and social well-being. Thus, the law will regulate the procedures to be followed to achieve this purpose and the corresponding demarcations within which private land appropriation is prohibited. Additionally, there are laws that support the provisions of Article 127 of the constitution, as follows:

- **Law 37 of 1962 of the National Assembly of Panama:** Establishes reserve lands for indigenous tribes exempt from being considered as state lands subject to agrarian reforms, they cannot be transferred in property, as they will fulfill a social function, ensuring that the benefits of technical assistance always reach indigenous communities.
- **Cabinet Decree 53 of 1971 of the Provisional Government Board:** Approves provisions related to the protection and integration of indigenous populations, establishing in its article 11, "the recognition of collective property rights, in favor of members of the indigenous population".
- **Law 41 of 1998 of the General Legislative Assembly of the Republic of Panama**: In its article 21 - numeral 2, and article 63, recognizing the right of Comarcas and indigenous peoples regarding the use, management, and sustainable traditional exploitation of renewable natural resources, located within the Comarcas and indigenous reserves created by law.
- **Law 72 of 2008:** through which the National Assembly establishes the special procedure for the adjudication of collective land ownership of indigenous peoples outside the comarcas, corresponding to article 127 of the Political Constitution of Panama. This title of collective property aims to guarantee the economic, social, and cultural well-being of the people who inhabit the indigenous community.
- **Executive Decree No. 223 of 2010 of the Ministry of Agricultural Development:** Establishes the special procedure for the adjudication of

collective land ownership of indigenous peoples that are not within the Comarcas; stating that to recognize such an area as traditionally occupied by indigenous peoples, it must present the "certification issued by the Comptroller General of the nation of the population census of the community, the certification of the national indigenous policy direction of the ministry of government and justice, accrediting the existence of the community". These requirements were met to obtain the titling, demonstrating through the law of assignment the existence of legal representation.

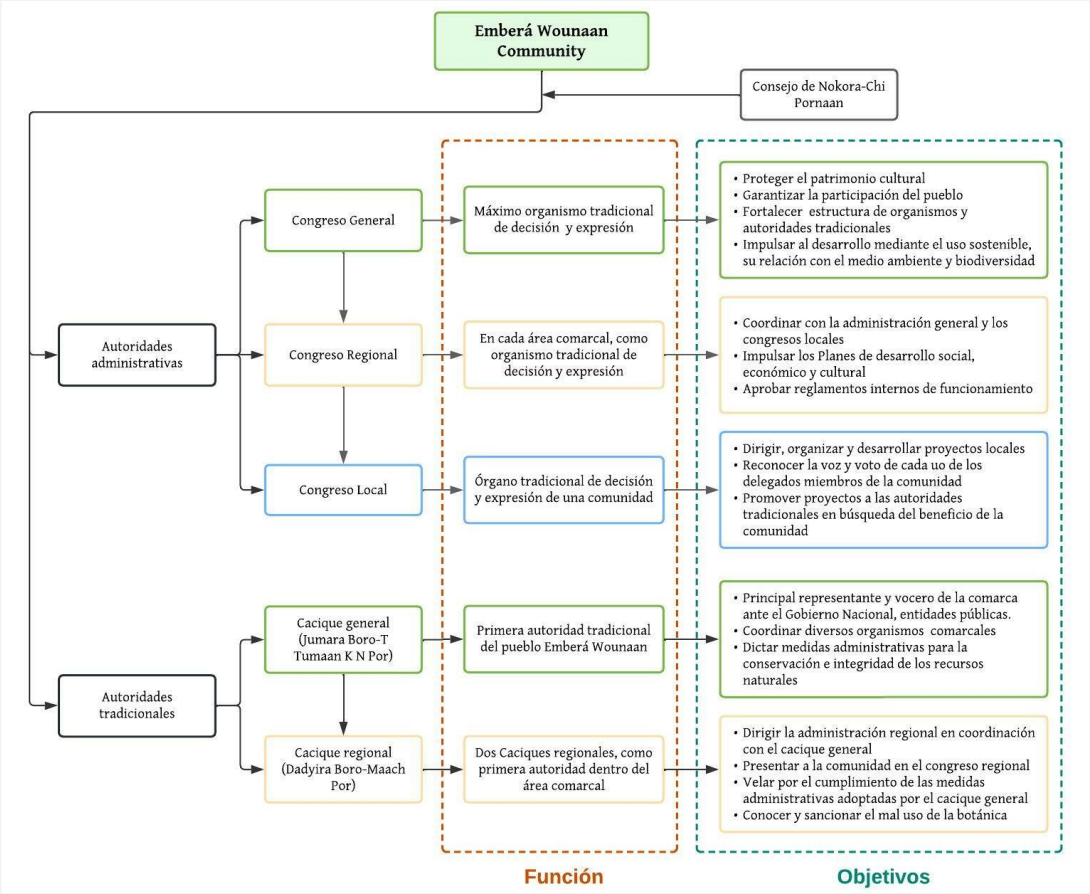
The Emberá Wounaan General Congress will serve as the highest traditional decision-making body and expression of the Comarca. Similarly, the regional and local congresses will have a board of directors, comprised of a president, vice president, secretary, assistant secretary, and treasurer, who will lead the development of plans, programs, and projects at their respective scales. Meanwhile, the Nokora-Chi Por Naan council will serve as a consultative body, where the general chief, regional chief, and presidents of the general, regional, and local congresses will submit plans, programs, and projects for consideration.

Regarding land ownership by the Emberá Wounaan Comarca, it was established and regulated by Law 22 of 1983 of the National Assembly of Corregimientos Representatives. This law recognizes the right to heritage and indigenous autonomy for the collective use of Emberá and Wounaan indigenous groups, for their integral development, prohibiting private appropriation. Similarly, Article 19 assigns responsibility to the community for the conservation and rational use of natural resources, such as flora, forest cover, soil, fauna, and water, aligning with the objectives of the REDD+ project.

The right to collective property of the Emberá Wounaan Comarca is ratified through Executive Decree No. 84 of 1999 of the Ministry of Government and Justice, by which the administrative charter of the Emberá Wounaan Comarca of Darién is adopted, recognizing the right to indigenous autonomy and self-management of the Emberá Wounaan people, in harmony and collaboration with governmental entities. Within its content, the following aspects are defined:

Title III concerning the government and administration of the Comarca: The administration of the Emberá Wounaan Comarca will be exercised by traditional and governmental authorities and bodies, establishing the administrative organization of the Comarca. (ver **Figure 3**).

Figure 3. Administrative and Traditional Organization of the Emberá Wounaan Comarca.



Source: Adapted by CO2CERO S.A.S, 2023.

Title VI, regarding the land regime:

- Article 83: The land within the Comarca constitutes the community's heritage for the collective use of indigenous groups, with the purpose of dedicating it to integral development activities and sustainable resource use. Therefore, private appropriation or alienation of such lands is prohibited.
- Article 84: Inhabitants within the administrative jurisdiction area of the Comarca shall have the right to land.
- Article 85: Depending on the case, it will recognize forms of land use such as family use, communal use, collective use, forest use, biocultural subsistence, and land for reforestation.

Title VII, regarding the economy: The general congress of the Emberá Wounaan Comarca will establish the finance department, which will be responsible for conducting

and controlling accounting operations, ensuring the development of effective and efficient financial self-management.

- Article 94: Revenues are considered Comarcal if they originate from activities and management of land use and rights, applicable in the case of implementing the GHG mitigation project type REDD+. The Comarca will carry out effective and efficient financial self-management of resources through control and administration instruments consistent with territorial reality.

Title VIII, regarding natural resources and the environment, establishes the following:

  - Article 95: The natural resources existing within the Emberá Wounaan Comarca are recognized as a collective heritage of the community, in which the general congress of the Comarca will work hand in hand with the National Environmental Authority (ANAM), defining policies for the protection, conservation, use, exploitation, and sustainable utilization of natural resources and the environment, managed by the Natural Resources and Environment Directorate.
  - Article 96: The Directorate of Natural Resources and Environment, in coordination with local congresses, will oversee and promote the protection and sustainable management of natural resources, with the aim of not allowing exploitation or use without authorized consent.
  - Article 97: The part of the Darién National Park located within the Comarca will be jointly administered by Traditional Authorities and the National Environmental Authority, prioritizing the benefit of the Emberá Wounaan indigenous people.
  - Article 98: Rational use activities of natural resources will be carried out when the interested community requests the opinion of the Regional Cacique through the local congress, which will be supported by the Natural Resources Directorate of the general congress to provide an opinion on the feasibility of the project, which will then be submitted to the General Cacique.

In this way, the right to collective property establishes a mechanism to protect cultural identity, promote economic and social development as an ethnic group, recognizing a high degree of autonomous policy in decisions that affect them. This allows us to confirm that the Emberá Wounaan Comarca has the necessary regulatory framework to obtain land titling, demonstrating through law the allocation and existence of legal representation, of a legitimate community and a territory that promotes its development.

5.3 REDD+ in national context.

The United Nations Framework Convention on Climate Change (UNFCCC) recognized during the Conference of the Parties (COP 13) held in Bali in 2007, the reduction of emissions from deforestation and forest degradation as a valid mechanism for mitigating the effects of climate change. This mechanism is applied in conjunction with the conservation, sustainable management, and enhancement of forest carbon stocks in developing countries.

Panama has been involved in efforts to reduce the effects of climate change through forest conservation and restoration, taking into account international commitments, where REDD+ represents an opportunity for improving and strengthening natural resource management. Among its strategies is the National Forest Restoration Program 2021 - 2025, whose objective is the structuring and leadership of processes for watershed restoration, recovery of degraded soils, and achieving carbon neutrality by 2050, favoring its Nationally Determined Contributions to the UNFCCC (MiAmbiente, 2022).

At the national level, the National Strategy for Reducing Emissions from Deforestation and Forest Degradation represents the transformation and commitment of the Ministry of Environment to act on forest resource management and its associated components, consolidating the country's capacity to conserve and increase forest resources, protecting them from latent threats, while supporting farmers and indigenous peoples in the management and use of the resources with which they coexist (MiAmbiente, 2022).

Through the National Forest Development Plan issued in 2008 by the National Environmental Authority, it is established that within the models of sustainable forest management, initiatives for reducing emissions from deforestation and degradation (REDD+) are involved as an important tool to include forest management in the fight against climate change. In this regard, the communities involved will obtain income through the sustainable management of forests as an opportunity cost compared to negative activities on the same.

The national climate change policy provides the principle whereby the commitment to implement adaptation and mitigation actions to counteract the adverse effects of climate change is recognized, taking into account areas of poverty, with the conservation and recovery of natural resources, and the preservation of ecosystems. Thus, within its objective 3, it aims to promote actions related to climate change mitigation in a manner compatible with sustainable economic and social development established in the Kyoto Protocol, under the promotion of implementing development projects in the forest production sector, supported by the Clean Development Mechanism (CDM), including a REDD+ type climate change mitigation project.

Meanwhile, Panama's National Climate Change Mitigation Strategy, developed by the Ministry of Environment, is based on four pillars:

i) Emission reduction through changes in land use and forestry;

ii) Emission reduction through deforestation and degradation;

iii) Cleaner production;

iv) Energy.

For the land use change and forestry sector (Pillar i), afforestation and reforestation are proposed as mitigation options, while a REDD+ project is established to address actions for emission reduction through deforestation and degradation (Pillar ii).

Since 2015, Panama has been part of the UN-REDD+ system, an international alliance aimed at establishing and strengthening the development of national and subnational programs and projects for emission reduction through deforestation and forest degradation. These initiatives are based on the analysis of each nation's specific context, including their carbon reservoir potential, favorable regulatory and legislative scenarios, and social opportunities.

In the consolidated text of Law 41 of 1998, which includes amendments approved by Law 18 of 2003, Law 44 of 2006, Law 65 of 2010, and Law 8 of 2018 of the National Assembly, the value of environmental management and organized work for sustainable resource utilization is recognized. The law acknowledges the right to receive credits as a result of traditional forest use and customs, provided that responsible care of natural resources is maintained during their execution.

5.4 Laws and decrees

In **Table 19**, some regulatory instruments related to the REDD+ Emberá Wounaan project, as well as greenhouse gas (GHG) mitigation initiatives within the territory, are presented. The documents related to this information are attached in 9_EnvironmentalLegislation\1_EnvironmentalLegalMatrix_REDD+EmberaWounaan_V1.xlsx.

Table 19. Laws and decrees related to REDD+ Emberá Wounaan project.

Legislation	Year	Entity	Description
Law 18	1952	National Assembly of Panama	Creating as a governmental dependency a Secretariat of Indigenous Affairs of the Republic, which will handle matters as ordered by law and those directly related to the indigenous administration of the national territory.
Constitution of Panamá	1972	National Assembly of Panama	An instrument created for national strengthening, guaranteeing freedom, democracy, and institutional stability, coupled with the promotion of social justice, general well-being, and regional integration.
Executive decree No. 84	1972	Ministry of Agriculture and Livestock	Declaring the Upper Darien a protective forest, in which the exploitation of forest resources, hunting of animals, agriculture, and livestock are restricted. Dedicated to the protection and sustainable use of natural resources in permitted areas.
Executive decree No. 21	1980	Ministry of Agricultural Developme nt	Establishes the Darien National Park, where logging, burning, land allocation, and activities that destroy natural resources are prohibited. In 1981, the United Nations Educational, Scientific and Cultural Organization (UNESCO) declared it part of the World Biosphere Reserve.
Law 1	1994	National Environmen tal Authority	This legislation establishes forestry regulations in the Republic of Panama and enacts other provisions to protect, conserve, enhance, increase, educate, research, manage, and rationally exploit the forest resources of the Republic. It sets minimum requirements for sustainable forest management, and harvesting natural forests in the required regions will require authorization through a contract with the environmental authority.
Resolution J.D. No. 01-95	1995	INRENARE	This resolution creates the biological corridor of the Bagre mountain range as a tool to ensure the conservation of representative samples of the ecosystems, fauna, and flora of the Darien. It

Legislation	Year	Entity	Description
			acknowledges the traditional lifestyles of local communities.
Law 41	1998	Legislative Assembly	Establishes ANAM as the authority promoting the environmental management of the national territory. In its article 66, it creates the National System of Protected Areas (SINAP) through Law 41 of July 1, 1998 "ANAM," which is later corroborated by the creation of the Ministry of Environment in Law No. 8 of March 25, 2015.
Resolution JD-05-98	1998	Ministry of Agricultural Developme nt	To establish the minimum requirements in forest management plans, where the environmental authority may establish a mechanism that encourages and promotes the management of natural forests, with the aim of capturing and sequestering carbon dioxide (CO2) and contributing positively to the national balance and global emissions of greenhouse gases. For this purpose, a promotion, monitoring, and control office will be established.
Executive Decree 84	1999	Ministry of Governmen t and Justice	By which the administrative organic charter of the Emberá Wounaan Comarca of Darién is adopted.
Law 20	2000	National Assembly of Panama	Establishes as its purpose the protection of the collective rights of intellectual property and traditional knowledge of indigenous peoples. Customs, traditions, beliefs, spirituality, worldview, and any other form of their cultural heritage shall be objectives of protection. From a standpoint where there are no industrial commercialization activities, such that the benefits perceived by the community from the commercialization of carbon certificates establish activities for the protection of traditional knowledge.
Decreto Ejecutivo No. 2	2003	Ministerio de economía y finanzas	Por la cual se aprueban los principios básicos y lineamientos de la Política Forestal de Panamá, estableciendo mecanismos de promoción, estímulo e incentivo en la valoración social y de mercado de los bienes y servicios generados a través de la valoración socioeconómica y la inclusión en las cuencas

Legislation	Year	Entity	Description
			nacionales para su revisión y diseño de incentivos económicos
Resolución AG No. 0358	2007	ANAM	Por la cual se modifica la resolución A.G. Nº 0334 de 2004, mediante la cual se declara un área protegida bajo la categoría de reserva hidrológica Serranía del Darién, con el propósito de proteger adecuadamente los nacimientos de los ríos y detener la expansión de la frontera agrícola.
Law 8	2015	National Assembly	Creates the Ministry of the Environment as the governing body in matters of protection, conservation, preservation, and sustainable utilization of natural resources. In its Chapter II, it establishes the state's relationship for climate change mitigation, conducting a national inventory of greenhouse gas emissions and absorptions, and establishing mechanisms to promote the transition to a low-carbon economy.
Executive Decree No. 393	2015	Ministry of Foreign Affairs	Adopts the Sustainable Development Goals (SDGs) as part of a nationally binding process involving all societal levels.
Executive Decree No. 59	2016	Ministry of Environment	Allows and regulates co-management in the protected areas system, in those areas overlapping with indigenous Comarcas. This is corroborated in Law No. 72 of 2008, which establishes the relationship between the national environmental authority and indigenous authorities for the execution of sustainable natural resource management plans.
Executive Decree No. 34	2019	Ministry of Environment	By means of which the National Climate Change Strategy 2050 is approved.
Decreto Ejecutivo 100	2020	Ministry of Environment	The Reduce Your Footprint National Program is created for the management and monitoring of low-carbon economic and social development in the Republic of Panama.

Legislation	Year	Entity	Description
Decreto Ejecutivo No. 137	2021	Ministry of Environment	The National Forest Restoration Program 2021-2025 is created, promoting the low-carbon economic and social development strategy, increasing ambition regarding NDCs for 2050.
Decreto Ejecutivo No. 142	2021	Ministry of Environment	By means of which the national Carbon Market of Panama is established progressively and gradually.
Decreto Ejecutivo No. 10	2022	Ministry of Environment	Which adopts the National Climate Action Plan and dictates other provisions.

Source: Compiled by CO2CERO S.A.S., 2022.

6 Climate change adaptation

Within the territory of Panama, adaptation to climate change is governed by Executive Decree No. 34 of 2019, which approves the National Climate Change Strategy 2050. This strategy is based on the principles of ensuring a healthy environment free from pollution, with natural resources such as air, water, and adequate food to meet the requirements of ideal human life development. Among the objectives of the law is the protection, conservation, and increase of existing forest resources in the country, while promoting their rational and sustainable management and use, incentivizing and implementing forest projects to mitigate climate change.

Law 1 of 1994 defines carbon capture in forests as an environmental service. Consequently, mechanisms will be established to attract financial and economic resources, where the REDD+ Mechanism is an alternative. In this context, the present project favors the manifestation of this mechanism as an alternative that contributes to mitigating climate change and from which activities are derived to adapt populations to the changes generated, with resilience and a constant increase in their quality of life.

According to the effects on the objectives of the national climate change strategy, it is possible to identify some contributions generated by the REDD+ Emberá Wounaan project with its activities to reduce them, as presented in **Table 20**.

Table 20. Relationship between REDD+ activities and the national climate change strategy.

Effect	Project contribution
Diversification of income sources and market access	• Technical support in sustainable family production models. • Design of sustainable economic alternatives and production chains. • Training in good productive practices. • Improvement of tools and work materials. • Institutionalization of good practices in economic development and well-being.
Additional income for sustainable landscape management	• Support in the certification and commercialization of reduced GHG emissions • Training in REDD+ and socio-environmental safeguards • Establishment of the Emberá Wounaan forest nursery
Innovative financing mechanisms for sustainable resource management	• Training in Sustainable Forest Management (SFM) • Non-timber forest product production
Increase in cultural and recreational habitats through forest management	• Designing strategies for preserving indigenous ancestral knowledge • Identifying territorial boundaries
Reduction in burning practices	• Strategies for protecting territorial boundaries • Technical support in sustainable family production models • Training in good production practices • Institutionalization of good practices for economic development and well-being
Equitable participation in benefit distribution	• Guidance in defining governance structures and well-being. • Creation of spaces for consultation and decision-making by authorities and members of the Emberá Wounaan community. • Training in good leadership practices.
Conservation and management of ecosystems	• Strategies for protecting territorial boundaries • Training in REDD+ and socio-environmental safeguards • Training in Sustainable Forest Management (SFM) • Forest restoration • Reforestation
Access to participation mechanisms and decision-making	• Guidance in defining governance structures and well-being. • Establishment of consultation and decision-making spaces for authorities and members of the Emberá Wounaan community. • Training in good leadership practices.

Effect	Project contribution
Implementation of existing policies for sustainable resource management	• Training in project management, finance, and resource administration. • Training in REDD+ and socio-environmental safeguards.

Source: Compiled by CO2CERO S.A.S., 2022.

Taking into account the REDD+ strategy designed for Panama, it is also possible to identify common points with other strategies in the country and with the activities designed within the initiative. In this way, the project engages with the following enabling conditions:

1. Implementation of an operational institutional framework: Through the generation of analysis and identification of common factors between international, national, and local policies and project actions, the project's management units and climate change mitigation initiative management at the national level play a necessary role in carrying out actions under a regulated context. Operational actions specific to the REDD+ context is consolidated, pursuing the objectives of reducing deforestation and degradation, increasing carbon reservoirs, and promoting sustainable forest management, all aimed at meeting the international framework.
2. Allocation of funds: Currently, the project involves some investments in the territory that favor conservation and sustainable forest management activities, thus aligning with the government's restoration and planting goals. In this sense, the project has also socialized mechanisms for the equitable distribution of the benefits it generates, emphasizing the importance of contributing sustainably to community development. Therefore, the project's results are strictly associated with reducing deforestation and forest degradation.
3. Climate change adaptation: The project analyzes, as part of its action axis, activities that contribute to reducing the effects of climate change and the adaptation mechanisms that the country has designed to achieve this. Similarly, the project's objectives are entirely focused on contributing to this goal, understanding REDD+ initiatives as a sustainable way to promote the sustainable development of indigenous communities and extend their positive externalities to other sectors aiming to mitigate climate change as well.
4. Promotion of the national Carbon market: The REDD+ Emberá Wounaan project aims to be a pioneer in generating carbon credits within indigenous territories. Therefore, it identifies the requirements and necessary variables in its execution to contribute to the consolidation of a carbon market, recognizing in the

successes of this initiative the phases that Panama must apply to establish itself in this sector.

5. Regulation on carbon ownership: By legitimizing indigenous communities and respecting their land ownership, the project has ensured that the avoided GHG emissions belong to the Emberá Wounaan Comarca, aligning with the authority granted to them constitutionally and by law, while complying with the socio-environmental safeguards determined by the international framework.

REDD+ Emberá Wounaan project has promoted the implementation of restoration processes involving the communities of Capetí, Unión Choco, and Nazareth. For this purpose, capacities related to the establishment of forest nurseries have been strengthened, with materials sourced from forest management activities such as recruitment, seed collection, and in-situ seedling acquisition. This favors the adaptation to climate change of the communities, resulting in increased carbon reservoirs, improved provision of ecosystem services, and sustainable forest resource management. Additionally, educational components related to REDD+ initiatives, social and environmental safeguards, sustainable forest management, and monitoring of vegetation cover have been included to integrate technical elements at the territorial level that support the initiative's objective. This helps to inform the community about the reality of their territory and the increasing demands for conservation over time.

Ensuring sustainable economic activities is a fundamental factor during the project, understanding agriculture as the direct means of family support and also, as a scenario for productive improvement, increased food availability, and strengthening of technical and operational capacities related to land work. This leads to a sustainable and resilient model adapted to climate change and respectful of the communities' traditions. Additionally, through the institutionalization of knowledge associated with agricultural management, combined forest systems, and harvesting strategies, knowledge is established in the scenario permanently, leading to self-management processes based on agriculture.

Furthermore, since 2012, activities aimed at strengthening culture and traditional knowledge have been implemented. This creates scenarios for community participation and cohesion, opening doors to communication and transparency among stakeholders, thereby enhancing decision-making processes. Similarly, efforts are made to defend territorial boundaries, where forest and community guard figures have been established as a way to increase the communities' sense of ownership over natural resources and reduce the effects of external agents on the territory, which do not adhere to the rules associated with natural resource management.

Table 21. Alignment of REDD+ activities of Emberá Wounaan project with the guidelines of the national REDD+ strategy.

REDD+ Activities	A. Promotion and implementation of sustainable forest management initiatives	B. Promotion of productive activities and livelihoods	C. Design and implementation of actions in indigenous territories	D. Implementation of facilitating actions
1.1.1 Guidance in defining governance structures and well-being				d11
1.1.2 Training in project management, finance, and resource administration			c9	
1.2.1 Creation of spaces for consultation and decision-making				d10
1.2.2 Training in good leadership practices			c9	
2.1.1 Development of community planning and development tools				d11
2.1.2 Design of strategies for the conservation of indigenous ancestral knowledge			c9	
2.1.3 Assessment of the provision and availability of basic services				d10
2.2.1 Identification of territorial boundaries			c9	
2.2.2 Strategies for the protection of territorial boundaries			c9	
3.1.1 Technical support in sustainable family production models		b6		
3.1.2 Design of sustainable economic alternatives and production chains		b7		

REDD+ Activities	A. Promotion and implementation of sustainable forest management initiatives	B. Promotion of productive activities and livelihoods	C. Design and implementation of actions in indigenous territories	D. Implementation of facilitating actions
3.2.1 Training in good production practices		b6		
3.2.2 Improvement of tools and work materials			c9	
3.2.3 Institutionalization of good practices in economic development and well-being		b6		
4.1.1 Training in REDD+ and socio-environmental safeguards				d10
4.1.2 Monitoring of vegetation and biodiversity				d10
4.1.3 Training in Sustainable Forest Management (SFM)	a3			
4.2.1 Creation of the Emberá Wounaan forest nursery	a3			
4.2.2 Forest restoration	a2			
4.2.3 Reforestation	a1			
4.3.1 Non-timber forest production		b7		

Source: CO2CERO S.A.S., 2023.

With this relationship, it is possible to identify that the axes under which the REDD+ activities of the project have been designed align with the guidelines and their components, within which it is possible to differentiate the following, which in turn are linked in **Table 21**.

a1. Restoration of lands with forestry vocation and agricultural use.

a2. Commercial reforestation.

a3. Conservation and sustainable management of natural forests.

b6. Organic agriculture.

b7. Biocommerce.

c9. Participation and contribution of indigenous peoples.

d10. Facilitating actions that promote and encourage the participation and involvement of all relevant actors.

d11. Establishing a conducive framework for the implementation of direct interventions aimed at modifying, creating, or implementing appropriate regulatory frameworks to ensure that direct interventions are effective and efficient.

7 Carbon ownership and rights

Below is a description of the party assuming responsibility for the carbon credits generated by the initiative.

7.1 Project holder

Below, are the proponents of REDD+ Emberá Wounaan project.

Individual or organization	*Comarca Emberá Wounaan*
Contact person	*Cacique Leonides Cunampia*
Job position	*President of the General Congress of the Emberá Wounaan Comarca*
Address	*Bal Harbou Plaza, Local 23 Second floor, Panama City*
Phone number	*+507 6900-7584*
Email	*NA*

Emberá Wounaan Comarca owns the territory where the initiative is implemented, thus being the proponent of the initiative and the owner of the reduced greenhouse gas emissions generated within the project boundary. **Table 22** and **Table 23** present the communities comprising the districts of Cémaco, totaling 29 communities, and Sambú, totaling 12 communities.

Table 22. Communities in the Cemaco District.

N.º	Community	N.º	Community	N.º	Community
Cirilo GuaynoraWard		**Manuel Ortega Ward**		**Lajas Blancas Ward**	
1	Capetí	5	Barranquillita	16	Canán
2	El Puente	6	La Esperanza	17	Sinaí
3	Unión Choco	7	La Pulida	18	Maach Pobor
4	Vista Alegre	8	Punta Grande	19	Alto Playón
		9	Nuevo Belén	20	Peña Bijagual
		10	El Común	21	El Salto
		11	Naranjal	22	Baja purú
		12	Corozal	23	Lajas Blancas
		13	Villa Nueva	24	Tortuga
		14	Boca Tigre	25	Dosake Purú
		15	Nazareth	26	Nuevo Vigía
				27	Villa Caleta
				28	Marraganti
				29	Bajo Chiquito

Source: Compiled by CO2CERO S.A.S., 2022.

Table 23. Communities in the Sambu district.

N.º	Community
Rio Sábalo Ward	
1	Puerto Indio
2	Bayamón
3	La Chunga
4	Boca Trampa
5	Villa Kerecia
6	Dai-Puru
Jingurudo Ward	

N.º	Community
7	Pavarandó
8	Boca Wina
9	Jingurudo
10	Churuco
11	Condoto
12	Borobichi

Source: Compiled by CO2CERO S.A.S., 2022.

7.2 Other Project participants

Additionally, some external roles have been involved in supporting the implementation of the GHG mitigation initiative; however, they do not have ownership or control over the GHG reductions obtained. These correspond to B Terra Corp., CO2CERO SAS, and Fundación Panamá Canal de Vida.

Table 24. Contact information of the managing partner.

Individual or organization	***B-Terra Corp***
Contact person	*Omar Fricentese*
Job position	*Project Coordinator*
Address	*Brazil Commercial Center, Mall Of 522, 5th Floor. Panama City, Panama.*
Phone number	*+507 213-0000*
Email	*info@b-terra.com*

Source: Compiled by CO2CERO S.A.S., 2022.

Table 25. Contact information of the technical partner.

Individual or organization	***CO2CERO S.A.S.***
Contact person	*Jose Luis Rivera Micán*
Job position	*General director*
Address	*Cra 45a# 104b-16 Bogotá D.C. (Colombia).*

Phone number	*+601 6047279*
Email	*info@co2cero.co*

Source: Compiled by CO2CERO S.A.S., 2022.

Table 26. Contact information of Fundación Panamá Canal de Vida.

Individual or organization	***Fundación Panamá Canal de Vida***
Contact person	*Carlos Iván Mantilla*
Job position	*General director*
Address	*Brazil Commercial Center, Mall Of 522, 5th Floor. Panama City, Panama.*
Phone number	*+507 213-0000*
Email	*info@b-terra.com*

Source: Compiled by CO2CERO S.A.S., 2022.

7.3 Agreements related to carbon rights

Through contractual agreements, the proponent of the initiative and the managing associates determine their responsibilities and rights in it. In the "1_Acuerdos\01_Acuerdo comunidad" folder, the understanding agreement established between the managing associate B Terra Corp and the authorities of the Emberá Wounaan Territory is presented. It defines that the participation in the commercialization of the reduced emissions of GHG, after deducting the expenses incurred by the project, will be 56% for the 41 communities of the Territory and 44% for the managing and technical associates during the 30-year lifespan of the project, ensuring that most of the benefits are given to the community. It is also determined that the management of resources will be regulated by a fiduciary figure, while the management is applied jointly between the managing associate (B Terra Corp.) and the general congress of the Territory, guaranteeing improvement in five pillars: health, food, education, health, and infrastructure.

In the partnership agreement established between the parties, namely the General Cacique of the Emberá Wounaan Territory and the managing associate B Terra Corp., established on March 15, 2022, it is considered that the Territory owns the land and therefore the project. Thus, its design and structuring are based on the uses, traditions, and customs of the indigenous people see folder 1_Acuerdos\Acuerdo comunidad\Contrato_B Terra_Emberá.pdf and

AUD_VV_2022\01_Acuerdos\01_Acuerdo comunidad\Nota aclaratoria_Cláusula 7.docx").

8 Environmental Aspects

Following the guidelines defined in the Environmental Net Damage and Socio-environmental Safeguards tool of the Biocarbon Registry version 1.0, it is demonstrated that the project activities do not cause impacts on the environment and local communities or society in general. For the normative analysis within the national and international framework, the environmental legal matrix related to the initiative is presented, justifying the applicability of the different laws and regulations that regulate the project (See folder *AUD_VV_2022\9_Legislación ambiental*).

In order to analyze the predictable effects on biodiversity and ecosystems within the project boundaries, an environmental assessment was conducted based on the categorization of effects adopting the methodology developed by Conesa (2010). This methodology assigns an importance value to each effect by using value scales for the criteria established by it, allowing them to be classified into different ranges depending on their nature. The parameters of this methodology were adapted to fit the specific characteristics of the REDD+ Emberá Wounaan project.

In total, seven (7) criteria were analyzed for negative effects and five (5) for positive effects, because the qualification for recoverability and reversibility criteria is not conducted as indicated by the Conesa methodology (2010). For all effects, the characteristics, intensity, extent, persistence, and timing were evaluated. In *AUD_VV_2022\11_Anexos y complementarios\4_NNH\01_Environmental aspect*, you can find the definition of each criterion and the rating of environmental effects with the respective justification of the assigned value in the assessment conducted.

Table 27. Rating and level of environmental importance of the effects determined in the environmental assessment.

N°	Effect	Rating	Environmental leve lof importance
1	Increase in Forest Governance	11	Positive: Low
2	Conservation of forest mass	27	Positive: High
3	Provision of habitats for fauna	33	Positive: High

N°	Effect	Rating	Environmental leve lof importance
4	Reduction of pressure on natural ecosystems	29	Positive: High
5	Conservation of biological corridors	27	Positive: High
6	Forest fires	-29	Negative: Moderate
7	Emergencies due to floods or hurricanes	-29	Negative: Moderate
8	Impact on vulnerable or endangered species (terrestrial or aquatic) according to IUCN in the area of the Comarca	-27	Negative: Moderate
9	Soil and water pollution with anthropogenic waste	-27	Negative: Moderate
10	Increase in the construction of unsustainable housing and the existence of traditional housing in precarious conditions	-23	Negative: Moderate
11	Limited knowledge of sustainable forest management within the Comarca	-15	Negative: Irrelevant
12	Susceptibility to scams related to carbon markets	-13	Negative: Irrelevant
13	Insufficient access routes to transport forest and agricultural production to consumers	-17	Negative: Irrelevant
14	Inappropriate land use	-36	Negative: Critical
15	Pressure from private timber companies on forest resources	-37	Negative: Critical

N°	Effect	Rating	Environmental leve lof importance
16	Illegal logging	-37	Negative: Critical

Source: CO2CERO S.A.S., 2022.

Finally, it is determined that for the REDD+ Emberá Wounaan project, there are five (5) positive effects, of which four (4) were classified as having a high level of environmental importance and one (1) with a low level of environmental importance. Additionally, there are ten (11) negative effects, five (5) moderate, three (3) irrelevant, and three (3) critical.

9 Socioeconomic Aspects

According to the results obtained from the socioeconomic assessment, several effects are identified as relevant and important for the continuous development of the project in the short, medium, and long term. It is noteworthy that these effects arise from the socialization processes that have been ongoing with the communities, where they identify the positive or negative benefits that REDD+ activities can generate for both the social and economic components of the Emberá Wounaan Comarca.

Below is **Table 28**, where the effects and their level of importance are identified. For this result, five (5) criteria were considered for qualification: directness, scope, magnitude, timing, and persistence. In *AUD_VV_2022\11_Anexos y complementarios\4_NNH\02_Socioeconomic aspect*, you can find the definition of each criterion and the rating of the socioenvironmental effects.

Table 28. Rating and socio-economic importance level of the effects determined in the assessment.

N°	Analysis Units- Socioeconomic Effects	Qualification	Level of Socioeconomic Importance
1	Hiring of local labor	21	Positive: High
2	Access to economic resources	23	Positive: High
3	Development of agricultural productive projects	23	Positive: High
4	Development of ethnic productive projects	23	Positive: High
5	Economic territorial growth	23	Positive: High
6	Devaluation of the carbon market	-19	Critical
7	Misuse of economic resources	-21	Critical

N°	Analysis Units- Socioeconomic Effects	Qualification	Level of Socioeconomic Importance
8	Abandonment of entrepreneurship	-19	Critical
9	Community disarticulation	-17	Moderate
10	Strengthening of good governance	-19	Critical
11	Community participation	19	Positive: High
12	Strengthening of land tenure	17	Positive: Medium
13	Improvement of roads	23	Positive: High
14	Recognition of territorial boundaries	19	Positive: High
15	Incursion of groups outside the law or drug traffickers	-21	Critical
16	Strengthening of territorial boundary security	23	Positive: High
17	Participation of Children, youth, elderly	15	Positive: Medium
18	Gender participation	19	Positive: High
19	Non-participation of children, youth, women, and elderly	-13	Moderate
20	Strengthening of community relationships	19	Positive: High
21	Strengthening of health	23	Positive: High
22	Strengthening of Education	23	Positive: High
23	Food security	23	Positive: High
24	Housing improvement	21	Positive: High
25	Improvement of basic services	23	Positive: High
26	Strengthening of family welfare	21	Positive: High
27	Solid waste management	15	Positive: Medium
28	Exposure to future pandemics	-17	Moderate
29	Rescue of cultural activities	19	Positive: High
30	Loss of cultural identity	-19	Critical
31	Disrespect for dignity and cultural diversity	-19	Critical
32	Self-rejection of indigenous identity and culture	-19	Critical

Source: CO2CERO S.A.S., 2023.

With the aforementioned information, 32 effects are obtained, with eighteen (18) having a Positive importance level: High, three (3) with Positive: Medium, three (3) with

Moderate, and eight (8) with Critical importance. The latter are identified in the risk management section along with their possible strategies.

While a significant number of effects with relevance for both communities and the territory are obtained, it can be analyzed that executing the project in the most transparent, honest, efficient manner, with joint and constant participation, generates well-being for the beneficiaries, improving their living conditions. However, there is a contrasting significant value of critical impact level that, if not taken into account and considered, may lead to a project reversal.

Therefore, from the REDD+ Emberá Wounaan project and following the criteria of the Cancun safeguards, assurance is given for participation and collective action, as well as respect for the rights of indigenous communities. This allows for the strengthening of relationships based on trust, individuals with leadership for decision-making, and actions in response to the challenges of their own dynamics. It also reinforces bonds in each of its members to work for the common good, through social inclusion, ancestral and ethnic knowledge, and community participation.

10 Stakeholders' Consultation

The REDD+ Emberá Wounaan project ensures, in accordance with the Cancun safeguards, the flow of information, respect for culture, and free, prior, and informed consent. Below are the processes and activities employed to achieve the consultation and approval phases within the territory, which align with the process described in the document "8_Guia_AcercamientoSocial_Emberá Wounaan_V2.pdf" found in Annexes and complementary materials.

10.1 Project idea

The initial consolidation of the REDD+ project idea arose between the managing and technical partners (B-Terra and CO2CERO S.A.S.) as a result of an analysis of the legal, normative, and technical framework. This analysis was necessary to ensure that the project benefits the community, reduces greenhouse gas emissions, and remains permanent for a minimum period of thirty (30) years. To ensure a responsible and committed workflow, these two parties established a temporary partnership contract (Refer to "*AUD_VV_2022\01_Acuerdos\02_Acuerdos empresas\Contrato_BTerra-CO2CERO.pdf*"), where they commit, according to their abilities, to contribute to the fulfillment and achievement of the objectives of the REDD+ initiative within the national territory, specifically in the Emberá Wounaan Comarca sector, involving the Darién, Cémaco, and Sambú districts.

Within this phase of communication between partners, percentages of participation related to management and technical implementation, payment mechanisms, benefit transfer, general project objectives, and certification program based on alternative analysis are defined. From this point, the first direct communication channel of the project is established, where B-Terra initiates a direct relationship with the community or their representatives to gather the necessary information for the design and structuring of the initiative. Simultaneously, this channel extends to the technical developer, consistently consolidating it with the certification program. The information channels designed in this phase include direct contact with field visits, phone calls, and intermediation through workers of the company B-Terra and/or CO2CERO S.A.S.

Once the essential elements of project structuring and the potential benefits generated by the initiative are consolidated, approaches to the communities are made to provide a framework regarding REDD+ initiatives, their influence on climate change mitigation, conservation, and improvement of living conditions for community members through nature-based solutions and payments for results. Additionally, community engagement with the population is conducted under the governance structures of each reserve and the Cancun safeguards, ensuring a more open, honest, transparent, and participatory communication, which has sparked interest among the population for the development of a REDD+ project within their territory, while respecting their culture and customs.

This initial socialization aimed to convey to the community the idea and importance of implementing a REDD+ project for the development of the territory and the improvement of the quality of life of the indigenous communities of the Emberá Wounaan Comarca, previously developed by the managing and technical partners, demonstrating the viability and assessment of the project environment, followed by monetary and non-monetary benefits in its execution, and additionally, highlighting the commitment of the communities as a fundamental part of the project development, based on good leadership, collective responsibilities, equal conditions, and joint democracy.

Ilustration 1. Socializations of the REDD+ Emberá Wounaan project.

Source: B-Terra Corp, 2022.

For the implementation of this phase, personnel from the company B-Terra were deployed to the territories, ensuring maximum participation from each community and granting them representative status. This was done to foster internal discussions that could lead to the approval of the initiative within the territory in subsequent stages of visitation, understanding the autonomy and respect for tradition in decision-making within each community. This development process is outlined in **Table 29** (Refer to "*11_Anexos y complementarios*\ *1_Asistencia.pdf* "). Prior procedures with traditional authorities and methods and communication channels with the communities were taken into account for the execution of the REDD+ project socializations.

Table 29. Some events of the socialization with the Emberá Wounaan Comarca.

Date	Topic	Location	Community
April 26, 2016	Presentation of conservation project idea	Hotel Continental, Panama City	Unión Chocó Vista Alegre

Date	Topic	Location	Community
January 20, 2020	Discussion on points proposed by timber company with pro-road committee and B-Terra Corp.	Cirilo Guaynora District	Unión Chocó
April 5, 2021	Training session	Cirilo Guaynora District	Unión Chocó
September 12, 2021	Meeting of communities in the Cirilo Guaynora Corregimiento	Panama City, Omar Torrijos Park	Vista Alegre Unión Chocó Puente Capetí
November 5 and 6, 2021	First seminar workshop on climate change, REDD+, and carbon market.	Cirilo Guaynora District	Capetuira
December 30, 2021	Training on climate change and carbon market with the Nokora Council	Panama City, Street Mall, B-Terra Office No. 522	Nokora council Emberá Wounaan District
January 18, 2022	Socialization workshop	Cirilo Guaynora District	Meteti
February 8, 2022	Socialization workshop	Lajas Blancas District	Nuevo Vigía
February 20, 2022	Socialization workshop	Lajas Blancas District	Bajo Puru
March 24, 2022	Socialization workshop	Manuel Ortega District	La Esperanza
March 24, 2022	Socialization workshop	Manuel Ortega District	Barranquillita
March 25, 2022	Presentation by B-Terra Corp. and Panama Canal Life Foundation	Lajas Blancas District	Bajo Chiquito- Tuqueza
April 5, 2022	Socialization workshop	Cirilo Guaynora District	Unión de Choco
April 5, 2022	Socialization workshop	Lajas Blancas District	Villa Caleta
April 12, 2022	Socialization workshop	Cirilo Guaynora District	Vista Alegre
April 13, 2022	Socialization workshop	Cirilo Guaynora District	Unión Chocó and Puente
April 13, 2022	Socialization workshop	Cirilo Guaynora District	Capetí

Date	Topic	Location	Community
April 14, 2022	Focus groups	Panama City, Street Mall, B-Terra Office No. 522	President Nokora, General Chieftain, Congress President and Team
April 25, 2022	Meeting with new authorities of the Comarca	Panama City, Street Mall, B-Terra Office No. 522	General Chieftain Cirilo Guainora President
July 22, 2022	Workshop with commission appointed by the chief	Panama City, Street Mall, B-Terra Office No. 522	District Authorities
July 30, 2022	Workshop with commission appointed by the chief	Panama City, Street Mall, B-Terra Office No. 522	District Authorities
August 5, 2022	Workshop with commission appointed by the chief	Panama City, Street Mall, B-Terra Office No. 522	District Authorities
August 13, 2022	Presentation of strategic plan of the Emberá Wounaan Comarca	Panama City, Street Mall, B-Terra Office No. 522	General Chieftain
October 25, 2022	Socialization workshop	Manuel Ortega District	Corozal
October 26, 2022	Extraordinary minutes of the Board of Directors of Cémaco and the Regional Chief of Cémaco	Official headquarters of the Emberá Wounaan General Congress	Salto de Chucunaque
October 25 and 26, 2022	Information forum and resolution of current concerns regarding B-Terra in communities.	Río Sábalo District	Puerto Indio Community (Sambú); Corozal, Lajas Blancas, and Baja Puru Communities (Cémaco)
November 11, 2022	Meeting with General Congress, Regional Congresses of Cémaco and Sambú, and Nokora Council	Panama City, Hotel Costa Inn	Legal Representatives of the Emberá District
November 22, 2022	Project socialization with General Congress Board	Panama City, Street Mall, B-Terra Office No. 522	General Congress Board

Date	Topic	Location	Community
November 24 and 25, 2022	Regional Congress of Sambú	Río Sábalo District	Puerto Indio
December 5, 2022	General Congress	Panama City, Sky Park Building	General Congress Board
December 16 and 17, 2022	Regional Congress of Cémaco	Cémaco District	Lajas Blancas Community

Source: CO2CERO S.A.S., 2022.

10.2 Stablishment of agreements

Once socialized with the legal representatives of each community in the two districts, a deadline is granted for the Nokora Councils, General Congress Board, Comarca Authorities, and General Chieftain to deliberate on the possibility of establishing a REDD+ project model in their territory, taking into account the factors of positive and negative impacts that may arise. In this way, an approach is made to ratify: firstly, the related concepts associated with the project, followed by profiling the development possibilities, and lastly, the decision made by both the communities in general and the legal representatives of Cémaco and Sambú.

It is worth mentioning that the agreement is a contractual model that commits the communities and associated developers in the different phases of diagnosis, design, execution, evaluation, and monitoring of the project development. Likewise, the managing partner is the guarantor figure of the process, where a joint and collective work is carried out supported by technical teams from the social and environmental axes, whose results mostly depend on the performance of the communities in the execution of alternative and sustainable activities capable of reducing emissions from deforestation and degradation.

Ilustration 2. Establishment of agreements with decision-makers' representatives of the Comarca.

Source: B-Terra Corp, 2021.

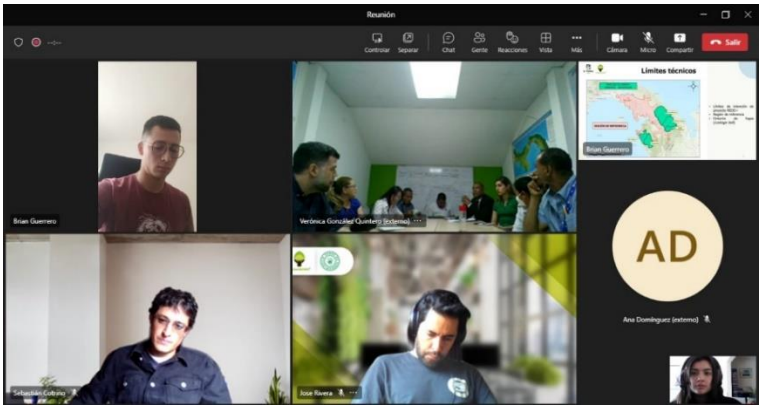
Additionally, the agreement outlines the basis for benefit distribution mechanisms, commitments, and responsibilities of the parties, ensuring adherence to principles of equality, gender equity, and inclusion as per the UN. Likewise, it is stated and confirmed that the ownership of the reduced greenhouse gas emissions is the responsibility of all involved communities (Refer to "1_Acuerdos\Acuerdo comunidad\Contrato_B Terra_Emberá.pdf").

10.3 Socialization to environmental authorities

Taking into account the importance of the functionality of environmental authorities within the territory and at the national level, they are considered a fundamental external actor for the project's execution. Therefore, the objectives of the government and regulatory

entities regarding the REDD+ initiative are taken into account to unify goals and design activities in accordance with the normative, legal, social, cultural, economic, and environmental framework of ethnic communities. The development of socializations with environmental authorities is aimed at providing educational insights into the project (objectives, scope, potential benefits, and project activities). Additionally, it aims to establish channels and communication ties between institution actors and project stakeholders to create a conducive context across various dimensions involved in the initiative (legal, regulatory, social, cultural, and economic).

Ilustration 3. Socialization conducted with the Ministry of Environment of Panama.



Source: CO2CERO S.A.S., 2023.

10.4 Scope of consultation with stakeholders

Once all phases of socialization and information transfer have been completed, the aim is to ensure transparent and precise information to the community. This allows them to understand the commitment and responsibility acquired through involvement in REDD+ projects and the consequent implementation of activities associated with reducing deforestation and forest degradation. The second scope is to provide external stakeholders with information that allows them to validate and verify that the initiative complies with the guidelines set by the UNFCCC, certification standards, and related national strategies, thus aligning objectives across different national normative and planning instruments. Finally, it aims to reaffirm that the initiative falls within the framework of compliance with the Cancun safeguards, with free, prior, and informed consent being the fundamental pillar of engagement and activity execution with rural communities.

Within this project, it is possible to identify annexes related to assistance in various engagement spaces, photographic reports, and assembly minutes for events involving multiple stakeholders. There are also contractual documents that ratify decisions made in different consultation spaces with results oriented towards the execution of the initiative (Refer to "11_Anexos y complementarios\1_Asistencia").

10.5 Summary of comments received

According to the social management conducted by B-Terra Corp, during the stages of socialization and project consolidation of REDD+ Emberá Wounaan, concerns were identified from the community regarding technical, social, and economic issues. Based on the description provided, the following pathway shows the questions asked by the community and the responses provided by B-Terra Corp. Refer to "11_Anexos complementarios\6_Anexo_Consolidado de preguntas_ProyectoREDD+.pdf".

10.6 Consideration of comments received

With the commitment to be an effective communication channel between external parties to the Emberá Wounaan Comarca during the initiative's development process and its inhabitants; within these communications and reaffirming the ownership of the initiative by the districts, they have the possibility to request explanation and accountability spaces at any time and according to their needs. The latter, mandatory, will be conducted at least once a year. Likewise, the consent records signed by the communities belonging to the Emberá Wounaan Comarca, indicating acceptance of the project, are described in "1_Acuerdos\01_Acuerdo comunidad". Additionally, a virtual PQRS (Petitions, Complaints, Requests, Suggestions) mechanism via email at PQRS.REDD@CO2CERO.CO is being developed in the development phase, which will be directly managed by CO2CERO S.A.S. Finally, it should be noted that these mechanisms must complete the development phase before being disseminated and approved through the participation and consensus of the entire comarca before starting the implementation process.

11 REDD+ Safeguards

Panama has presented its first summary of safeguards information for REDD+ in the year 2022, covering an assessment period from 2009 to 2021. Among the necessary elements to integrate into the current project is the national interpretation of safeguards that seeks to relate the nation's current situation and its actions oriented towards REDD+ with the proposed Socioenvironmental Safeguards of the UNFCCC. Thus, the evaluation for this project is based on what is indicated by MiAmbiente in its national interpretation of safeguards and its applicability to the project scale, as well as its correspondence with the tools of the certification program.

To demonstrate compliance with the Cancun Safeguards, the methodology suggested in the Tool for demonstrating compliance with REDD+ safeguards from the Biocarbon Registry version 1.1 was developed. This can be found in "AUD_VV_2022\11_Anexos y complementarios/4_Herramienta de Salvaguardas_REDD+ Emberá Wounaan_V4", where compliance with the requirements for each safeguard during the design, structuring, and implementation of the REDD+ Emberá Wounaan project and its activities is evidenced.

Within this tool, compliance with the safeguards is identified according to the twelve (12) requirements set forth by the Biocarbon Registry. These are supported by the request for evidence of compliance and its corresponding justification. The evidence is distributed through the different inputs used and generated for the initiative, thus delineating specific routes within the project folder.

With reference to the above, it is justified that the analysis of complementarity and compatibility was addressed as one of the requirements set forth by the Tool for demonstrating compliance with REDD+ safeguards version 1.1 proposed by BioCarbon Registry, taking into account the legal compliance analysis conducted (see "AUD_VV_2022\09_Legislación ambiental\1_MatrizLegalAmbiental_REDD+EmberaWounaan_V1.xlsx"). In this case, laws, decrees, or policies that align with forest management in the Republic of Panama and those referencing climate change mitigation initiatives or strategies were selected. Based on this, complementarity justifies how the project development aligns with the strategic principles of the analyzed regulations, while compatibility analysis accredits how the project activities promote compatibility and avoid contradicting national government provisions.

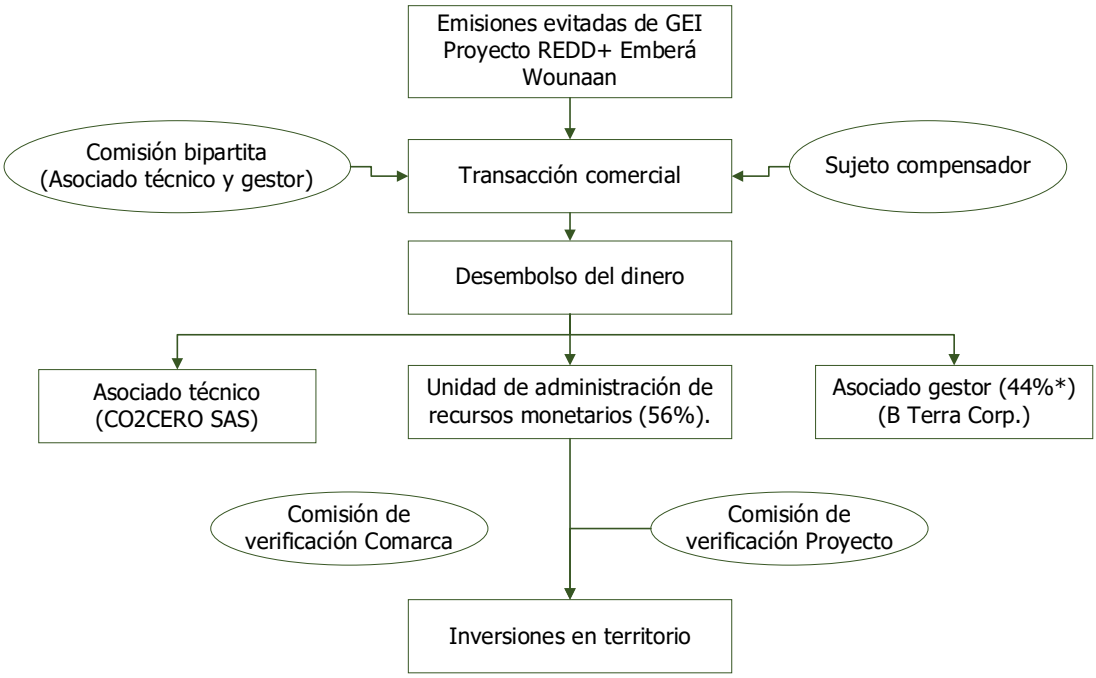
It is important to highlight an element specific to Safeguard C: Respect for traditional knowledge and rights of social and cultural communities, corresponding to benefit distribution. Mechanisms ensuring fair and equitable distribution of results obtained by the project and its respective actions to reduce deforestation and degradation must be considered. The REDD+ Emberá Wounaan project consolidates the Benefit Distribution Annex tool, which presents the legal foundations supporting resource management and allocation processes within the territory, identified beneficiaries, and the classification of the type of benefit to be acquired. These are fundamental aspects for identifying the most appropriate distribution methods.

Additionally, at the project level and in conjunction with its stakeholders, a scheme has been consolidated describing the process for disbursement, the percentage distribution for each of the involved actors (technical associate, managing associate, and Comarca represented by the monetary administration unit), and the application of investments within the territory due to the commercialization of carbon credits generated within the

comarca limits (Refer to document "AUD_VV_2022\11_Anexos y complementarios\5_Anexo_DistribuciónBeneficios_V3.pdf\Figura 1. Esquema de transacción de beneficios monetarios del proyecto"). Within this, a Monetary Resource Administration Unit is considered, for the present verification period corresponding to ASSETS TRUST & Corporate Services Inc (Refer to document "AUD_VV_2022\11_Anexos y complementarios\9_IntenciónServicios_Fiduciaria_EmberaWounaan.pdf"), and two verification commissions: one composed of comarcanos who, through their internal processes, define the relevance of the investments to be managed, and a project verification commission including delegates from the technical team, who will contrast the investments presented by the Emberá Wounaan Comarca with the project's strategic lines.

The 44% allocation for the managing associate according to the contract entered into in the Comarca will recognize their management actions to achieve the project in its social, financial, and administrative aspects. This includes the initial investment applied to consolidate agreements and commitments, necessary approaches to address important implementation factors, and recognition of the technical associate's work as a documentation structurer, quantifier, monitor, and analyzer of related and necessary information to present the initiative to different evaluation levels and achieve carbon credit certification. The remaining 56% constitutes the project owner's own income and sustains the implementation of designed REDD+ activities (See **Figure 4**).

Figure 4. Scheme of Monetary Benefits Transaction of the Project.



Source: CO2CERO S.A.S., 2023.

12 Grouped Projects

REDD+ Emberá Wounaan Project is not a grouped project.

13 Implementation of the project

13.1 Implementation status of the project

Below, the contributions generated by the project in the different defined investment lines are described. The indicators for measuring their implementation to date are presented in "AUD_VV_2022\2_Cobeneficios\3_Actividades REDD+\ActividadesREDD+_Emberá Wounaan_V2.xlsx" and "AUD_VV_2022\2_Cobeneficios\3_Actividades REDD+\SoporteActividades".

13.1.1 Governance and administration

One of the relevant actions to be carried out for the project is capacity building, serving as a tool to introduce knowledge at the community level that strengthens the self-management of the initiative over time. Understanding concepts such as project management, finance, and resource administration are crucial to achieving the success

of REDD+ activities and their positive, inclusive, and equitable impact at the community level. Administrative roles within the Emberá Wounaan Comarca have been primarily trained, ensuring that the understanding of the content is effective and can be correctly transferred to the community in subsequent socialization exercises. Similarly, the project has accompanied processes for defining governance structures, primarily the election of territorial authorities within the framework of the community development plan (Refer to folder "AUD_VV_2022\2_Cobeneficios\Soportes Actividades\1.1 Gobierno y administración").

Ilustration 4. Engagement with the Ministry of Environment of Panama.

Source: B-Terra Corp, 2022.

13.1.2 Transparency and participation

Ensuring the full and effective participation of community members in line with their socio-environmental safeguards, the project has facilitated consultation meetings and decision-making processes regarding greenhouse gas mitigation initiatives. These meetings have included general consultations, the definition of memoranda of understanding, mechanisms for resolving doubts, and regional congresses for the districts of Cémaco and Sambú. Additionally, key roles within indigenous authorities have been involved in capacity-building processes, ensuring an initial avenue for the dissemination of knowledge related to good leadership practices within the community.

It is crucial that leaders and officials are the first to acquire this knowledge and apply it in the execution of their administrative duties.

Ilustration 5. Processes for the election of territorial authorities in the district of Cémaco.

Source: CO2CERO S.A.S., 2022.

13.1.3 Planning and foresight

A fundamental factor for ensuring a project's long-term sustainability and fostering a sense of belonging within the community is aligning its pillars with the normative and planning frameworks at various levels of influence (national, regional, and local), while respecting indigenous tradition and autonomy. Therefore, it is essential to recognize the planning tools currently in use within the community. This recognition, coupled with insights provided by the community, highlights the need to strengthen these tools, ultimately leading to updated models that accurately identify the population's real needs and incorporate their current intentions. In this way, the REDD+ Emberá Wounaan project is contributing to the development of the Emberá Wounaan Comarca's Strategic Plan for 2022-2027, which involves updating its existing planning tools (internal regulations, resource management standards, etc.) (See "AUD_VV_2022\2_Cobeneficios\Soportes Actividades\2.1 Planeación y prospectiva").

Ilustration 6. Work teams to build the 2022-2027 Strategic Plan.

Source: B-Terra Corp, 2022.

In the preservation of ancestral knowledge, canoes constitute the most important mode of transportation for the Emberá Wounaan indigenous communities, established ancestrally as the only means capable of meeting needs in the mobility of goods, people, health supplies, among others. With the aim of conserving cultural and ancestral tools at the Comarca level, integrated with forest protection, an annual canoe competition has been created. This competition recognizes, at the family level, the value attributed to the canoe, from the proper selection of individuals for its utilization, the compensation for felled trees, to the care provided to them throughout the year. This strategy aims to ensure the extended use of timber resources while reinforcing cultural values, teamwork, equity, and community ownership. The event is part of the commemoration of the delivery of Comarcal lands with Law 22 of 1983, and participants are required to wear their traditional attire during the competition.

Ilustration 7. Canoe competition held in the Río Tuira sector, developed since 2016 during the first half of January until the present date.

Source: B-Terra Corp, 2018.

From the perspective of community health and well-being, the REDD+ Emberá Wounaan project has also contributed to improving the necessary implements to ensure a good quality of life in the territory. Among these, mechanisms for strengthening teamwork, promoting healthy attitudes, and fostering sportsmanship at the community level have been highlighted. Additionally, it reduces the infiltration of inappropriate habits adopted from external agents with cultural differences. The project encourages sports competitions in soccer and basketball for various members of the community, both men and women.

Ilustration 8. Sports teams for males and females from the Emberá Wounaan Comarca in the years 2018 and 2022.

Source: B-Terra Corp, 2021.

The initiative has fostered equity and cohesion at the community level by including youth populations, improving inter-community communication through the integration of groups from other regions in sports events. Similarly, the fundamental objective is to instill concepts of leadership, healthy competition, and strengthening the dimension of being, aiming to expand the capacity for knowledge acquisition and local-regional benefit appropriation. Ultimately, job opportunities will be created around physical development and sports within the community, reducing activities that require forest exploitation and its resources.

Ilustration 9. Improvement of sports equipment for the community by B-Terra Corp and the Panama Canal Life Foundation in the years 2021 and 2022.

Source: B-Terra Corp, 2021.

Additionally, the water supply conditions in the communities of Puente, Unión Chocó, and Vista Alegre have been improved, optimizing the use of natural resources and reducing the need for Comarcanos to traverse the forest in search of water sources. This also engages the communities in territorial activities linked to conservation, restoration, and sustainable management (see **Ilustration 10**).

Ilustration 10. Support for infrastructure and economic activities in the communities of Puente, Unión Chocó, and Vista Alegre.

Source: B-Terra Corp, 2021.

Within the community's needs, the importance of improving communal areas, tools, and working conditions, as well as covering basic service needs such as water supply and sanitation, has been highlighted. By improving these conditions, with the help of the Panama Canal Life Foundation and B Terra Corp., it was possible to make some adjustments to communal spaces such as Chingue Buche (Meeting House of the General Congress) in the community of Unión Chocó (See **Ilustration 11**) reducing the use of wood for infrastructure reconstruction within the communities, which is one of the main factors contributing to deforestation.

Ilustration 11. Community within Chingue Buche Improved.

Source: B-Terra Corp, 2021.

Finally, diagnosing the situation related to the provision and availability of basic services, sanitation, and well-being is a fundamental input to guide community development and the creation of strategies for personal and group development, understanding basic needs as a mandatory link to address other project objectives. In this regard, the REDD+ Emberá Wounaan project has designed a survey to assess the state of provision of basic services and population dynamics, providing information that will contribute to identifying future changes after the implementation of actions in the territory. The collected information includes personal and family aspects, the status of existing services in the community, problems related to basic needs within the community, and perceptions about biodiversity. You can find more details in the folder AUD_VV_2022\2_Cobeneficios\Soportes Actividades\2.1 Planeación y prospectiva\2.1.3 Evaluación del estado de servicios.pdf.

13.1.4 Leakage monitoring

The monitoring of areas experiencing deforestation and degradation during the reference period (2008 – 2018) was conducted according to the delineation of the leakage belt within the REDD+ Emberá Wounaan project area. Subsequently, the avoided emissions in the Ex-Ante scenario due to deforestation (EfdefM) and degradation (EfdegM) were calculated, taking into account the deforestation and degradation rates identified in the baseline scenario during the reference period and the forest cover in the project's starting year (2018). It was assumed that there would be a linear trend over the 30-year duration of the initiative.

13.1.5 Non permanence risk monitoring

For the current project, an analysis of implementation risks is conducted across its various activity phases. In AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\8. Risk management, the method used to

assess the identified effects during the initiative's execution in the environmental, social, and financial realms is presented, utilizing the permanence risk management tool consolidated by BioCarbon Registry in its version 1.0. **Table 30** lists the risks identified by some stakeholders within the Emberá Wounaan Comarca and also by some experts knowledgeable about the forest reality in Panama and, more specifically, in the Darién region. Additionally, the level of control, impact level, and proposed mitigation strategy for each risk are established.

As mentioned earlier, risks were considered following impact and control criteria, specifying the following:

According to the level of control that the comarcal authorities and their project advisors have over each potential or present risk:

a. It's within their control area (mitigation mechanisms exist or can be created).

b. It's within their influence area (no direct control, but influence can be exerted on those who have it).

c. It's not within the influence area (there's no way to control or influence the causes of the risks).

According to the level of environmental or social impact of the activity's risk:

a. High impact.

b. Moderate impact.

c. Low impact.

Additionally, it is important to note that risk identification was carried out through the consultation of secondary information and the collection of primary information in collaboration with the community. In this process, reference historical documents such as "The Main Environmental Problems of Panama" issued by the Ministry of Environment of the Republic of Panama, as well as documents related to the development and management of indigenous communities in the country, were consulted. Furthermore, it is important to highlight the work carried out by the managing partner, B-Terra Corp, who advised the Emberá Wounaan Comarca in the construction of the Strategic Plan for Emberá Wounaan 2022-2027, where a participatory diagnosis was conducted to identify the main strengths, opportunities, weaknesses, and threats of the community. See "AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf" and "AUD_VV_2022\11_Anexos y

complementarios\1_Asistencia\Sesiones_Lideres_Encargados_17 11 2022.pdf" for more details.

Table 30. Risk factor management strategies and reversal and non-permanence risks.

Risks	Control	Impact	Strategies	Risks Origin
Environmental				
Hurricanes and floods	c	B	- Implement early warning communication mechanisms during tropical storm and hurricane seasons to minimize their impact on communities. - Coordinate with relevant national and international agencies to provide early and necessary assistance for repairing damages.	The rise in sea level, strong winds, floods, droughts, soil erosion, and earthquakes are also common threats affecting coastal areas of Panama. Thus, among the most common threats, we have gusts of wind, floods, high tides, and landslides. (MiAmbiente, 2022). Additionally, it is observed that inadequate solid waste management causes ocean pollution, obstruction of drainage systems, floods, facilitates disease transmission, increases respiratory conditions due to burning, harms animals consuming waste, causes visual pollution, and affects economic development. ((MiAmbiente, 2022).
Forest fires	a	A	- Eradicate burning as a mechanism for establishing cultivation zones. - Implement early warning mechanisms for wildfires and their suppression.	The majority of agricultural land use expansion occurs through the conversion of forested areas. Consequently, this transformation causes the destruction and degradation of forests, loss of biodiversity of flora and fauna, soil erosion and degradation, sedimentation of water bodies, landscape degradation, and other significant effects.

Risks	Control	Impact	Strategies	Risks Origin
				(MiAmbiente, 2022). Additionally, at a national level, it has been identified that anthropogenic burning of vegetation and solid waste generates the negative environmental effects mentioned earlier, which can also occur naturally. Therefore, these issues are grouped at the project level under the category of forest fires.
Limited knowledge of sustainable forest management within the Comarca.	a	A	Training in sustainable forest management in all communities.	Environmental education of the population was considered in the study conducted by MiAmbiente (2022), The most relevant external and underlying problem. Actually, the problem is not the lack of environmental education but its effectiveness in generating changes in citizens. The institutional context in the Panamanian public sector lacks the appropriate and sufficient instruments and capacities for its implementation. Consequently, unplanned economic growth, inadequate land occupation and use management, and pressure from anthropogenic activities have generated negative impacts on natural resources such as deforestation and increased emissions. (MiAmbiente, 2022).
Inappropriate land use.	a	A	-Training in sustainable forest management. -Establishment of community forest enterprises.	ForestalIn Panama, agricultural and livestock activities have the greatest impact on changes in land use. Based on forest cover data from 2000 to 2012, we can estimate that the agricultural and livestock area increased by approximately 130,715 hectares during that period. The

Risks	Control	Impact	Strategies	Risks Origin
				majority of this land use expansion occurs through the conversion of forested areas (MiAmbiente, 2022). Additionally, for the development of an indicative territorial planning plan, it is found that within the institutional context, the Panamanian public sector lacks the appropriate and sufficient instruments and capacities for its implementation. Consequently, unplanned economic growth, inadequate management of land occupation and use, and the pressure of anthropogenic activities have generated negative impacts on natural resources such as deforestation and increased emissions. (MiAmbiente, 2022).
Pressure from private logging companies on forest resources.	b	B	Strengthen existing negotiation mechanisms with private logging companies based on terms agreed upon by Comarcal authorities.	Within the development of the Strategic Plan 2022-2027, threats have been identified regarding the pressure from third parties on natural resources, leading to illegal logging and poaching, as well as the presence of intermediaries in the distribution chain. Additionally, primary forests are being logged and replaced by tecal forests. In the Darién region, 21.62% of intervened forests have been replaced by plantations, along with 1.44% of mixed cativo and 0.54% of homogeneous cativo since the enactment of the Incentives Law (Law No. 24 of 1992). (Carrera et al, 2021). Some tribal chiefs have granted "concessions" to logging companies to

Risks	Control	Impact	Strategies	Risks Origin
				extract cocobolo wood. (Bech, A, 2014). According to official data provided by the Ministry of Environment (2017), among the provinces with the highest utilization of timber from plantations during the years 2016 and 2017, Darién stands out. (Carrera et al, 2021). Supports in: *AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf*
Illegal loggin	a	B	- Strengthen monitoring, detection, and reporting mechanisms for illegal logging. - Encourage forest conservation in the Comarca by increasing employment alternatives.	The lack of control and supervision mechanisms over natural resources within the Emberá Comarca facilitates illegal logging and trafficking of wild animals for commercialization to third parties. (COONAPIP, 2009). Roads continue to be opened to transport heavy machinery into the forest for logging purposes. Subsequently, the timber is sold, and the land is cleared by burning to make space for cattle ranching. (Bilbao, 2019). Deforestation, since 1972, has been driven by restrictions in both international and national markets, which demand only a small number of species from heterogeneous forests. Specifically, only 15 out of the 300 species identified by the national inventory conducted by FAO are in demand. Moreover, selective mechanized extraction in the Darién was focused on species such as mahogany, cedar, and oak. Starting in

Risks	Control	Impact	Strategies	Risks Origin
				1955, exploitation of "cativo" (Prioria copaifera) began, contributing to 75% of the timber exported from the Darién. (FAO, 1972).
Tendency towards scams related to carbon markets.	a	C	- Detailed training for Comarcal authorities on topics related to carbon markets. - Establishment of mechanisms to evaluate any offers related to carbon markets. - Prompt and public reporting to competent authorities (national and/or international).	Within the development of the Strategic Plan 2022-2027, a threat has been identified stemming from scammers seeking to take advantage of the current situation in the Comarcas, which could result in scams in the carbon market. Supports in: *AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf*
Impact on vulnerable or endangered species (terrestrial or aquatic) according to the IUCN within the area of the Comarca.	a	C	- Conduct an inventory of vulnerable or endangered species according to studies conducted by the IUCN. - Establish regulation protocols regarding utilization and commercialization to protect the identified species.	The majority of agricultural land use expansion occurs through the conversion of forested areas. Consequently, this transformation causes the destruction and degradation of forests, loss of biodiversity of flora and fauna, soil erosion and degradation, sedimentation of water bodies, landscape degradation, and other significant effects. (MiAmbiente, 2022).
Insufficient access routes to transport	b	C	Planning, construction, and maintenance of access roads for strictly agroforestry purposes, according to	It is evident that one of the environmental issues at both national and local levels is the difficulties in accessing

Risks	Control	Impact	Strategies	Risks Origin
forestry and agricultural production to consumers.			ecological standards, with the participation of workers from the Comarca.	external markets (access roads). Additionally, roads continue to be opened to transport heavy machinery into the forest for logging purposes. Subsequently, the timber is sold, and the land is cleared by burning to make space for cattle ranching. (Bilbao, 2019). Supports in: *AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf*
Contamination of soils and water sources with anthropogenic waste.	b	C	Monitoring, planning, and maintenance of aqueduct systems in all communities, with the participation of workers from the Comarca.	Domestic wastewater refers to those originating from residential areas and other establishments, primarily generated by human metabolism and domestic activities. Inadequate management of solid waste leads to ocean pollution, drainage obstruction, floods, disease transmission, increased respiratory ailments due to burning, harm to animals consuming waste, visual pollution, and economic development impairment. (MiAmbiente, 2022). This environmental issue has identified that indigenous territories lack a formalized public service infrastructure. (MiAmbiente, 2022), Leaving the community exposed to the various negative effects mentioned earlier and increasing pollution in the environment.

Risks	Control	Impact	Strategies	Risks Origin
Increase in the construction of unsustainable housing and the existence of traditional homes in poor conditions.	a	B	Inventory and maintenance of dignified, environmentally friendly homes in line with the Emberá Wounaan lifestyle.	The conversion of agricultural and forested land to urban uses and infrastructure development occurs on a smaller scale but affects the potential for food production and public resource use, such as the deterioration of beaches. (MiAmbiente, 2022). Additionally, it is found that unsustainable housing leads to poor disposal of domestic wastewater.
Social				
Abandonment of forestry enterprises due to low productivity.	a	B	Ongoing training in forest management tools and business management, administration, human capital management, finance, cost management, distribution chains, customer service, among others.	The indigenous peoples of the world face various national, local, and community challenges due to a dehumanizing global economy, compounded by little practical governmental support. In this regard, many of us continue to live in invisibility and in conditions of marginalization within national and regional development plans. (Leonidez Cunampia-Cacique general Emberá Wounaan, 2022) Evidence see in: AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf"

Risks	Control	Impact	Strategies	Risks Origin
				Supports see in: AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados_17 11 2022.pdf"
Incursion of armed groups or drug traffickers, as well as transit immigrants, within the boundaries of the Comarca.	b	C	Maintenance and strengthening of National Defense authorities in the border area with Colombia to ensure physical integrity and the right to life.	Despite being the province with the lowest crime rate, between 2009 and the first semester of 2010, the homicide rate per 100,000 inhabitants increased in Darién from 6.6 to 23.9. At the national level, the rate rose in 2009 to 23.7 per 100,000 inhabitants from a rate of 19.3 in 2005, representing an increase of 4.4 points during the analysis period of this report. (USAID, 2011). Evidence sees in: AUD_VV_2022\11_Anexos y complementarios\4_NNH\02_Socioeconomic aspect
Loss of cultural identity, the worldview of ancestors, their history and knowledge about the forest, their language, and traditions.	a	A	Continuous dialogue with national authorities to incorporate content related to indigenous cultures, traditions, histories, and aspirations into formal educational and social programs. This content would be delivered by community-trained teachers in Human Activation and various areas of Emberá Wounaan knowledge.	The indigenous peoples of the world face various national, local, and community challenges due to a dehumanizing global economy, compounded by little practical governmental support. In this regard, many of us continue to live in invisibility and in conditions of marginalization within national and regional development plans. However, collective leadership has proven to be an effective tool for addressing the various barriers that prevent our just aspiration for cultural, social, and economic development within the context of

Risks	Control	Impact	Strategies	Risks Origin
				our territories, the environment surrounding us, and our ancestral desire to live in harmony with it. (Leonidez Cunampia-Cacique general Emberá Wounaa, 2022) Evidence see in: AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf" and "AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados_17 11 2022.pdf"
Disrespect for the dignity and cultural diversity inherent in being Emberá Wounaan.	b	A	Constant dialogue with national authorities to incorporate content related to indigenous cultures, their traditions and histories, and their aspirations into formal educational and social programs.	The demands and social conflicts in communities awaiting the recognition of their territories. Among these conflicts, we can highlight: 1. Indigenous territories are not respected by various non-indigenous actors, and there is an alarming process of invasion of indigenous territories (titled or under claim) by these non-indigenous actors. (CEPAL, 2006) There is a strong presence of extractive companies in indigenous territories with licenses from the State, but without the consent of traditional authorities and communities. (CEPAL, 2006).

Risks	Control	Impact	Strategies	Risks Origin
				Evidence see in: AUD_VV_2022\11_Anexos y complementarios\4_NNH\02_Socioeconomic aspecto
Self-rejection of indigenous identity and culture.	a	A	- Permanent motivation towards self-discovery, self-awareness, self-image, self-respect, and self-esteem. - Incorporation of the Emberá Wounaan Comarca Strategic Life Plan 2022-2052.	The indigenous peoples of the world face various national, local, and community challenges due to a dehumanizing global economy, compounded by little practical governmental support. In this regard, many of us continue to live in invisibility and in conditions of marginalization within national and regional development plans. However, collective leadership has proven to be an effective tool for addressing the various barriers that prevent our just aspiration for cultural, social, and economic development within the context of our territories, the environment surrounding us, and our ancestral desire to live in harmony with it. (Leonidez Cunampia-Cacique general Emberá Wounaan, 2022) Evidence see in: AUD_VV_2022\11_Anexos y complementarios\13_Plan estratégico Emberá Wounaan 2022-2027.pdf" Supports see in: AUD_VV_2022\11_Anexos y complementarios\1_Asistencia\Sesiones_Lideres_Encargados_17 11 2022.pdf"

Risks	Control	Impact	Strategies	Risks Origin
Non-inclusion of women, youth, and children in project activities.	a	B	Training women, youth, and children in their potentialities to enable them to actively participate in all relevant project activities.	The loss of culture has become evident among the new generations, who show little interest in ethnic practices. These facts raise concerns about the transfer of holistic worldviews and towards an ethnic loss. (Velásquez, 2012). Previous studies have highlighted that in many indigenous communities, women have "a leading role in making decisions about important aspects of their societies, such as health, care, and education of children, adults, and elders, spiritual ceremonies and rituals that restore community harmony, knowledge transfer between generations, as well as agricultural tasks, crops, water management, and other natural resources, family feeding, among other areas. (PNUD, undp.org, 2016) Evidence see in: AUD_VV_2022\11_Anexos y complementarios\4_NNH\02_Socioeconomic aspect

Risks	Control	Impact	Strategies	Risks Origin
Exposure to future pandemics that threaten the health of the inhabitants of the Comarca.	c	B	- Systematization of disease prevention practices and their treatment using the ancestral medicine provided by the forest, known by the elders and shamans. - Continuous dialogue for the active presence of the Ministry of Health regarding infrastructure, medical personnel, and supplies.	The traditional territories of indigenous peoples face greater deprivation in access to sanitation, leading to an additional burden of unpaid work for indigenous women and girls and exposing them to a higher risk of contagion. Precisely in the municipalities where the indigenous population predominates, which encompass those territories either wholly or partially, situations of greater vulnerability are recorded. Although the non-indigenous population there also finds itself in a more disadvantaged situation than in other municipalities, gaps persist to the detriment of the indigenous population. (Agudo, 2022) Evidence see in: AUD_VV_2022\11_Anexos y complementarios\4_NNH\02_Socioeconomic aspect
Financial				
Exclusion of national bank credits for forestry companies	c	A	- A reasoned request to the Superintendence of Banks based on the equality of indigenous peoples and individuals compared to the rest of Panamanians.	On February 8, 2021, the Legislative Branch of Panama approved the Special Regime for the Establishment of Operators and Developers of Agro-parks, Law 196, resulting in impacts on indigenous legislations (IWGIA, 2022). The Law 72 on Collective Lands has not had, to date, adequate implementation due to lack of political will

Risks	Control	Impact	Strategies	Risks Origin
due to the collective land tenure condition			- Seeking resources from international organizations willing to respect land tenure and our commitment to Mother Earth.	and economic resources, despite its regulation through Decree 223 of June 29, 2010 (National Development Plan, 2020).
Possible losses in the value of carbon credits generated by the project due to market fluctuations.	c	A	-Establish marketing strategies for the carbon credits generated by the project at both national and international levels. -Create market value, emphasizing on work and technical and social management. -Conduct a market study to develop offerings according to demand	According to the dynamics of carbon credit values observed over the last 6 months, there has been a downward trend in prices. This trend is attributed to national-level publicity highlighting misuse and mismanagement of resources derived from the sale of projects from the AFOLU sector, such as REDD+ projects. This publicity mentions the harm caused to indigenous and Afro-Colombian communities and their territories, affecting governance, participation, and decision-making processes According to a study by science, most carbon offset programs significantly overestimate the levels of deforestation they prevent. This means that many of the "carbon credits" purchased by companies to offset emissions are not linked to forest preservation in the real world as claimed. (tiempo, 2023)
Operational risk due to human errors, inadequate or faulty internal processes,	a/c	C	- Monitoring organizational operations of companies, both technically associated and managerial, to prevent this risk.	Much of this information should be actively published by those who have it, without those seeking it needing to make a request. This is because several of the involved parties, especially indigenous peoples, are less likely to

Risks	Control	Impact	Strategies	Risks Origin
system failures, and as a result of external events.			- Conducting the accountability process within established timelines to verify progress in project activities. - Continuous improvement of internal processes within each company and the communities belonging to the Comarca.	use mechanisms that require information requests. Information should be provided regularly since sporadic workshops, for example, are not sufficient to generate real participation, transparency, or consent. (ONU REDD, 2013) See in: AUD_VV_2022\02_Cobeneficios\3_Actividades REDD+
Reversion				
Nationalization of carbon credits.	b	A	- Consolidation of measures to protect projects already executed prior to the implementation of new measures. - Creation of a carbon stakeholders association to guide the process of carbon credit nationalization. - Designing a regulatory system capable of protecting the fair, competitive, and equitable distribution of goods obtained within the national market.	The inadequate management of economic resources can translate into a risk that negatively affects the communities involved in the project due to deviations and improper execution of the benefits received by the project. In recent years, technical studies have been conducted worldwide to ensure that the benefits associated with the implementation of REDD+ projects are aligned with reality and to avoid overestimation of credits, as well as improper management of benefits by communities. In order to prevent these situations, national governments in Latin America and the Caribbean have made decisive decisions by granting the state full authority to develop REDD+ initiatives, as is the case with Ecuador and Costa Rica. Through their forest governance and land use policies, they take charge of managing and monitoring these initiatives by creating
Restricción normativa para la ejecución de proyectos REDD+ con privados.	b	A	- Implementación de proyectos a través de buenas prácticas y cumplimiento de los derechos de las comunidades involucradas.	

Risks	Control	Impact	Strategies	Risks Origin
			- Demostración de beneficios comunitarios ante las entidades competentes para la reorientación de restricciones a actores privados.	carbon taxes and international financing funds.)(Ministerio de Ambiente del Ecuador, 2016) (Ministerio de Ambiente y Energía, 2016)
Increase in deforestation rates.	a	A	The strategies you've outlined are essential for addressing deforestation effectively and promoting sustainable forest management. By implementing activities focused on REDD+ (Reducing Emissions from Deforestation and Forest Degradation), communities can receive incentives for conserving forests and biodiversity. Additionally, institutionalizing good practices and regulations within communities can help ensure the long-term sustainability of forest resources. Early warning systems for deforestation and degradation can enable timely intervention to prevent further loss of forest cover. Overall, these measures contribute to conserving forests, protecting biodiversity, and mitigating climate change while supporting the well-being of local communities.	According to the ex-ante analysis of the Emberá Wounaan REDD+ project, it is evident that in the scenario without the project, the areas lost due to forest deforestation increase from 552.47 to 1,348.78 ha from 2018 to 2019, as a result of the identification of deforestation agents in the project area (cattle ranching, agriculture and forest harvesting). In addition, according to the document "Principales problemáticas de la República de Panamá" issued by MiAmbiente, a loss of forest cover has been identified since 2012 at an average of 8,618 ha per year (MiAmbiente, 2022).
Cancellation of the contract by the Shire .	a	A	- Guarantee of compliance by the parties involved with the contractual premises agreed upon. - Execution of transparent processes, known by the comarca and suitable to its level of understanding.	It is imperative in agreements managed between two or more parties that there are risks of force majeure that prevent the execution of the responsibilities established in the contractual agreements, such as national legal provisions, the impossibility of carrying out activities, or

Risks	Control	Impact	Strategies	Risks Origin
			- Ratification of the contractual figures established between the parties. - Ongoing socialization of the performance achieved by the project and the proposed REDD+ activities.	possible extreme events of social or environmental origin. To prevent these risks, according to the terms established in the binding contracts, possible causes for the suspension of contracts are presented along with the mechanisms that must be taken in terms of communicating the cessation of activities. Supports see in: "AUD_VV_2022\01_Acuerdos\02_Acuerdos empresas\Contrato_BTerra-CO2CERO.pdf" y "AUD_VV_2022\01_Acuerdos\01_Acuerdo comunidad\Acuerdo entendimiento B Terra - Comarca.pdf"
"Non-compliance with contractual terms by the parties involved."	b	B	- Monitoring and control of the activities carried out by the parties. - Confirmation of responsibilities and duties contractually established between the parties. - Application of penalty clauses and economic measures in case of non-compliance with responsibilities and duties by the parties.	
Depreciation of carbon credits.	c	B	- Establishment of fixed-price contracts. - Guarantees of flexibility in the price of credits in the face of complex market dynamics. - Consolidation of projects with social, climate and environmental value, reflecting a favorable price.	Durante the last 6 months, there has been a downward trend in the price of carbon credits from the AFOLU sector under REDD+ initiatives due to the public scrutiny to which projects have been exposed in terms of overestimation of emission reductions and distribution of benefits with Afro-descendant and indigenous communities, who are the owners of the forests where the projects take place and who have expressed, in some cases, not receiving the promised economic benefits after completing the project stages. Taking the

Risks	Control	Impact	Strategies	Risks Origin
				above into account and according to market price statistics provided by the Trove Research platform as of September 3 of the current year, it is evident that the price trend per credit has been quite irregular and has been declining for more than 6 months with an estimated 36% reduction compared to the price at the beginning of the year. (Trove Research, 2023) See in: " AUD_VV_2022\11_Anexos y complementarios\14_Reporte de precios TroveResearch.pdf"

Source: B-Terra Corp & CO2CERO S.A.S., 2023

13.1.6 Uncertainy management

According to the methodology described, uncertainty is managed through the application of discounts in emission factors, where the acceptable uncertainty is 10% in the use of average carbon values. The identification of uncertainty associated with forest monitoring data begins with the evaluation of sampling error in the values collected from forest plots, using random stratified sampling for carbon stock in aboveground biomass, litter, and organic soil carbon. It was determined that the sampling error is 9.79%, consistent with accepted values; therefore, no discount factor associated with uncertainty in forest monitoring data is required (See folder Carbon\FE_EmberaWounaan_V3).

13.2 Revision of monitoring plan

The monitoring report of the REDD+ Emberá Wounaan project for the period from April 20, 2018, to December 31, 2022, has been reviewed during the year 2023 as part of the validation and verification process by a Conformity Assessment Body.

13.3 Request for deviation applied to this monitoring period

REDD+ Emberá Wounaan Project does not exhibit methodological deviations according to the specifications outlined in section 3.1 of the project document, which details compliance with the BCR 0002 methodology in its version 3.1 proposed by BioCarbon Registry. Please refer to AUD_VV_2022\06_Project Document\PDD_Emberá Wounaan_V9\3.1 Quantification methodology.

13.4 Notification or request of approval of changes

As of the date of this monitoring report, the REDD+ Emberá Wounaan Project has not requested any changes or adjustments to the registration process of the initiative.

14 Monitoring system

14.1 Description of the monitoring plan

14.1.1 Procedures established for management of GHG emission reductions

The field information surveys were conducted using forest inventories adapted according to the methodology of the Panama forest inventory. In *AUD_VV_2022\12_Reporte de monitoreo\01_Inventario forestal*, you can identify the methodology applied for data collection, the logbook describing the field observations, and the database with the results obtained once the inventory was implemented. Additionally, the results of the carbon analysis for soil and litter samples captured within the same methodological

framework described are attached. It is important to clarify that the monitoring plan was developed following the guidelines of methodology BCR 0002 version 3.1 and the "monitoring, reporting, and verification tool version 1.0."

Regarding the field data collection to evaluate the performance of project activities, field visits were carried out by specialist teams, mainly the team from the managing partner. During these visits, sufficient evidence is verified and compiled to confirm that the region has undertaken actions to reduce deforestation and degradation, both retrospectively and to date (see "*AUD_VV_2022\2_Cobeneficios\3_Actividades REDD+\ActividadesREDD+_Emberá Wounaan_V2.xlsx"* and *"AUD_VV_2022\2_Cobeneficios\3_Actividades REDD+\SoporteActividades*"). It is important to highlight that the project will undergo triennial verification processes. If it is not possible to conduct them within the established timeframe, monitoring may be extended for up to a maximum of 5 years.

14.1.2 GHG emission reductions estimation

The estimates of greenhouse gas (GHG) emissions reduced within the project boundary of the Emberá Wounaan Comarca are presented in AUD_VV_2022\3_Carbono\Carbono_Total_EmberaWounaan_V8.xlsx. Within this file, you can identify the results for Ex Ante estimations of deforestation and forest degradation reduction activities. Similarly, the analysis is broken down by activity, with separate estimation scenarios for deforestation and forest degradation, along with their corresponding Ex Ante and Ex Post scenarios (see sections *1.5.2* Total GHG emission reductions achieved in this monitoring period *and 14.* Implementation status of the project

14.1.3 Identification of baseline scenario

The baseline estimation of the project is based on the trend of emissions generated during the reference period of the initiative (2008 – 2018) and its behavior over the accreditation horizon of the initiative, which corresponds to 30 years. In AUD_VV_2022\6_Documento de proyecto\PDD_EmberáWounaan_V9.docx\3.6.3.3 Activity Data, the determinations of emissions and deforestation dynamics during the historical period for deforestation and forest degradation can be observed. Similarly, in the folder 3_Carbono, baseline estimations applicable to the initiative for its Ex-Ante and Ex Post scenarios are presented.

14.1.4 Leakages

Monitoring was conducted in areas that experienced deforestation and degradation during the reference period (2008 – 2018), according to the delineation of the leakage belt in accordance with the REDD+ Emberá Wounaan project area. Subsequently, emissions avoided in the Ex-Ante scenario for deforestation (EfdefM) and degradation

(EfdegM) were calculated, taking into account the respective deforestation and degradation rates identified in the baseline scenario during the reference period and the forest cover in the project's starting year (2018), assuming a linear trend over the 30-year duration of the initiative.

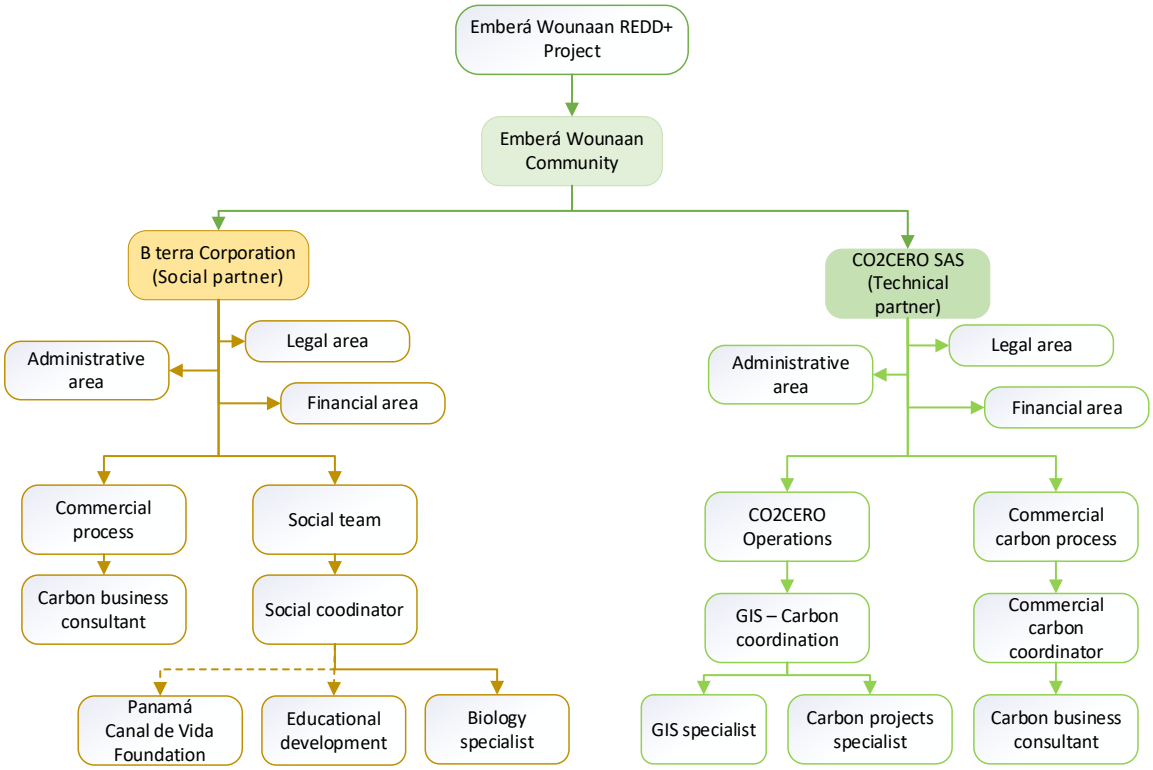
14.1.5 Assessment of environmental effects of the project

With the aim of examining the foreseeable consequences on biological diversity and ecological systems within the project boundaries, an environmental assessment was carried out using the effect categorization methodology developed by Conesa (2010). This methodology assigns a level of relevance to each effect by applying value scales to the criteria established by it, thus allowing classification into different levels according to their nature. The parameters of this methodology were adjusted to fit the specific characteristics of the REDD+ Emberá Wounaan project, as seen in 8. Environmental Aspects.

14.1.6 Roles and responsibilities

In **Figure 5,** the organizational structure of the REDD+ Emberá Wounaan project is presented, reaffirming that it is the Emberá Wounaan Comarca that is the proponent and owner of the project, while its social and technical management associates are B Terra Corp., Fundación Panamá Canal de Vida, and CO2CERO S.A.S. respectively. The social management associate establishes direct links, communication channels, and mechanisms for community participation necessary for the consolidation of the project. Similarly, it ensures the flow of oral and written information among the various stakeholders, always following the process of free, prior, and informed consent. The technical management associate is responsible for the design and structuring of the project document, the quantification of the reduced GHG emissions, and their certification through procedures issued by certification programs, conformity assessment bodies, and market dynamics.

Figure 5. REDD+ Emberá Wounaan organizational structure.



Source: CO2CERO S.A.S., 2022.

14.1.7 Information management

The REDD+ Emberá Wounaan project manages its information following the guidelines established by the project developer and its corresponding information management and data handling processes. In folder *13_Gestión de información*, procedures for information management in Forest Carbon Projects, quality review, and information management in REDD+ projects are presented. Additionally, *Anexo. Caracterización documental REDD_V4* provides the structure of the folders containing the project for evaluation along with their corresponding content.

For each of the products and deliverables generated for this initiative, a quality review process has been conducted, which depends on the sources providing the information. In any case, the generator of such information filters their records to transfer appropriate information to the project's requirements. In the current case, B-Terra Corp acquires primary information from direct work with communities and strategic actors at the territorial level. This information undergoes quality review by the technical associate, who verifies the accuracy, transparency, and quality of the generated information, which will

be integrated into the project document, monitoring report, and complementary documents of its structure.

All inputs obtained from external entities for the consolidation of the project document will be reviewed and checked under the quality parameters defined by the organization, as well as those determined by certification programs, methodologies, and Conformity Assessment Bodies. Finally, the products to be provided to the Conformity Assessment Body will be supervised by the project developer and other project associates if required. Their contents are compared against the certification program and methodological rubrics, reducing the level of uncertainty and improving consistency with them.

The processed and generated information for the projection and quantification of avoided GHG emissions in its baseline, ex-ante, and ex-post scenarios has been managed within a level of uncertainty corresponding to ISO 14064-2, 14064-3, 14065:2020 standards and the provisions of version 3.1 of the BioCarbonRegistry's BCR 0002 methodology, equivalent to 95% or higher. Currently, the REDD+ Emberá Wounaan project handles a sampling error of 9.79%, once evaluated on the information gathered in the forest inventory (see "AUD_VV_2022\03_Carbono\FE_EmberaWounaan_V3.xlsx").

14.2 Data and parameters to quantify the reduction of emissions

14.2.1 Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter	*Forest and non-forest area*
Data unit	*Hectares*
Description	*Forest area at the beginning of the project´s crediticing period.*
Source of data used	*Review of forest boundaries in the project area, vehicle surveys, and coverage control points.*
Value (s)	*436,551 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*The parameter is used to establish the baseline.*
Justification of choice of data or description of measurement methods and procedures applied	*Global Positioning System (GPS) and Landsat satellite imagery analysis under the forest/non-forest classification model by Hansen et al, 2010 and Hansen et al, 2013. For further details, see "AUD_VV_2022\04_SIG\Informe Geoprocesamientos SIG REDD+ Embera Wounaan V3.docx"*
Additional comments	*NA*

14.2.2 Data and parameters monitored

Within the sub-chapter, variables related to the validation and verification process of the initiative are proposed, considering that its execution horizon is 30 years. These are presented as general parameters, that is, parameters that evaluate the generality of the project, related to deforestation, those that measure actions under this effect, and degradation, those corresponding to partial effects on forest cover; all these parameters will be compiled in the audit folders according to the certifications obtained, thus achieving information management and data conservation.

Data / Parameter	*Deforested and degraded area for the period 2018-2022.*
Data unit	*Hectares*
Description	*Total project area according to geographic information (GIS) formulation.*
Measured /Calculated /Default:	*Default value according to the geographic analysis*

Source of data	*Review of forest boundaries in the project area, vehicle surveys, and coverage control points.*
Value(s) of monitored parameter	*See "AUD_VV_2022\03_Carbono\MonitoreoAreas_REDDEmberaWounaan_V5.xlsx" and "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*To monitor the project boundaries.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*Global Positioning System (GPS)*
Measuring/ Reading/ Recording frequency	*At the beginning of the project socialization, during follow-up visits, during validation, and each verification. Each project verification (triennial), maximum quinquennial.*
Calculation method (if applicable)	*NA*
QA/QC procedures applied	*See section 15.1.7. Information management in the document*

Data / Parameter	*CSBm,f*
Data unit	*Hectares*
Description	*Annual change in forest-covered area in the leakage area*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*

Source of data	*See "AUD_VV_2022\03_Carbono\MonitoreoAreas_REDDEmberaWounaan_V5.xlsx"*
Value(s) of monitored parameter	*7,097.56 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*The data is used for monitoring the project and conducting quantification.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See"AUD_VV_2022\03_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$CSB_{lb} = \left(\frac{1}{t_2 - t_1}\right) x\ (A_1 - A_2)$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*CSBim,m*
Data unit	*Hectares*
Description	*Annual change in forest covered area in the project area.*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\MonitoreoAreas_REDDEmberaWounaan_V5.xlsx"*

Value(s) of monitored parameter	*727.88 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*The data is used to monitor the project and perform quantification.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$CSB_{im,m} = \left(\frac{1}{t_2 - t_1}\right) x\ (A_i - A_m)$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*EAim,m*
Data unit	*tCO2e*
Description	*Annual emission due to deforestation in the project area.*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*

Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx" and "AUD_VV_2022\03_Carbono\MonitoreoAreas_REDDEmberaWounaan_V5.xlsx"*
Value(s) of monitored parameter	*421,506 tCO2e*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used for CO_2e calculation in the project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$EAim,m = CSBim,m\ x\ CT_{eq}$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*EAfm*
Data unit	*tCO2e*
Description	*Annual emissions due to deforestation in the leakage area.*

Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx" and "AUD_VV_2022\03_Carbono\MonitoreoAreas_REDDEmberaWounaan_V5.xlsx"*
Value(s) of monitored parameter	*133,622 tCO2e*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the quantification stage of the project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$EAfm = \left(CSBfm\ x\ CT_{eq}\right) - EAf$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*DFP_{REDD+}*
Data unit	*Hectares*
Description	*Annual primary degradation in the Project area*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx" y*
Value(s) of monitored parameter	*8.91 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the monitoring and quantification stage of the Project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$DFP_{REDD+proy,año} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{núcleo} - A_{núcleo-parche}\right)$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*DFS_{REDD+}*
Data unit	*Hectares*
Description	*Annual secondary degradation in the project area.*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Value(s) of monitored parameter	*160.57 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the monitoring and quantification stage of the Project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$DFS_{REDD+proy,año} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{perforado} - A_{perforado-parche}\right)$

QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*DFP_{REDD+}*
Data unit	*Hectares*
Description	*Annual primary degradation in the leakage area.*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Value(s) of monitored parameter	*12.77 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the monitoring and quantification stage of the Project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*

Calculation method (if applicable)	$DFP_{f,año} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{núcleo,f} - A_{núcleo-parche,f}\right)$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	DFS_{REDD+}
Data unit	*Hectares*
Description	*Annual secondary degradation in the leakage area.*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Value(s) of monitored parameter	*110.91 ha*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the monitoring and quantification stage of the Project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Measuring/ Reading/	*Each project verification (triennial), maximum every five years.*

Recording frequency	
Calculation method (if applicable)	$DFS_{f,año} = \left(\frac{1}{t_2 - t_1}\right) x \left(A_{perforado,f} - A_{perforado-parche,f}\right)$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*EAREDD+*
Data unit	*tCO_2e*
Description	*Annual emissions due to degradation in the Project area (Monitoring period).*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Value(s) of monitored parameter	*53,872.65 tCO_2e*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the monitoring and quantification stage of the Project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*

Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$EA_{REDD+proy,año} = (DFP_{REDD+proy,año} \, x \, DTBCO_{2eq,1}) + (DFS_{REDD+proy,año} \, x \, DTBCO_{2eq,2})$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

Data / Parameter	*EAf*
Data unit	*tCO_2e*
Description	*Annual emissions due to degradation in the leakage area (Monitoring period)*
Measured /Calculated /Default:	*Calculated according to the formula in the 'Calculation method' section.*
Source of data	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*
Value(s) of monitored parameter	*36,471.47 tCO_2e*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	*Used in the monitoring and quantification stage of the Project.*
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of	*See "AUD_VV_2022\03_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6.xlsx"*

last calibration, validity)	
Measuring/ Reading/ Recording frequency	*Each project verification (triennial), maximum every five years.*
Calculation method (if applicable)	$EA_{f,año} = (DFP_{f,año} \, x \, DTBCO_{2eq,1}) + (DFS_{f,año} \, x \, DTBCO_{2eq,2})$
QA/QC procedures applied	*See section 15.1.7. Information management of this document*

15 Quantification of GHG emission reduction / removals

The present monitoring report quantifies the reduced greenhouse gas (GHG) emissions within the project boundaries of the Emberá Wounaan Comarca, from the project start date of April 20, 2018, until December 31, 2022, equivalent to 4 years, 8 months, and 11 days. The reduction of emissions generated by the project was quantified annually during the implementation years of the project up to the present date. It is worth noting that the risk buffer value for non-permanence is set at 20% of the emission reductions.

15.1 Baseline emissions

The quantification of the reduced greenhouse gas emissions (GHG) from deforestation and forest degradation for the REDD+ Emberá Wounaan Project is carried out through the Biocarbon Registry's BCR 0002 methodology, version 3.1. The application of this methodology is based on the correspondence of forest cover identified within the project boundaries with the variables and parameters required in the calculation methods. Similarly, the project responds to the biophysical and dynamic conditions of deforestation and forest degradation, which are characterized based on their historical trends in the decade prior to the project start date, considering patterns of agents, factors, and underlying causes caused by these phenomena within the territory.

15.1.1 Deforestation

Here are the activity data for deforestation identified within the project boundary and complementary areas. The change in forest cover surface (CSB) data used for this quantification is derived from the historical average approach. This involved analyzing

the coverage change between the project's start date and ten years prior to it, resulting in the gross deforestation of the area. This is defined under the premise that at the first date, the area had forest cover, and for the second period, it was already devoid of it.

To minimize effects from areas without information, Landsat images from reliable platforms are used, ensuring consistent sourcing and providing credible tracking of forest changes over time. The historical period used in this project is 2008 - 2018, ensuring the availability of eligible and suitable areas for analysis.

For estimating the annual change in forest cover surface in the reference region, data from the final and initial years of the reference period, and the forest surfaces identified in each of these periods are used, obtaining the value representing the projected forest loss in the baseline scenario. The obtained value is presented in 3_Carbono\Carbono_Deforestacion_REDDEmberaWounaan_V8.xlsx.

Based on the emission factor obtained for the project (see "AUD_VV_2022\06_Documento de proyecto\PDD_Emberá Wounaan_V9\3.6.3.2 Quantification of the emission factor"), baseline emissions were calculated, resulting in a total of 93,925,782 tCO2e for all years within the project area (see **Table 31**).

Table 31. Emissions of baseline scenario.

Year	EAIb (tCO_2e)		Total
	BLMM	BLMS	
2018	371,057	1,824,633	2,195,690
2019	529,047	2,601,527	3,130,574
2020	529,047	2,601,527	3,130,574
2021	529,047	2,601,527	3,130,574
2022	529,047	2,601,527	3,130,574
2023	529,047	2,601,527	3,130,574
2024	529,047	2,601,527	3,130,574
2025	529,047	2,601,527	3,130,574
2026	529,047	2,601,527	3,130,574
2027	529,047	2,601,527	3,130,574
2028	529,047	2,601,527	3,130,574
2029	529,047	2,601,527	3,130,574
2030	529,047	2,601,527	3,130,574
2031	529,047	2,601,527	3,130,574
2032	529,047	2,601,527	3,130,574
2033	529,047	2,601,527	3,130,574
2034	529,047	2,601,527	3,130,574
2035	529,047	2,601,527	3,130,574
2036	529,047	2,601,527	3,130,574
2037	529,047	2,601,527	3,130,574

Year	EAlb (tCO_2e)		Total
	BLMM	BLMS	
2038	529,047	2,601,527	3,130,574
2039	529,047	2,601,527	3,130,574
2040	529,047	2,601,527	3,130,574
2041	529,047	2,601,527	3,130,574
2042	529,047	2,601,527	3,130,574
2043	529,047	2,601,527	3,130,574
2044	529,047	2,601,527	3,130,574
2045	529,047	2,601,527	3,130,574
2046	529,047	2,601,527	3,130,574
2047	529,047	2,601,527	3,130,574
2048	159,439	784,022	943,461
TOTAL	**15,872,846**	**78,052,936**	**93,925,782**

Source: CO2CERO S.A.S., 2023.

Donde:

- EAlb (tCO_2e): CO_2e emissions from deforestation in the baseline scenario.
- BLMM: Mature mixed broadleaf forest.
- BLMS: Secondary mixed broadleaf forest.

15.1.2 Forest degradation

Here are the activity data for the forest degradation identified within the project boundary and complementary areas. To determine forest fragmentation belonging to primary and secondary degradation, processing is done using the Landscape Fragmentation Tool available for ArcGIS® software.

This tool determines the extent in hectares corresponding to each fragmentation class and subsequently identifies the rate of change or transition that occurs between them according to the type of degradation (see **Table 32**). To obtain greater accuracy in quantifying degraded areas, modeling was performed for an intermediate year of the reference period (2013), which allowed us to show that the transition between classes of degraded areas during the years of the reference period occurs adequately. For the proper management of the Landscape Fragmentation Tool, some subdivisions of the reference region were applied, modeling separately, and then joining the results.

Table 32. Transition between fragmentation classes.

Type of area	Period 2008 a 2018 Area			Annual degradation (ha)	
	Type of degradation	Mature mixed broadleaf forest	Secondary mixed broadleaf forest	Mature mixed broadleaf forest	Secondary mixed broadleaf forest
Reference region	Primary	266.34	1,946.16	26.63	194.62
	Secondary	75.28	1,791.88	7.53	179.19
Potential leakage area	Primary	6.93	124.75	0.69	12.48
	Secondary	7.99	152.90	0.80	15.29

Source: CO2CERO S.A.S., 2022.

The estimation of annual historical degradation in the baseline scenario is performed according to both primary and secondary degradation. For primary degradation, the years of the beginning and end of the reference period are identified, considering the area defined for the reference region in the core class in the initial year and its transition in the final year of the reference period. Additionally, for secondary degradation, the area in the reference region in the perforated class in the initial year and its transition in the final year of the reference period are taken into account. It is expected that, due to the project's development, there will be a decrease of 98% in primary degradation and 56% in secondary degradation.

For the estimation of annual historical degradation in the leakage area in the baseline scenario, primary degradation is considered, calculated using the values obtained in the leakage area in the core class in the initial year and the transition area in the final year of the period. Additionally, for the estimation of annual secondary degradation, the values from the leakage area in the perforated class in the initial year and its transition in the final year of the period are used.

The percentage increase in emissions in the leakage area generated by the project commitment in the ExAnte scenario is consistent with 10%, as suggested by methodology BCR 0002 version 3.1. However, for primary degradation in the Mixed Mature Broadleaf Forest stratum, this parameter corresponds to the percentage decrease in annual degraded area evidenced from the analysis conducted between 2018

and 2022 (monitoring period), compared to the annual degraded area of the baseline period (2008-2018).

Based on the emission factor obtained for the project, the baseline was calculated, resulting in a total of 4,011,837 tCO2e for all years within the project area (see **Table 33**).

Table 33. Carbon stocks due to degradation in the baseline scenario.

Año	EAlbdeg (tCO2e) BLMM	EAlbdeg (tCO2e). BLMS	EAlbdeg (tCO2e)	
	Annual	Annual	Annual	Accumulated
2018	13,061	80,723	93,784	93,784
2019	18,623	115,093	133,716	227,500
2020	18,623	115,093	133,716	361,216
2021	18,623	115,093	133,716	494,931
2022	18,623	115,093	133,716	628,647
2023	18,623	115,093	133,716	762,363
2024	18,623	115,093	133,716	896,078
2025	18,623	115,093	133,716	1,029,794
2026	18,623	115,093	133,716	1,163,510
2027	18,623	115,093	133,716	1,297,225
2028	18,623	115,093	133,716	1,430,941
2029	18,623	115,093	133,716	1,564,657
2030	18,623	115,093	133,716	1,698,372
2031	18,623	115,093	133,716	1,832,088
2032	18,623	115,093	133,716	1,965,804
2033	18,623	115,093	133,716	2,099,519
2034	18,623	115,093	133,716	2,233,235
2035	18,623	115,093	133,716	2,366,951
2036	18,623	115,093	133,716	2,500,666
2037	18,623	115,093	133,716	2,634,382
2038	18,623	115,093	133,716	2,768,098
2039	18,623	115,093	133,716	2,901,813
2040	18,623	115,093	133,716	3,035,529
2041	18,623	115,093	133,716	3,169,245
2042	18,623	115,093	133,716	3,302,961
2043	18,623	115,093	133,716	3,436,676
2044	18,623	115,093	133,716	3,570,392
2045	18,623	115,093	133,716	3,704,108
2046	18,623	115,093	133,716	3,837,823
2047	18,623	115,093	133,716	3,971,539

Año	EAlbdeg (tCO2e) BLMM	EAlbdeg (tCO2e). BLMS	EAlbdeg (tCO2e)	
	Annual	Annual	Annual	Accumulated
2048	5,612	115,093	40,298	4,011,837
TOTAL	**558,729**	**3,533,515**	**4,011,837**	

Source: CO2CERO S.A.S., 2023.

Where:

- *EAlbdeg (tCO2e) BLMM*: CO_2e emissions from degradation in Mixed Mature Broadleaf Forest in the baseline scenario.
- *EAlbdeg (tCO2e). BLMS*: CO_2e emissions from degradation in Mixed Secondary Broadleaf Forest in the baseline scenario.
- *EAlbdeg (tCO2e)*: Total CO_2e emissions from degradation in the baseline scenario.

15.2 Project emissions/removals

Here are the results of greenhouse gas (GHG) emissions obtained from deforestation and forest degradation for the REDD+ Emberá Wounaan project. It should be noted that the non-permanence risk value (buffer) corresponds to that determined by Biocarbon Registry, where a fraction of 20% of the total credits generated by the project has been standardized.

15.2.1 Emissions avoided ex ante

The reduction of emissions generated by the project is estimated in the Ex-Ante scenario, which would occur once the project is implemented over a period of 30 years, involving activities to reduce deforestation and forest degradation.

16.2.1.1 Deforestation

For the estimation of the Ex-Ante emission reductions generated by deforestation, a projection of the decrease due to project activities was made, in accordance with the determination of the deforested area from 2018 to 2022 and the historical period (2008-2018), both for the project area and the Potential Leakage Area as follows:

- The percentage projection of deforestation reduction due to the implementation of REDD+ activities was carried out based on the comparison between the historical deforestation rate of the project using the Puyravaud formula and the deforestation rate of the initial monitoring period (2018-2022). The subtraction

and conversion to percentage of each of the rates allow to demonstrate the percentage effectiveness of the project activities implementation.

- On the other hand, for the projection of leakage in the project area, the value suggested by the methodology BCR 0002 version 3.1 (10%) is used.

16.2.1.2 Forest degradation

For the estimation of Ex-Ante emissions reduction due to degradation, a projection of the decrease resulting from the project activities was conducted, in line with the determination of the transition area for each type of degradation from 2018 to 2022, both for the project area and the Potential Leakage Area. The results are compiled in (See 3_Carbono\ Carbono_Degradacion_REDDEmberaWounaan_V6).

The percentage projection of the decrease in degradation due to the implementation of REDD+ activities in the eligible area generated by the project commitment in the ExAnte scenario is evaluated through the percentage decrease in the annual degraded area evidenced from the analysis conducted between 2018 and 2022 (monitoring period), compared to the annual degraded area of the baseline period (2008-2018). This will allow us to demonstrate the decrease in the degraded area resulting from the project, compared to what was generated in the baseline period. It should be noted that since these are emissions, this result should be subtracted from a value of 100%, as it represents the percentage increase in emissions, not their decrease.

Table 34. Degradation data from the fragmentation analysis for the Ex-Ante scenario.

Type of area	Period 2018 to 2022			Annual degradation area (ha)	
	Type of degradation	Mature mixed broadleaf forest	Secondary mixed broadleaf forest	Mature mixed broadleaf forest	Secondary mixed broadleaf forest
Reference region	Primary	2.24	6.67	0.45	1.33
	Secondary	35.06	125.51	7.01	25.10
Potential leakage area	Primary	2.10	10.66	0.42	2.13
	Secondary	7.35	103.56	1.47	20.71

Source: CO2CERO S.A.S., 2022.

In this way, the Ex-Ante emissions reduction of the project due to degradation activities was obtained, taking into account the net emissions generated by the project estimated

by its implementation, as shown in the folder 3_Carbono\Carbono_Degradacion_REDDEmberaWounaan_V6, sheet 'Ex Ante'.

15.2.2 Reductions (avoidance, displacement or destruction) of net GHG emissions

In the calculation workbook 3_Carbono\Carbono_Total_EmberaWounaan_V8.xlsx, in the "Ex ante" sheet, the results of net greenhouse gas emission reductions in the Ex-ante scenario for the entire project are presented, summarizing the behavior of deforestation and degradation activities, where:

- *Ealb:* CO_2e emissions due to deforestation and degradation in the baseline.
- *EAf:* CO_2e emissions due to deforestation and degradation in the leakage belt.
- *RE Totales:* Total emission reductions of CO_2e due to deforestation and degradation.
- *Buffer:* Reserve for the risk of non-permanence for the emission reduction scenario due to deforestation and degradation.
- *RE Netas:* Net emission reductions of CO2e due to deforestation and degradation.

Taking into account the selected pools in the project (Deforestation and Degradation), as explained earlier, the total for the project is 65,475,497 tCO2e for all the years within the project area, with an average emission of 2,112,113 tCO2e (See 3_Carbono\Carbono_Total_REDDEmberaWounaan_V8).

Table 35. Summary of ex ante emissions in the project scenario.

Year	GHG emission reductions in the baseline scenario (tCO2e)	GHG emission reductions in the project scenario (tCO_{2e})	GHG emissions attributable to leakages (tCO_{2e})	Estimated Net GHG Reduction (tCO_{2e})
2018	2,289.474	213,572	162,637	1,530,612
2019	3,264,289	304,507	231,885	2,182,317
2020	3,264,289	304,507	231,885	2,182,317
2021	3,264,289	304,507	231,885	2,182,317
2022	3,264,289	304,507	231,885	2,182,317
2023	3,264,289	304,507	231,885	2,182,317
2024	3,264,289	304,507	231,885	2,182,317
2025	3,264,289	304,507	231,885	2,182,317
2026	3,264,289	304,507	231,885	2,182,317

Year	GHG emission reductions in the baseline scenario (tCO2e)	GHG emission reductions in the project scenario (tCO_{2e})	GHG emissions attributable to leakages (tCO_{2e})	Estimated Net GHG Reduction (tCO_{2e})
2027	3,264,289	304,507	231,885	2,182,317
2028	3,264,289	304,507	231,885	2,182,317
2029	3,264,289	304,507	231,885	2,182,317
2030	3,264,289	304,507	231,885	2,182,317
2031	3,264,289	304,507	231,885	2,182,317
2032	3,264,289	304,507	231,885	2,182,317
2033	3,264,289	304,507	231,885	2,182,317
2034	3,264,289	304,507	231,885	2,182,317
2035	3,264,289	304,507	231,885	2,182,317
2036	3,264,289	304,507	231,885	2,182,317
2037	3,264,289	304,507	231,885	2,182,317
2038	3,264,289	304,507	231,885	2,182,317
2039	3,264,289	304,507	231,885	2,182,317
2040	3,264,289	304,507	231,885	2,182,317
2041	3,264,289	304,507	231,885	2,182,317
2042	3,264,289	304,507	231,885	2,182,317
2043	3,264,289	304,507	231,885	2,182,317
2045	3,264,289	304,507	231,885	2,182,317
2046	3,264,289	304,507	231,885	2,182,317
2047	3,264,289	304,507	231,885	2,182,317
2048	983,758	91,769	69,883	657,685
Total	**97,937,619**	**9,136,054**	**6,957,194**	**65,475,497**

Source: CO2CERO S.A.S., 2023.

15.3 Leakages

The monitoring of areas that experienced deforestation and degradation during the reference period (2008 - 2018) was conducted according to the delineation of the leakage belt in accordance with the REDD+ Emberá Wounaan project area. Subsequently, as outlined in "AUD_VV_2022\06_Documento de proyecto\PDD_Emberá Wounaan_V9\3.6.1.3 Leakage area," the avoided emissions in the Ex-Ante scenario for deforestation (EfdefM) and degradation (EfdegM) are calculated, taking into account the deforestation and degradation rates identified in the baseline scenario during the reference period and the forest cover in the year the project began (2018), assuming a linear trend over the 30-year duration of the initiative.

The identification of the project's leakage area was established through an analysis of the displacement of deforestation and degradation agents, associating access points to the forest given the proximity to navigable rivers, which are the main means of transportation. Additionally, the Pan-American Highway, although not within the project's boundary, serves as a significant driver of mobility. Urban centers and forest edges, which are more susceptible to deforestation or degradation, were also considered. The analysis of mobility identified that potential deforestation and degradation activities defining the leakage area are highly linked to the mentioned deforestation factors.

The factors of the mobility analysis and their importance values were established based on evidence collected from the territory's characteristics, identifying the range of mobility in meters per class, relative weight, and subsequent spatial analysis for the delineation of the leakage area through a multi-criteria analysis using GIS software ArcMap 10.8, based on the determination of Euclidean distances of each mobility agent.

15.4 Net GHG Emission Reductions / Removals

Taking into account the selected pools in the project (Deforestation and Degradation), as explained earlier, the total emissions for the project amount to 65,475,497 tCO2e for all years within the project area, with an average emission of 2,112,113 tCO2e (See 3_Carbono\Carbono_Total_REDDEmberaWounaan_V8).

15.5 Comparison of actual emission reductions with estimates in the project document

As mentioned in the project document, the percentage projection of the reduction in deforestation/degradation for the implementation of REDD+ activities in the eligible area generated by the project's commitment in the Ex-Ante scenario is evaluated by the percentage decrease in the annual deforested/degraded area evidenced from the analysis conducted during the monitoring period, compared to the annual area of the

baseline period. This allows to demonstrate the difference between the Ex-Ante and Ex Post scenarios.

Table 36. Comparison of ex ante and ex post scenarios

Year	Ex ante tCO_2e	Ex post tCO_2e	Difference %
2018	1,530,612	1,551,806	1.38%
2019	2,182,317	2,239,469	2.62%
2020	2,182,317	2,255,612	3.36%
2021	2,182,317	2,257,408	3.44%
2022	2,182,317	2,249,922	3.10%
Net emissions	**10,259,881**	**10,554,217**	**2.87%**

Source: CO2CERO S.A.S., 2023.

15.6 Remarks on difference from estimated value in the registered project document

In this case, there are no reported increases in the reductions generated by the implementation of the initiative because it is the first monitoring period of the REDD+ Emberá Wounaan project subjected to a validation and verification process, which means that there are no changes in the estimates presented in section 3. Quantification of GHG emission reduction of the Project Document, see 'AUD_VV_2022\06_Project Document\PDD_Emberá Wounaan_V9\3. Quantification of GHG emission reduction'.

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