REDD++ PANI PROJECT

Document Prepared by BIOTRADE SAS

Contact: Ruby Acosta | direccion.biotrade@gmail.com | +57 301 6279136

Project Title	*REDD++ PANI Project*
Version	*V1.0*
Date of Issue	*April 30, 2022*
Project Location	*Colombia, Amazonas*
Project Proponent(s)	*BIOTRADE SAS* *Ruby Acosta Bastidas* *direccion.biotrade@gmail.com* *Phone: +57 301 6279136* *Address calle 42 b sur #72 T - 47, Bogotá, Colombia*
Prepared By	*BIOTRADE SAS* *Ruby Acosta Bastidas* *direccion.biotrade@gmail.com* *Phone: +57 301 6279136* *Address calle 42 b sur #72 T - 47, Bogotá, Colombia*
Validation Body	*Earthwood Services Private Limited - ESPL*
Project Lifetime	*01 January 2017 – 31 December 2047; 30 years*
GHG Accounting Period	*01 January 2017 – 31 December 2047; 30 years*

History of CCB Status	*NA*
Gold Level Criteria	***Benefits to the community*** *The PANI REDD++ Project will strengthen the PANI communities, from the increase of capacities such as autonomy and governance over their territory. The governance of the communities is essential for the management and sustainable management of the PANI territory. The project's programs will improve the social, cultural, educational, technological, environmental, and productive infrastructure of the PANI, to have a positive impact on the social development and quality of life of the communities.* ***Benefits to biodiversity*** *The PANI REDD++ Project will contribute directly to the regional monitoring program for an "Endangered" (EN) species, such as the Charapa tortoise (Podocnemis expansa) in the PANI territory. The project will prioritize conservation and monitoring actions for objects defined as High Conservation Values, such as the humid and salt forests, the Charapa Turtle (Podocnemis expansa), the Jaguar (Panthera onca), the Tapir (Tapirus terrestris), the Cerillo (Tayasu pecari) and the tiger fang (Pseudoplatystoma tigrinum). The species defined as objects of conservation are nationally or globally threatened species, and are of great importance to the PANI territory, from their cosmogony as indigenous peoples, to their value as natural resources (food, income generation and the culture of indigenous peoples). of the PANI). In this way, the PANI REDD++ Project contributes to the conservation of biodiversity through the implementation of national monitoring programs and protocols for different threatened species.*
Expected Verification Schedule	*NA*

Table of Contents

The page numbers of the table of contents below shall be updated upon completion of the project description.

1 SUMMARY OF PROJECT BENEFITS

The PANI REDD++ Project is located on the Caquetá River in the Amazonas department of Colombia, traditional territory of the Miraña – Bora ethnic groups, recognized as PANY territory, and is represented by the Association of Indigenous Authorities *P ii ne Aiiyveju N ii dies Iachimua* – NIBP (which means, ' *God of the center and his grandchildren* '), encompasses the entire area of the Cahuinarí National Natural Park, which corresponds to 80-85% of the PANI territory. In this region there are key ecosystems for biodiversity such as the tropical rain forest, the cananguchales, and the salty ones, within which important and threatened species live, such as: the Charapa Turtle (*Podcnemis expansa*), the Jaguar or Tiger (*Panthera onca*), the Tapir (*Tapirus terrestris*), and the Pintadillo tiger (*Pseudoplatystoma tigrinum*). In addition to this biological richness, the PANI territory is home to different indigenous peoples from four reservations: Nonuya de Villa Azul, Curare los Ingleses, Predio Putumayo, and Miritί Paraná, within which there are also Indigenous Peoples in a situation of Voluntary Isolation (PIA).

The main objective of the PANI REDD++ Project is to *conserve the PANI territory environmentally and culturally, through the consolidation of its own government, strengthening of traditional knowledge, actions for sustainable development, and monitoring and control of the territory, to improve the quality of life of the communities that inhabit it during the duration of the PANI REDD++ project (30 years)* . In this way, the project seeks to reduce the emission of Greenhouse Gases (GHG) by reducing the degradation of forests, through four strategic lines: i) consolidation of self-government, ii) strengthening of traditional knowledge, iii) actions for the sustainable development of the PANI territory, and iv) monitoring and control.

The PANI REDD++ Project is projected from January 1, 2018 and will have a duration of 30 years, where it is estimated that a reduction of 106,600.905 tCO2e will be achieved. In this way, the project will generate positive impacts on biodiversity through the conservation of nearly 1,600,000 hectares of Amazon forest, and thus maintain the ecological integrity of ecosystems and safeguard the services they provide, protect habitats of species of important and vulnerable. On the other hand, the community will benefit from the REDD++ PANI project through the strengthening of governability and governance of the territory, the rescue of cultural values, and the improvement of the *good life* of the inhabitants. The project will prioritize conservation and monitoring actions for objects defined as High Conservation Values, such as the humid and salt forests, the Charapa Turtle (*Podocnemis expansa*), the Jaguar (*Panthera onca*), the Tapir (*Tapirus terrestris*), the Cerillo (*Tayasu pecari*) and the tiger fang (*Pseudoplatystoma tigrinum*). These conservation objects are nationally or globally threatened species, and are of great importance for the PANI territory, from their cosmogony as indigenous peoples, to their value as a natural resource (food, income generation and the culture of the PANI peoples).

1.1 Unique Project Benefits

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) Strengthening of the governance and governability of indigenous peoples over the management and conservation of their territory	2.1.11

2) Rescue, recovery and revitalization of unique indigenous traditions	4
3) Conservation and sustainable management of the forests of the Amazon, and the natural resources and ecosystem services they provide.	4.1.3
4) Consolidation of sustainable productive economic alternatives with a gender equity approach, which improve the family economy of the communities.	4
5) Protection of four threatened species and their habitats, which are important biologically, culturally and economically, and the identification of methods for their community monitoring.	5

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
GHG emission reductions or removals	Net estimated emission removals in the project area, measured against the without-project scenario	Does not apply	-
	Net estimated emission reductions in the project area, measured against the without-project scenario	106,600,905	3.2.4
Forest[1] cover	For REDD[2] projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	Does not apply	-
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	Does not apply	-
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices are expected to occurred as a result of project activities, measured against the without-project scenario	Does not apply	-
	Number of hectares of non-forest land in which improved land management practices are expected to	Does not apply	-

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)

[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)

[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)

[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
	occurred as a result of project activities, measured against the without-project scenario		
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	To define	2.1.11
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	To define	2.1.11
Employment	Total number of people expected to be employed in project activities,[5] expressed as number of full-time employees[6]	To define	2.3.15
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	To define	2.3.15
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	To define	2.1.11
	Number of women expected to have improved livelihoods or income generated as a result of project activities	To define	2.1.11

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	To define	2.1.11
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	To define	2.1.11
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	To define	2.1.11
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	To define	2.1.11
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	To define	2.1.11
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	To define	2.1.11
Well-being	Total number of community members whose well-being[8] is expected to improve as a result of project activities	To define	2.1.11

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
	Number of women whose well-being is expected to improve as a result of project activities	To define	2.1.1 1
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation,[9] measured against the without-project scenario	To define	5.2
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	5	5.5

[9] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species

[10] Per IUCN's Red List of Threatened Species

[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

The PANI REDD++ Project is located in the jungles of the department of Amazonas (Colombia), within the indigenous reservations: Nonuya de Villa Azul, Curare los Ingleses, Predio Putumayo, and Mirití Paraná, and which covers about 1,600,000 hectares. , where more than 99% of the area is forest. This Amazonian region is strategic for the development of REDD projects due to its great biological and cultural wealth, where diverse ecosystems are found, such as the tropical humid forest (bh -T), the cananguchales, and the salt marshes, which are important reservoirs biodiversity and threatened or vulnerable species, such as the Charapa tortoise (*Podcnemis expansa*), the Jaguar (*Panthera onca*), the Tapir (*Tapirus terrestris*), the tiger squirrel (*Pseudoplatystoma tigrinum*), among others. The implementation area of the REDD++ PANI project also provides essential environmental services for the different indigenous peoples that inhabit this territory, within which there are also Indigenous Peoples in a situation of Voluntary Isolation (PIA).

The PANI territory has a governance trajectory of more than 30 years[12], and nearly 12 years through the PANI Special Management Regime and the Cahuinarí National Natural Park (REM PANI-PNN Cahuinarí), where the consolidation of the Plan de Vida PANI, and other initiatives have been implemented in the territory, for which the PANI REDD++ Project will rely on work with the communities and coordination with other actors, based on respect and understanding of the autonomy of indigenous communities over their territory.

General objective:

- Environmentally and culturally conserve the PANI territory, through the consolidation of its own government, strengthening of traditional knowledge, actions for sustainable development, and monitoring and control of the territory, to improve the quality of life of the communities that inhabit it the duration of the REDD++ PANI project (30 years).

Specific objectives:

- Promote the political, technical and operational conditions of the PANI for the consolidation of *its own Government*[13] that responds to the context and needs of the PANI community.

- Promote the permanence and rescue of sustainable cultural practices within the PANI territory, both in their daily lives and in self-government actions.

- Provide the PANI association with technical conditions to achieve sustainable development of its territory

[12] Since the creation of the indigenous reservations Mirití Paraná and Predio Putumayo in 1987 and 1988, respectively.

[13] Self- *government* is a term of the indigenous populations of Colombia, which refers to a form of organization with cultural criteria and indigenous traditions, which regulate social relations and relations with nature and from them norms, laws, habits and behaviors are defined. (Political Constitution of 1991, Colombia).

- Design and implement strategies for participatory community monitoring and control of nature and social management.

2.1.2 Project Scale

Project Scale	
Project	
Large project	X

2.1.3 Project Proponent (G1.1)

Organization name	BIOTRADE SAS
Contact person	Ruby Acosta Bastidas
Title	Director of BIOTRADE SAS
Address	Address calle 42 b sur #72 T - 47, Bogotá, Colombia
Telephone	+57 301 6279136
Email	direccion.biotrade@gmail.com

2.1.4 Other Entities Involved in the Project

Provide contact information and roles/responsibilities for any other entities involved in the development of the project. Copy and paste the table as needed.

Organization name	PANI Association
Contact person	Olmedo Augusto carijona Matapi
Title	Legal representative PANI Association
Address	NIBP
Telephone	+57 310 7551642
Email	olmedocarpani@gmail.com

2.1.5 Physical Parameters (G1.3)

The PANI project belongs to the great Amazon biome, located on the northwestern side of the great Amazon plain, which is characterized by lowland tropical rainforests. The 1'690,702 ha of the project are in the non-municipalized areas of La Pedrera, Mirití - Paraná, Puerto Arica and Puerto Santander in the department of Amazonas, Colombia (Riaño & Salazar, 2016). The main rivers that flow the project area are the Caquetá and Cahuinarí Rivers, both are part of the Amazon River macro-basin (Figure 1).

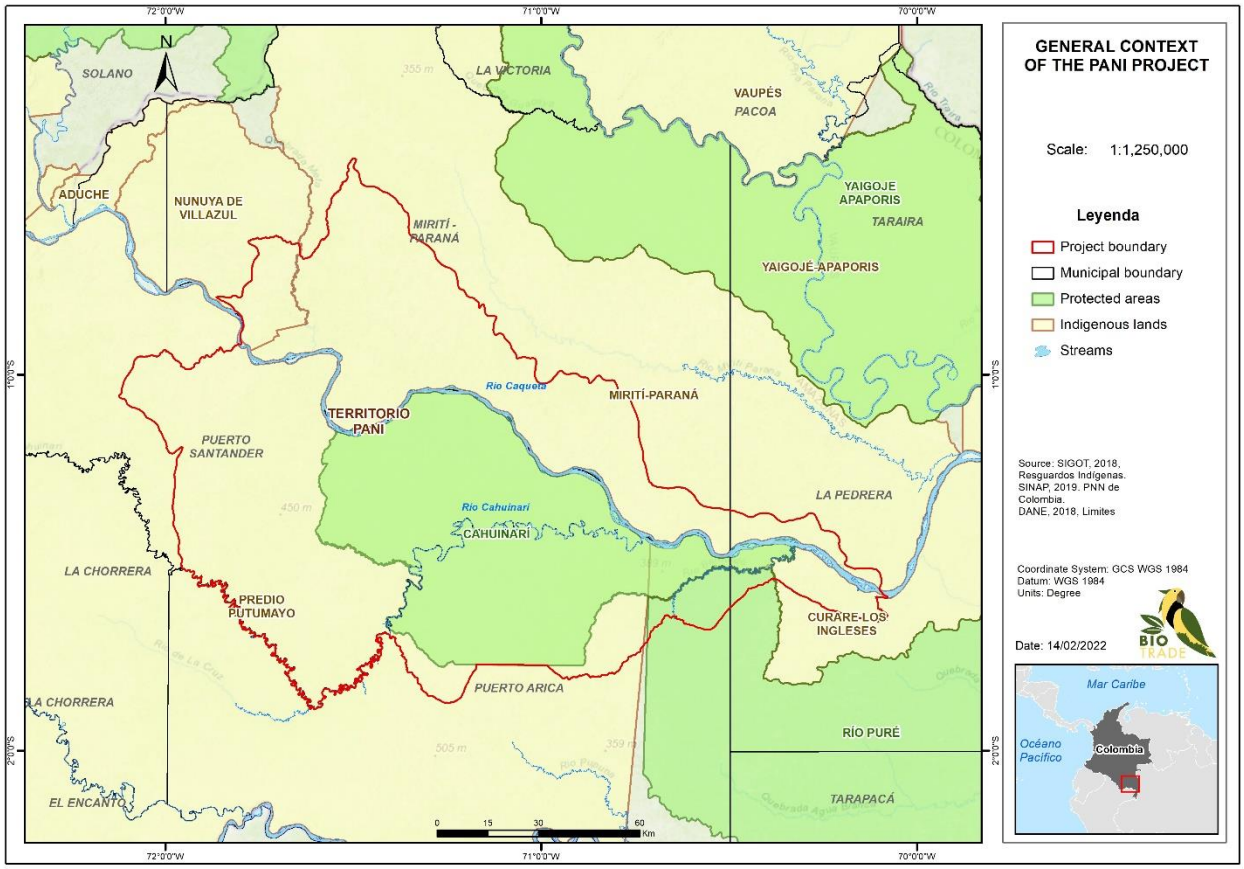


Figure 1. General context of project area.

In regional terms, the territories of the PANI indigenous association are located on the southern Colombian Amazon, more specifically, they are part of the Middle Caquetá region (Duivenvoorden & Lips, 1993). This region is also home to the Miraña and Bora, Witoto, Yucuna, Tanimuka, Matapí, Muinane, among others indigenous populations (OPIAC, 2022).

2.1.5.1 Topography

PANI territory is part of the lowlands of the Amazon basin. According to the altitude of the Araracuara meteorological station operated by IDEAM, the average altitude of the area is 150 m above sea level. The area has an alluvial plain topography (shaped by the Caquetá, Cahuinarí and Bernardo rivers), a large Tertiary sedimentary plain, terraces and hard rock formations.

According to Duivenvoorden & Lips (1993), the alluvial plain of the Caquetá River is characterized by a convex-concave topography, related to the presence of lateral sequences of elongated bars and depressions that run more or less parallel to the current river channel. This plain can be classified into areas of frequent flooding and areas of sporadic flooding, generally located further away from the river. On the frequent flood plain, we can find levees, bars, and beaches, this latest visible during the low water season.

Floodplains are also found in the alluvial plains of rivers of Amazonian origin, where most of the rivers run sinuously on a plane that reveals riverbank complexes as they pass.

Far from the banks of the Caquetá River, low and high terraces are found. Ibidem describes the low terraces of the Caquetá River as zones with a height of about 10 m above the low level of the Caquetá, some reach a level of 15 m and present a flat topography. Meandering rivers run over these terraces, forming shallow valleys of 2-6 and up to 8 m in depth and 10-100 m wide.

On the other hand, high terraces of the Caquetá River cover a much larger area than low terraces. Duivenvoorden & Lips (1993) found high terraces at three levels of approximately 25, 40-45 and 55-60 m above the average low level of the Caquetá River. They distinguish parts with a flat topography, little dissected, with a low to intermediate drainage density, and parts with a strongly dissected topography, with an intermediate to moderately high drainage density. The valleys formed in the high terraces are, in general, deep, and V-shaped, with very steep slopes (between 10-35°).

The Tertiary sedimentary plane is the largest topographic region within the study area. Duivenvoorden & Lips (1993) describe it as an extension of flat land with little dissected areas and dissected parts. The top elevation can reach 70 m above the lower level of the Caquetá River, although the southeastern part of the project area is only 40 m high.

Hard rock formations or sandstone plateau occur in the PANI territory near to Santa Isabel. There are elevations with an almost flat relief, with very irregular shapes due to the presence of deep fissures, structural scarps of 10 m in height and the presence of outcrops and loose sandstone blocks (Duivenvoorden & Lips, 1993). The dissected parts are characterized by straight, regular, and very steep slopes (15 - 35°). There are also isolated hills of hard rocks that can be found, mainly near to Santa Isabel, which do not have the tabular shape of the sandstone plateau (Figure 2).

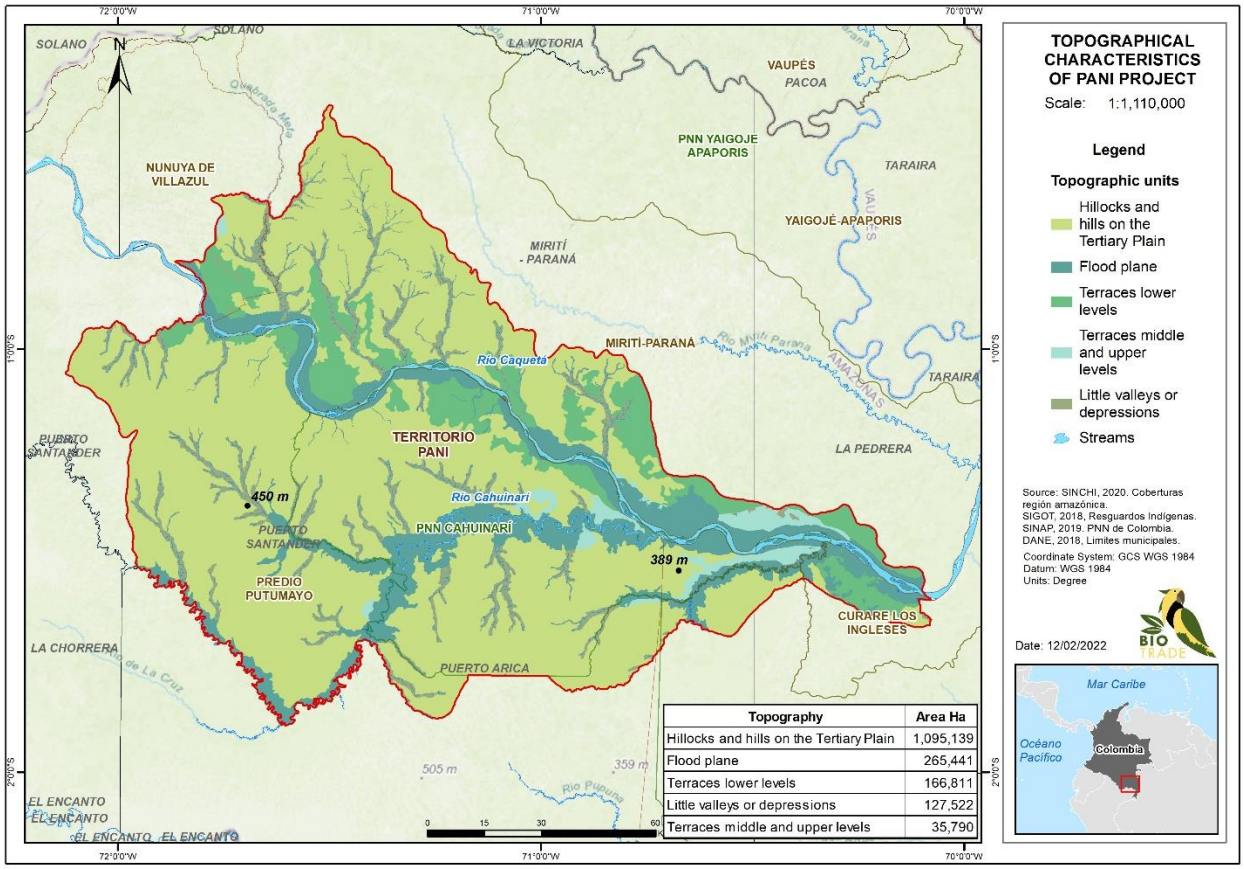


Figure 2. Topographical characteristics of project area.

2.1.5.2 Soils

The soils of the project area are developed on landscapes of hills, alluvial plains, and alluvial valleys. Hills are characterized by a repetition of banks of variable height and circular base, are separated by the dense to moderately dense hydrographic network that covers the PANI area; while the soils that are located on the alluvial plains of the Caquetá and Cahuinarí rivers are developed on deposits of mixed, fine, heterometric and organic sediments, product of the periodic flooding of the water bodies (Rocha, Calvache, Cetina, & Bernal, 1990). The alluvial valleys of the Caquetá, Cahuinarí and Bernardo rivers have soils on elongated and flat terrain, interspersed by two higher areas with terrace systems resulting from the dissection of water bodies on rocks.

Within the PANI territory there are 6 soil suborders, classified as Dystropepts, Hemists, Aquents, Perox, Udults, and Aquepts. According to spatial information from the Instituto Geográfico Agustín Codazzi (2015), soils are described at the subgroup level, finding soil cartographic units in association, consociation, and complex (Figure 3). The soil types are described below (Table 1).

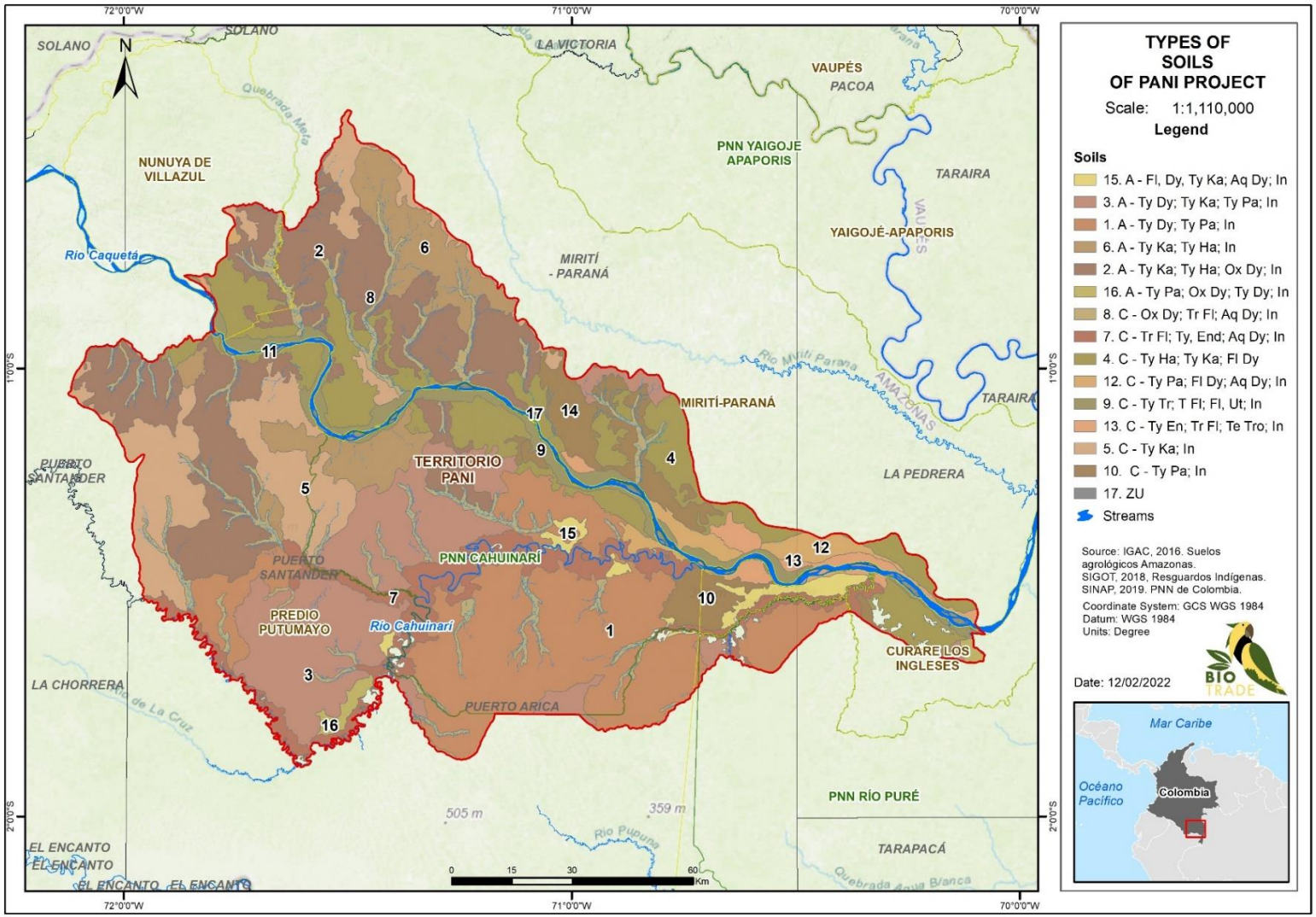

TYPES OF SOILS OF PANI PROJECT
Scale: 1:1,110,000
Legend
Soils
15. A - Fl, Dy, Ty Ka; Aq Dy; In
3. A - Ty Dy; Ty Ka; Ty Pa; In
1. A - Ty Dy; Ty Pa; In
6. A - Ty Ka; Ty Ha; In
2. A - Ty Ka; Ty Ha; Ox Dy; In
16. A - Ty Pa; Ox Dy; Ty Dy; In
8. C - Ox Dy; Tr Fl; Aq Dy; In
7. C - Tr Fl; Ty, End; Aq Dy; In
4. C - Ty Ha; Ty Ka; Fl Dy
12. C - Ty Pa; Fl Dy; Aq Dy; In
9. C - Ty Tr; T Fl; Fl, Ut; In
13. C - Ty En; Tr Fl; Te Tro; In
5. C - Ty Ka; In
10. C - Ty Pa; In
17. ZU
Streams
Source: IGAC, 2016. Suelos agrológicos Amazonas.
SIGOT, 2018, Resguardos Indígenas.
SINAP, 2019. PNN de Colombia.
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Date: 12/02/2022
BIO TRADE
Mar Caribe
Océano Pacífico
Colombia
SOLANO
LA VICTORIA
VAUPÉS
PACOA
NUNUYA DE VILLAZUL
PNN YAIGOJE APAPORIS
TARAIRA
YAIGOJÉ-APAPORIS
Río Caquetá
MIRITÍ - PARANÁ
MIRITÍ-PARANÁ
TERRITORIO PANI
PUERTO SANTANDER
LA PEDRERA
PNN CAHUINARÍ
PREDIO PUTUMAYO
Río Cahuinari
CURARE LOS INGLESES
LA CHORRERA
PUERTO ARICA
PNN RÍO PURÉ
TARAPACÁ
EL ENCANTO
505 m
359 m
Río Pupuna
Quebrada Agua Blanca
72°0'0"W
71°0'0"W
70°0'0"W
1°0'0"S
2°0'0"S
0 15 30 60 Km

Figure 3. Types of soils of the project area.

Table 1. Legend of the types of soils of the PANI project.

Label	Landscape	Type of soil	Percentage	Area (ha)
1	Hilly	Association: Typic Dystropepts; Typic Paleudults; Inclusion	50, 40, 10	305,213
2	Hilly	Association: Typic Kandiudults; Typic Haploperox; Oxic Dystropepts; inclusion	50, 40, 10	282,724
3	Hilly	Association: Typic Dystropepts; Typic Kandiudults; Typic Paleudults; inclusion	35, 30, 25, 10	212,914
4	Flood plain	Complex: Typic Haploperox; Typic Kandiudults; Fluventic Dystropepts	40, 30, 20, 10	184,117
5	Hilly	Consociation: Typic Kandiudults; Inclusiones	45, 40, 15	155,965
6	Hilly	Association: Typic Kandiudults; Typic Haploperox; Inclusiones	45, 25, 20, 10	107,101
7	Alluvial valley	Complex: Tropic Fluvaquents; Typic, Endoaquents; Aquic Dystropepts; inclusions	35, 35, 20, 10	103,732
8	Hilly	Complex: Oxic Dystropepts; Tropic Fluvaquents; Aquic Dystropepts; inclusions	35, 25, 25, 15	79,967
9	Flood plain	Complex: Typic Tropaquepts; Tropic Fluvaquents; Fluvaquentic, Utropepts; inclusions	35, 30, 20, 15	55,126
10	Hilly	Consociation: Typic Paleudults; inclusions	80, 20	54,125
11	Water bodies	Water body	Cuerpo de agua	45,392
12	Alluvial valley	Complex: Typic Paleudults; Fluventic Dystropepts; Aquic Dystropepts; inclusions	40, 30, 20, 10	28,210
13	Alluvial valley	Complex: Typic, Endoaquents; Tropic Fluvaquents; Terric Tropohemists; inclusions	40, 30, 20, 10	25,120
14	Hilly	Consociation: Typic Paleudults; inclusions	80, 20	23,905
15	Alluvial valley	Association: Fluventic Dystropepts; Typic Kandiudults; Aquic Dystropepts; inclusions	35, 30, 25, 10	20,993
16	Hilly	Association: Typic Paleudults; Oxic Dystropepts; Typic Dystropepts; inclusions	35, 30, 20, 15	8,805
17	Urban areas	Uban area	-	34

Suborder Dystropepts.

Rocha, Calvache, Cetina, & Bernal (1990) describe the Dystropepts soils as superficial soils, limited by a high content of exchangeable aluminum; well drained, with clayey textures and well evolved. They present a sequence of AB horizons of friable consistency and brownish colors in surface to reddish in depth. Chemical analyses indicate that they are very acidic; low to very low in calcium, magnesium, and potassium saturation; low in phosphorus and nitrogen and high in aluminum saturation.

According to the USDA (1999) soil classification guide, the suborders Aquic, Oxic and Typic are described beneath:

Aquic Dystropepts: Other Dystropepts that have, in one or more horizons within 75 cm of the mineral soil surface, redox depletions with chroma of 2 or less and also aquic conditions for some time in normal years (or artificial drainage).

Oxic Dystropepts: Other Dystropepts that have in 50 percent or more of the soil volume between a depth of 25 cm from the mineral soil surface and either a depth of 100 cm or a densic, lithic, or paralithic contact if shallower:

1. A CEC (by 1N NH4 OAc pH 7) of less than 24 cmol(+) per kg clay; or

2. Both a ratio of measured clay in the fine-earth fraction to percent water retained at 1500 kPa tension of 0.6 or more and the following: the CEC (by 1N NH4 OAc pH 7) divided by the product of three times [percent water retained at 1500 kPa tension minus percent organic carbon (but no more than 1.00)] is less than 24.

Typic Dystropepts: Other Dystropepts.

Suborder Hemists:

USDA guide (1999) define the suborder Hemists like wet Histosols in which the organic materials are moderately decomposed. The botanic origin of much of the organic material cannot be readily determined. The fiber content of much of the organic material is between one-sixth and two-thirds after rubbing between the thumb and fingers.

Ground water is at or very close to the surface of these soils much of the time unless artificial drainage has been provided. The level of ground water may fluctuate but seldom drops much below the bottom of the surface tier. Hemists occur from the Equator to latitudes with a cryic temperature regime. They are in closed depressions and in broad flat areas, such as coastal plains and outwash plains. Most Hemists are under natural vegetation and are used as woodland, rangeland, or wildlife habitat.

Typic Tropohemists: Soil Survey Staff (1987) define Tropohemists like:

a. Do not have a mineral layer between 5 and 30 cm thick within organic materials or do not have two or more thin, continuous mineral layers in the control section below the surface tier;
b. They have less than 25 cm of the subsurface and bottom tiers consisting of fibric materials and less than 25 cm of the subsurface and bottom tiers consisting of sapric materials.
c. Do not have a layer of water within the control section beneath the surface tier.
d. Do not have a limnic layer(s) that are 5 cm or more thick within the control section.
e. Do not have a lithic contact within the control section.

Suborder Aquents

The Entisols has unique properties common, they are dominance of mineral soil materials and absence of distinct pedogenic horizons (USDA, 1999).

The Aquents are the wet Entisols. They may be in tidal marshes, on deltas, on the margins of lakes where the soils are continuously saturated with water, on flood plains along streams where the soils are saturated at some time of the year, or in areas of wet, sandy deposits. Many Aquents have bluish or grayish colors and redoximorphic features. They may have any temperature regime. Most of them formed in recent sediments, and they support vegetation that tolerates permanent or periodic wetness.

Tropic Fluvaquents: are other Aquents that have either 0.2 percent or more organic carbon of Holocene age at a depth of 125 cm below the mineral soil surface or an irregular decrease in content of organic carbon from a depth of 25 cm to a depth of 125 cm or to a densic, lithic, or paralithic contact if shallower.

And they present jungle tropical conditions, high precipitation through the year with less precipitation in the dry month (more than 60 mm) and average temperatures > 18°C.

Typic Endoaquents: are the Aquents that have an isofrigid, frigid, or warmer temperature regime and endoaquic saturation. The ground water fluctuates from a level near or above the soil surface to about 100 cm below the soil surface and is sometimes below 200 cm.

Endoaquents are nearly level, and their parent materials are typically late-Pleistocene or Holocene sediments.

Suborder Perox

Perox are Oxisols well drained with a perudic soil moisture regime. According to USDA (1999) the unique properties of Oxisols are extreme weathering of most minerals other than quartz to kaolin and free oxides, very low activity of the clay fraction, and a loamy or clayey texture (sandy loam or finer). They are characteristic of tropical or subtropical regions, on land surfaces that have been stable for a long time.

In Perox, clearing and burning are difficult because of atmospheric wetness. Curing many seed crops and storing produce also are difficult.

Typic Haploperox: These are the Perox that have, in all subhorizons of an oxic horizon within 150 cm of the mineral soil surface. They Have 35 percent or less base saturation (by NH4 OAc) in some or all parts within 125 cm of the mineral soil surface; and do not have a sombric horizon within 150 cm of the mineral soil surface.

Also, this type of soil Do not have an apparent t ECEC[14] of less than 1.50 cmol (+) per kg clay and a pH value (1N KCl) of 5.0 or more in some part of an oxic horizon within 150 cm of the mineral soil surface; and do not have a kandic horizon that has its upper boundary within 150 cm of the mineral soil surface.

Suborder Udults

[14] Effective Cation Exchange Capacity (ECEC).

Udults belong to the Order Ultisols. The Ultisols are soils that have an argillic or kandic horizon with low base saturation. There is more precipitation than evapotranspiration at some season, and some water moves through the soils and into a moist or wet substratum (USDA, 1999).

Udults are the more or less freely drained, humus-poor Ultisols that have a udic moisture regime. They are in humid climates, and most receive well distributed rainfall. Most have light-colored upper horizons, commonly a grayish horizon that rests on a yellowish brown to reddish argillic or kandic horizon. A few that developed from basic rocks have a dark brown or reddish-brown surface horizon that rests on a dark red or dusky red argillic or kandic horizon. Some have a fragipan or plinthite, or both, in or below the argillic or kandic horizon.

Typic Paleudults

These are the very deep, more or less freely drained Udults on very old stable land surfaces. These soils do not have a kandic horizon. Many have a thick argillic horizon. The soils have a clay distribution in which the percentage of clay does not decrease from its maximum amount by as much as 20 percent within a depth of 150 cm from the mineral soil surface.

These soils do not have a fragipan or a horizon in which plinthite either forms a continuous phase or constitutes one-half or more of the volume within 150 cm of the mineral soil surface. The natural vegetation consisted of forest plants.

Typic Kandiudults

Kandiudults are the Udults that are very deep and have a kandic horizon and a clay distribution in which the percentage of clay does not decrease from its maximum amount by as much as 20 percent within a depth of 150 cm from the mineral soil surface, or the layer in which the clay percentage decreases has at least 5 percent of the volume consisting of skeletans on faces of peds and there is at least a 3 percent (absolute) increase in clay content below this layer. These soils do not have a fragipan or a horizon in which plinthite either forms a continuous phase or constitutes one-half or more of the volume within 150 cm of the mineral soil surface.

Suborder Aquepts

The suborder Aquepts belongs to order Inceptisols. This type of soils have a wide range in characteristics and occur in a wide variety of climates.

According to the USDA (1999), the unique properties of Inceptisols are a combination of water available to plants for more than half the year or more than 3 consecutive months during a warm season and one or more pedogenic horizons of alteration or concentration with little accumulation of translocated materials other than carbonates or amorphous silica. In addition, Inceptisols are a thick, have a dark surface horizon and a high calcium supply.

Typic TropAquepts

These are the wet Inceptisols. The natural drainage is poor or very poor and, if the soils have not been artificially drained, ground water is at or near the soil surface at some time during normal years but typically not at all seasons. These soils generally have a gray to black surface horizon and a gray subsurface horizon with redox concentrations that begins at a depth of less than 50 cm. A few of the soils have a brownish surface horizon that is less than 50 cm thick. The Typic Tropaquents are found under very hot conditions, and high yearly rainfall, typical of the Equatorial zone.

Fluvaquentic Ustropepts

Romero Picón (2010) describes these soils as having formed from recent colluvial sediments, and frequently have buried gum horizons. They have loamy, sandy loam and clayey textures, dark grayish-brown colors and a poorly developed coarse blocky structure. Chemically they are slightly acidic, poor in organic matter, with medium to high cation exchange capacity, very high total base saturation, high phosphorus availability for plants and moderate fertility.

2.1.5.3 Climate (Rainfall and Temperature)

2.1.5.3.1 Climate

The climate of the southern region of the Colombian Amazon is influenced by three major atmospheric circulation systems. Its location on the equator allows the interaction of the tropical band of NE trade winds, the tropical band of SE trade winds, and the equatorial band where these two converge (Dominguez, 1985).

The dynamic interaction of the air masses and the corresponding rainfall and solar radiation over the area defines, according to Köppen's system (1936), the climate of the Middle Caquetá region as Afi: equatorial, always humid without a dry season, with sufficient rainfall (>60 mm) in all months, with a temperature difference of less than 5°C between the warmest and coldest month, and high relative humidity, which is always higher than 80% in the area (CORPOAMAZONIA, n.d.). These conditions allow the development of the equatorial rainforest, characterized by tall, dense vegetation composed of large trees. In the Holdridge system, the area of Medio Caquetá, to which the study area belongs, holds to the tropical rainforest life zone (Bh-T) (Duivenvoorden & Lips, 1993).

Precipitation and temperature data for the Middle Caquetá region were obtained from the Araracuara station located at coordinates 0°37' S and 72°24' W at approximately 160 m above sea level.

2.1.5.3.2 Rainfall behavior

Monthly precipitation averages at the Araracuara station show an almost unimodal precipitation regime, with a decrease in rainfall in the months of December, January, and February (period of low precipitation). The rainiest months are April, May, June, and July. There is a slight decrease in precipitation in the month of August (called veranillo). The annual average rainfall is 3059 mm.

The least rainy periods occur when Araracuara is under the influence of the trade winds (Dominguez, 1985). These winds come from the northern equatorial mass during the months of December to March, when the intertropical convection zone (equatorial low-pressure zone) is located south of Araracuara over the Amazonian trapezoid. In the August-September period, the equatorial low-pressure zone is located north of Araracuara, between 5 and 10° N (Cochrane et al., 1985), and trade winds can reach the Araracuara area from the southeast. During the rest of the year, the equatorial zone of low pressure passes the town of Araracuara (Cochrane et al., 1985), causing greater rainfall.

According to Duivenvoorden & Lips (1993), the lowest number of rainy days is recorded in January and February with an average of 14 rainy days each, and July is the month with the highest average number of rainy days (24 days). The annual average number of rainy days (adding the monthly averages) is 225 days, representing 62% of the days of the year. While the relatively long periods of persistent droughts generally occur in the months of November to March. In the rainiest months: April, May, June, July, September and October, there can be periods of 4 or even 5 consecutive days without rain. Regarding rainfall intensity, 70% of the rain fell in downpours greater than or equal to 10 mm, while 16% fell in downpours greater than or equal to 50 mm (Figure 4).

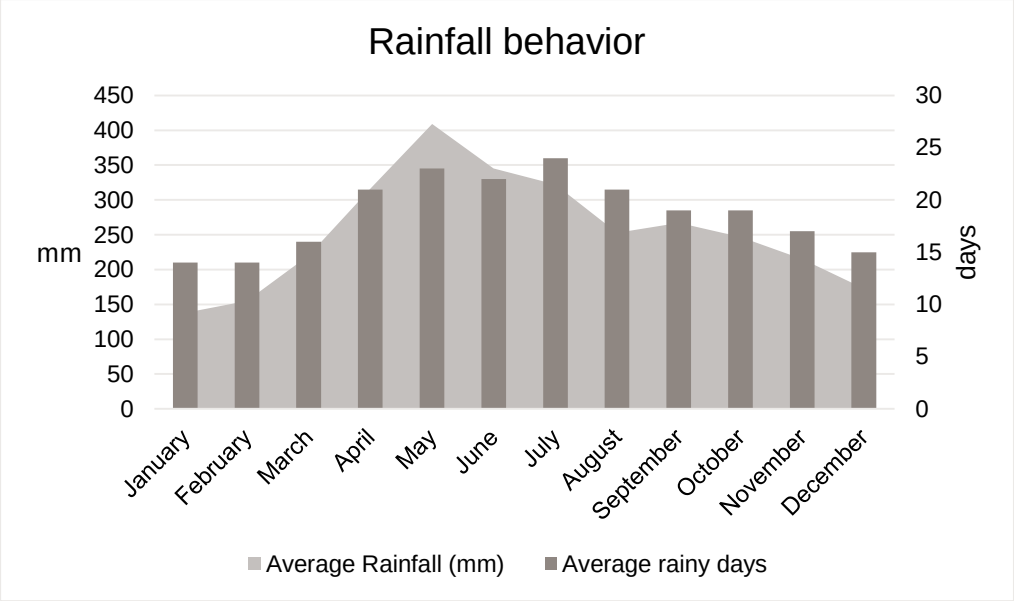


Figure 4. Rainfall behavior. Average multiyear (30 years).

2.1.5.3.3 Air temperature

In Araracuara, as in the entire equatorial zone, the temperature shows large daily fluctuations, and temperature fluctuations over the course of the year are negligible. During the day the temperature reaches 29 to 32°C (maximum monthly averages); at night it drops to 21 - 23°C (minimum monthly average). Maximum temperatures are reached in the period between December and March. The highest average monthly temperature was recorded in December (27.2°C). June and July are the months with the lowest average monthly temperature (25.2°C). The other months have temperatures within the average range, which, according to CORPOAMAZONIA, averages 28°C in the southeastern Amazonian plain (Figure 5).

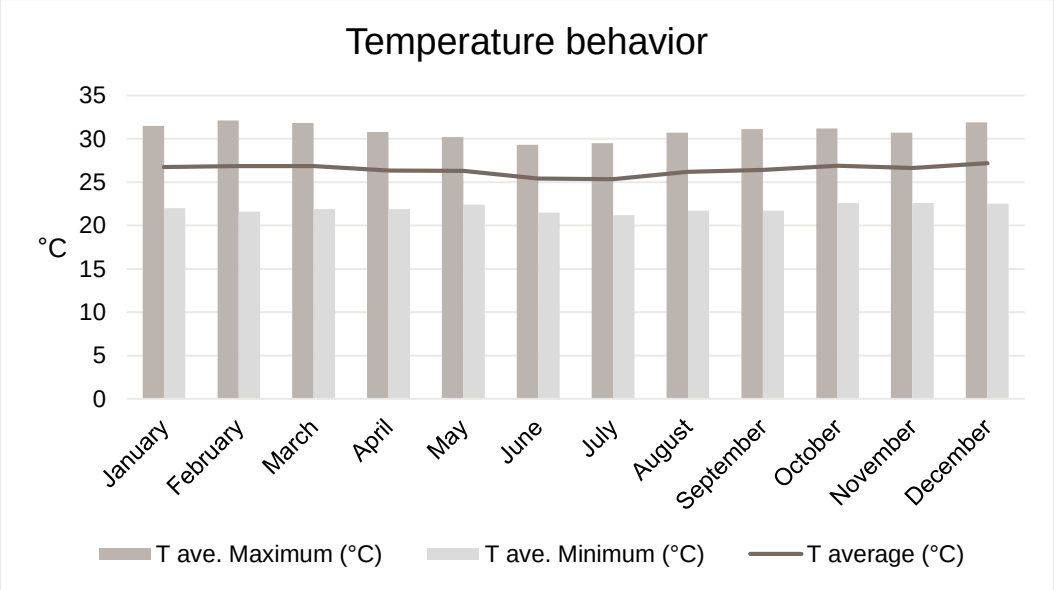


Figure 5. Temperature behavior. Average multiyear (30 years).

2.1.5.3.4 Relative Humidity

In general terms, the relative humidity in the area is very high, with monthly averages varying between 82 and 92%; these numbers are slightly higher in the rainiest months (April - July). Likewise, the relative humidity is higher and more or less constant at night. During the day it can drop to below 50%.

2.1.5.3.5 Potential Evapotranspiration and Water Balance

Duivenvoorden & Lips (1993) calculated potential evapotranspiration (PE) based on 5-year average monthly evaporation data from the evaporimeter tank of the Araracuara station. The PE was calculated at 1,447 mm/year during the period 1986 - 1990, using a coefficient of 0.85 to correct the data (Doorenbos & Pruitt, 1977).

When analyzing the monthly averages, it is observed that precipitation always exceeds potential evapotranspiration and that all soils have an excess of water throughout the year. However, in almost all years there are one or more months (during December-February) which precipitation is lower than the PE.

2.1.5.4 Hydrology

The PANI territory is in the northwestern sector of the Amazon River macro-basin. This important macro-basin includes the Caquetá and Cahuinarí river basins, which represent 59% and 40% of the territory respectively; the remaining 1% belongs to fractions of the Putumayo and Mitirí - Paraná River basins. About 254.1 km of the Caquetá River crosses the PANI territory in a southwest to northeast direction, while 416.7 km and 115.1 km of the Cahuinarí and Bernardo Rivers (respectively) cross the PANI area in a southwest to northeast direction and finally flow into the Caquetá River.

The Caquetá River basin is in the northwestern part of the Amazon River basin. According to HIMAT (former IDEAM), the average flow of the Caquetá River in 1980-81, near the Brazilian border, was 12,380 m3/s (Duivenvoorden & Lips, 1993). The course of the river is characterized by the presence of long bends, up to 25 km wide. In some parts the course is almost straight. In the stretch from Araracuara to the mouth of the Cahuinarí River, the sinuosity index is 1.3, which characterizes it as a relatively straight river. In addition, in combination with the presence of stable islands covered with well-developed alluvial forest, Duivenvoorden & Lips, (1993) indicate that the Caquetá River can be classified as a braided river. Throughout the middle Caquetá River basin there are outcrops of Precambrian rocks in the river channel. In the case of the Cahuinarí River, the sinuosity index is 2.2, characterizing it as a meandering river.

The water level of the Caquetá River shows an annual periodicity, with minimum levels in the months of December-February and maximum levels in the months of June-August. The seasonal amplitude of the Caquetá River water level, near to Araracuara, generally varies between 7 and 8 m. In the rest of the Middle Caquetá area, the amplitude of the Caquetá River water level generally varies between 6-8 m per cycle. Walschburger, Monje, & Muñoz (1990) recorded a 9.8 m amplitude of the Cahuinarí River near its mouth in the Caquetá River in the period from September 1988 to October 1989.

According to Sioli's optical characteristics for rivers classification (1950), the Caquetá River is classified by Duivenvoorden & Lips (1993) as a whitewater river. The water of this river is clearly distinguished from other rivers and streams by its high pH, high content of sand, clay, and silt in suspension coming from the erosive processes operating in the Andes Mountains, which provide a light brown color to its waters, and high content of calcium and bicarbonates, which makes it a river with a relatively high electrolytic charge, so these aquatic environments have better potential conditions for biological production (Arrignon, 1979).

On the other hand, most of the Amazonian rivers and streams in the Middle Caquetá area Clearwater rivers, although sometimes the color is slightly darker due to the mixture with black water streams. Generally, they are born in places that present very strong geological material and are slightly acidic waters with very low levels of electrolytes and very low load of suspended materials, which allows total transparency and clear observation of the bottom of the riverbed.

Duivenvoorden & Lips (1993) describe the Cahuinarí River as a Clearwater river with high calcium and bicarbonate values. Although high electrical conductivity and electrolyte values are an exception, these phenomena may be because of the Cahuinarí basin developed mainly in the blue tertiary clays of the Pebas formation, which apparently contain high concentrations of nutrients (Lips & Duivenvoorden, 1991). This same phenomenon could also explain the fact that the waters of the Cahuinarí are not as crystalline as the waters of the other Amazonian rivers.

The streams that drain the low areas in the alluvial plains where a lot of organic material accumulates, occasionally have dark colors, also the stagnant waters of the swamps in the low terraces of the Caquetá River present characteristics of black water.

2.1.5.5 Hydrogeology

The hydrogeology of the study area can be grouped into terraces and alluvial plains of the Caquetá River, the plains and alluvial deposits of the Cahuinarí and Bernardo rivers, and the Tertiary sedimentary plane.

Alluvial terraces of the Caquetá River

Duivenvoorden & Lips (1993) classify the terraces of the Caquetá River between low and high considering the height of the wall above the low river level. The low terraces of the Caquetá River have a height of about 10 m, some of them reach 15 m, and are characterized by their flat topography. The high terraces cover a

much larger area than the low terraces and are grouped into three levels of approximately 25, 40-45 and 55-60 m above the average low level of the Caquetá River. There are parts with a flat topography, little dissected, with a drainage density between low and intermediate, and parts with a strongly dissected topography, with a drainage density between intermediate and moderately high.

The parent material of the terraces is constituted at the base of the sequence by yellow sands and rounded quartz gravels up to 5 cm in diameter. Ibidem identified in the lower part of the sequence, sands and gravels cemented with secondary iron, which form discontinuous ferruginous crusts and sheets. In some cases, flint (chert), of Andean origin, is found at the base. The following layers (ascending) present finer deposits, although always with a component of coarse angular quartz sand.

Ibidem describe the sediment sequence of the terraces as not very thick: maximum thickness of approximately 10 m, and most often describe sequences only 2-3 m deep. In addition, the sediments of the high terraces lie on Tertiary sediments and very rarely on sandstone rocks.

Plains and alluvial deposits of Caquetá and Cahuinarí rivers

These are alluvial plains characterized by convex-concave topography, related to the presence of lateral sequences of elongated bars and depressions that run more or less parallel to the current river channel. The Caquetá River plain can be classified into areas of frequent flooding and areas of sporadic flooding, generally located further away from the river. On the frequent flood plain, there are dikes, bars and beaches, the latter being visible during the low water season.

Floodplains are also found in the alluvial plains of rivers of Amazonian origin, where most of the rivers run sinuously on a plane that reveals complexes of riverbanks as they pass through.

The characteristics of the alluvial deposits of the Amazonian rivers are quite variable because they depend on the geological materials present in each river basin (Duivenvoorden & Lips, 1993). Van der Hammen (1991) describes the alluvial sediments of the Cahuinarí River as relatively clayey and with accumulation of peaty material.

Ibidem describes the alluvial plain of the Caquetá River as sandy sediments at the base and clays in the upper part, probably deposited in a late-glacial (Pleistocene) depositional phase. On the other hand, the current deposits that form beaches vary from silty to sandy with very fine gravel. The sediments of the dikes are composed of fine silty sands. Further inland in the floodplain the actual sediments are clays and silty clays.

Tertiary sedimentary plane

The Cahuinarí River flows over the Amazonian Lower Tertiary plain, according to the Servicio Geológico Colombiano (2015) this plain is composed of poorly consolidated Miocene conglomerates and arenites in which claystone can be found with intercalations of siltstones, sandy mudstones, and arenites.

The Cahuinarí River flows over the Amazonian Lower Tertiary plain, according to the Colombian Geological Service (2015) this plain is composed of poorly consolidated Miocene conglomerates and arenites in which claystones can be found with intercalations of siltstones, sandy mudstones, and arenites Khobzi et. al., (1980); Eden et. al., (1982); and Hoorn (1990) describe in this unit blue sandy clays and claystones, siltstones and very fine sands. They also highlight the presence of black clays, lignites and calcareous levels. Also noteworthy are the presence of mollusks, ostracods, and vertebrate macrofossils in blue clays. According to Hoorn (1990) these sediments were deposited in a coastal environment in the middle Miocene age.

Duivenvoorden & Lips, (1993) describe that, layers of a few meters of sandy alluvial sediments that cover the sediments of the Pebas formation, and the Upper Amazonian Tertiary, are regularly found in both flat and strongly dissected parts. The base of this layer is formed by rounded gravels of 1-2 cm in diameter and according to their composition are of Andean origin (Figure 6) (Table 2).

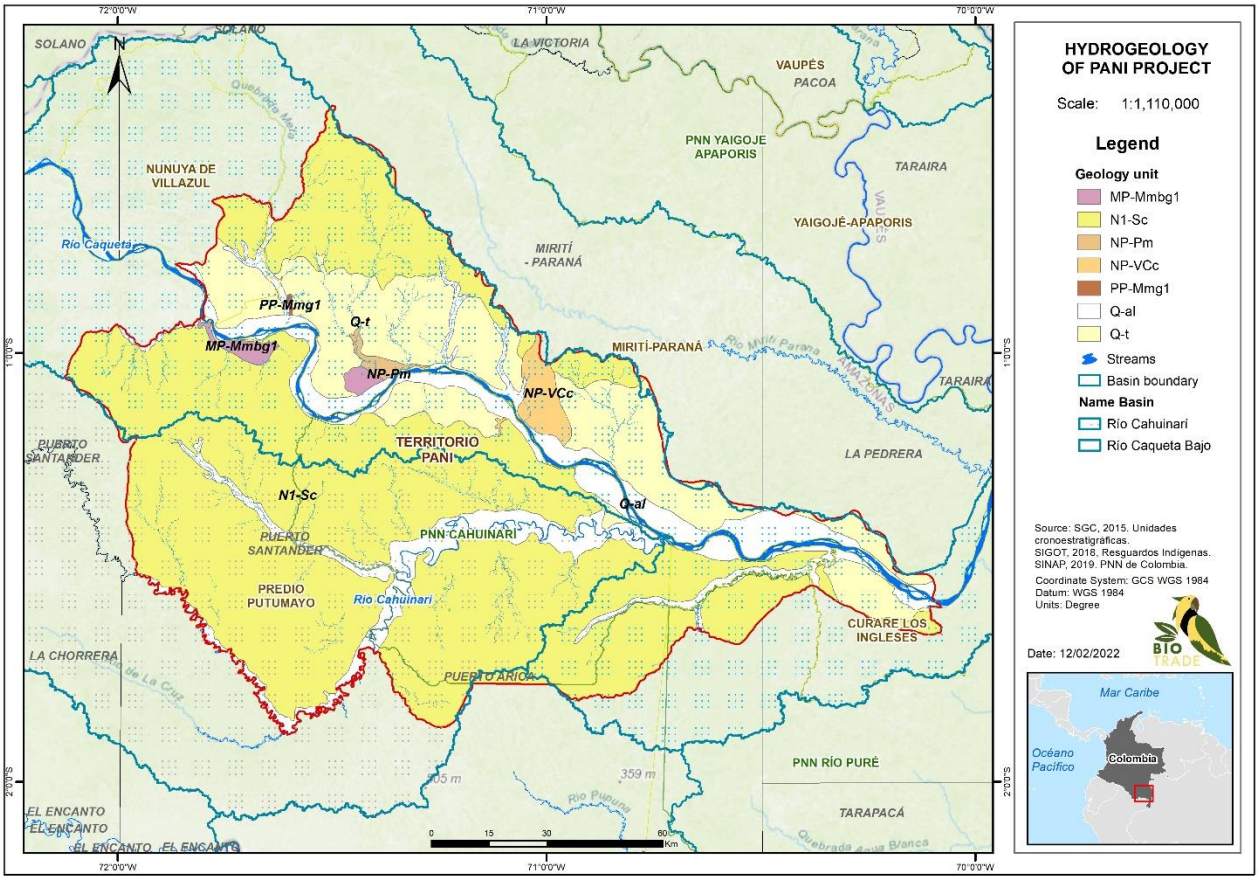


Figure 6. Hydrogeology of project area.

Table 2. Hydrogeology legend for the PANI project

Basin name	Landscape unit	Geology unit	Description	Age	Area (ha)
Caquetá river	Hard rock forms	MP-Mmbg1	Metaconglomerates, metarenites, quartzites and metapelites with very low-grade regional metamorphism.	Mesoproterozoic	11,986
	Tertiary sedimentary plane	N1-Sc	Poorly consolidated conglomerates and arenites with ferruginous and clayey matrix.	Miocene	498,370

Basin name	Landscape unit	Geology unit	Description	Age	Area (ha)
			Also, claystones with intercalations of siltstones, sandy mudstones and arenites.		
	Hard rock forms	NP-Pm	Alkaline gabbro	Neoproterozoic	6,119
	Hard rock forms	NP-VCc	Conglomerates, rhyodacitic tuffs, quartzarenites and feldspathic arenites.	Neoproterozoic	20,950
	Hard rock forms	PP-Mmg1	Quartz-feldspathic gneisses, amphibolites, migmatites, quartzites, quartz gneisses and granites with variations to alaskites and monzonites.	Paleoproterozoic	539
	Plains and alluvial deposits	Q-al	Alluvial and floodplain deposits	Quaternary	174,456
	Alluvial terraces	Q-t	Alluvial terraces	Quaternary	287,373
Cahuinarí river	Tertiary sedimentary plane	N1-Sc	Poorly consolidated conglomerates and arenites with ferruginous and clayey matrix. Also, claystones with intercalations of siltstones, sandy mudstones and arenites.	Miocene	589,056
	Plains and alluvial deposits	Q-al	Alluvial and floodplain deposits	Quaternary	87,644
	Alluvial terraces	Q-t	Alluvial terraces	Quaternary	1,823
Miritί Parana, Putumuyo rivers	Tertiary sedimentary plane	N1-Sc	Poorly consolidated conglomerates and arenites with ferruginous and clayey matrix. Also, claystones with intercalations of siltstones, sandy mudstones and arenites.	Miocene	7,944
	Hard rock forms	NP-VCc	Conglomerates, rhyodacitic tuffs, quartzarenites and feldspathic arenites.	Neoproterozoic	43
	Alluvial terraces	Q-t	Alluvial terraces	Quaternary	4,399

2.1.6 Social Parameters (G1.3)

2.1.6.1 History of the PANI

The affiliation of the Bora and Miraña peoples is patrilineal, which indicates that they descend from the same mythical ancestor, that they are parts of the body of the ancestor and members of the same group, that is to say, that they have a consubstantial relationship (Miraña & Guiro, 2013). By 1710 there were more than 30 Bora and Miraña clans and lineages, currently, at least 10 survive: achiote, chontaduro, boa, sparrowhawk, coconut, macaw, tiger, parrot, muchilero, mosquito. They are towns that have lived a history of contact with the empires of Spain and Portugal, so that later it was influenced by Brazil, Peru and Colombia in republican times. However, at the end of the 19th century, Colombian rubber tappers were the first to enter the Igaraparaná, Cahuinarí and Caquetá river basins, which were replaced by Peruvian rubber tappers at the beginning of the following century. The rubber industry and other processes associated with slavery reduced its population from around 15,000 in 1905 to just over 400 in 2008 (Miraña, et al., 2009), 363 in 2013 (Miraña & Guiro, 2013)and 521 in 2022 (PANI, 2022).

When we refer to the Mirañas, we must consider that this name does not correspond to their self-denomination, since they name themselves as *Dopiriameje* . The Miraña denomination corresponds to what

the Portuguese, Brazilians and the tribes that were to the east of them called them, and means in the Tupi language "people who run". For their part, the Boras call themselves Umejete, “face people”. These two ethnic groups, together with the Muinanes, belong to the Bora linguistic family (Miraña, et al., 2009).

By the middle of the 18th century, Portuguese merchants went up the Caquetá-Japurá to Araracuara, in search of cocoa, sarsaparilla and Miraño people to enslave since these were very numerous and controlled the Caquetá River between the Cupatí stream (Puerto Córdoba) and the Quinché. A commercial exchange was also carried out in which the "whites" exchanged axes and tools for fariña, feathers, batons, blowguns, tar, spears, hammocks and other articles made by the Boras and Mirañas . Two commands were established, one Miraña in the Cupatí stream and the other Bora in the Putumayo river at the mouth of the Igaraparaná , with whom the "whites" made the exchanges, to later distribute the merchandise throughout the territory (Miraña, et al., 2009).

The extractive dynamics in the Colombian Amazon began to appear, initially with a large commercial empire known as Casa Arana, which was created by a Peruvian congressman and rubber merchant named Julio César Arana del Águila who made alliances with some Colombian rubber tappers from 1901, to later found Casa Arana in 1903. The house had two large districts: El Encanto and La Chorrera, the first focused on areas surrounding the Carapaná River and its tributaries, the second on the areas surrounding the Igá Paraná and Cauhuinarí (Pineda, 2003). Through contracting and slavery methods, the Arana house managed to have a large amount of labor, which by 1922 had 12,000 indigenous people, including those who worked in the rubber industry and their families.

In the particular case of the Miraña Bora ancestral territory, camps of the first rubber tappers were established on the Cahuinarí River, carrying out the practice of indebtedness [15]for the extraction of rubber with the Bora and Miraña. Later, the Arana house buys the camps and debts of Abyssinia and Morelia (Caquetá River); Santa Catalina, Gondar and Gavilanes (Cahuinarí River); and Providencia, Indostán, and Santa Julia (Igaraparaná River). Later, the capture of La Pedrera in 1911 by soldiers of the Peruvian army, forced the Bora and Miraña to withdraw and enter the Miritί River in search of refuge, by 1933, when the war with Peru had ended, the Bora and Miraña went out again to the Caquetá and Cahuinarí rivers (Miraña, et al., 2009). It is estimated that at the beginning of the Arana house (1908) there was a population of approximately 15,000 Mirañas and Boras (PNNC, 2010), rising to just over 500 by 2021 (PANI, 2022).

Today, these dynamics make it possible to identify that there are Indigenous Peoples in Voluntary Isolation (PIA)[16], who inhabit the tributaries of the lower Bernardo River, ancestral territory of the PANI, and the Puré River. They are known by the Miraña and Bora as colloquially as Arojes (people from guama), Caraballos or Yurí Passé, which at the beginning of the 20th century controlled the area of the mouth of the Bernardo River in the Caquetá River and was attacked by the Brazilians who were trading along the Caquetá River. There has been no contact with them since 1969, when an expedition was looking for a Colombian trader named Julián Gil, who wanted to contact them to get cheap labor (Franco, 2012).

After the war with Peru (1932-1937) (Gonzalez & Samacá, 2012), a great demand for animal skins began to be generated in the United States and Europe, which had repercussions in the Colombian Amazon, in which the Boras and Mirañas began to hunt tigrillos to obtain the skin of tigrillo, tigre (tigrilladas) and otters

[15]Endless cycle that allowed the bosses to maintain, by force of obligation, a very cheap workforce, almost free, which only benefited from some tools used in the extraction of rubber, skins and others (BANREP)

[16]According to the Inter-American Commission on Human Rights, and Decree Number 1232 of 2018 of the Colombian Ministry of the Interior, and for the PANI they are currently known as PIENSE (Indigenous Peoples in a Natural State).

(Payán & Trujillo, 2006). The economic relations did not change with respect to the rubber industry , presenting again a bonanza of resources including the indebtedness system for the indigenous. Around 1974 this business ended with the commercial ban that regulated the disappeared INDERENA. After this event, a cycle of bonanzas began that began with the use of eggs and charapa turtle (80's), gold mining in alluvial deposits (decades of the 80's, 00's 10's) and illicit crops (90's) (Miraña, et al., 2009).

There are a series of relevant events that after 1982 led to the creation of the PANI association of traditional indigenous authorities, such as the creation of the Miritί Parana (1981) and Predio Putumayo (1988) indigenous reservations, the declaration of the PNN Cahuinarí (1987), the constitution of Colombia of 1991 and decree 1088 of 1993 and that we will later be contemplating in this document (Miraña, et al., 2009).

In 1994, the communities of San Francisco (partiality of Solarte and Las Palmas), Puerto Remanso and Mariapolis (partiality of Manacaro) came together to create ALEZCA - Local Association of Regional Ethnic Groups of Captains, whose purpose was to associate for the management of transfers, the education and health of its associates. The following year (1995), the Association changed its name to PANID (God of the center and his grandchildren Mirañas) and later in 1996 through a contest the association defined that it would be named PANI (God of the center and his grandchildren) . From that moment on, the Association began a campaign to obtain its legal recognition and organizational structure (Figure 1), which by the year 2000 was achieved before the Ministry of the Interior and Justice. Since that date, the association has not updated the registry of existence and legal representation before said Ministry (Miraña & Guiro, 2013).

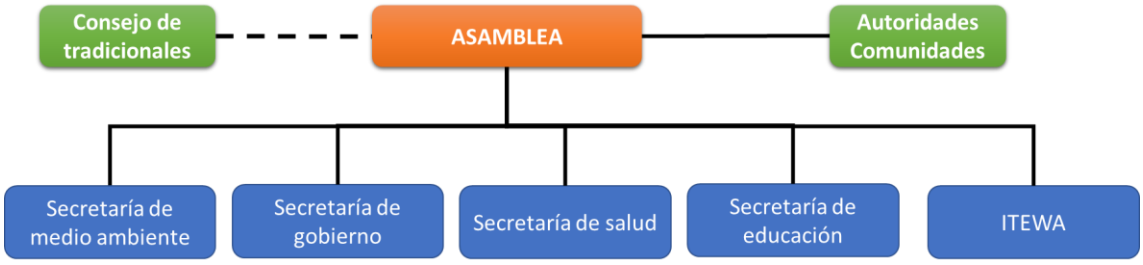


Figure 1. PANI organizational structure. Source: (Miraña & Guiro, 2013).

Finally, for 2018, a special procedure was established for the implementation of indigenous territories in non-municipalized areas of the departments of Amazonas, Vaupés and Guainía; this through decree 632 of 2018, which gives guidelines for the recognition of indigenous government structures and delimit their territories as territorial entities, to finally define matters related to the administration of state resources (Guio & Rojas, 2019).

Currently, the PANI is developing actions to apply decree 632 of 2018, which allows it to go from an AATI to an Indigenous Territorial Entity (ETI) [17], since its territory is in a non-municipalized area of the department of Amazonas. One of the requirements to be ETI is the agreement of the limits of its territory, for which it is based on the agreements on the territory that were made between 2007 and 2008 with the Conservation

[17]Work that is being coordinated with the support of the Norwegian embassy through the Gaia Amazonas Foundation.

Mosaics project that, based on intercultural meetings and congresses with the neighbors adjusted limits and agreements of use and exploitation, which are developed in numeral 2.5.3.3.

2.1.6.2 demographics

The population dynamics of the Bora and Miraña tended to have provisional settlements, which were changed according to the possibilities of finding food (hunting and fishing) and the possibility of making a good chagra. Thus, in 1941 the first permanent community was created, that of Puerto remanso (1941) with the arrival of Guillermo Miraña and Carlos Koogwao . Later, other communities were formed, such as San Francisco (1942), Mariapolis (1955), Quinché Metá (1979), Las Palmas (1996) and Manacaro (2013). Currently, the PANI has five communities and one partiality (Miraña & Guiro, 2013).

2.1.6.2.1 PANI communities

Quinche – Metá

This community is located within the Nunuya reservation of Villa Azul in the northwestern part of the PANI territory, with its homes on the north side of the Caquetá River, bordering the Peñas Blancas community of the CRIMA association. The families of Quinché — Metá decided to join the PANI in 1979, its founder was Hilario Mutis (PNNC, 2010). It currently has 25 inhabitants of the Cavillari , Huitoto , Miraña ethnic groups and some settlers who are part of the community and are taken into account as long as they comply with the internal regulations of the community and the Organization (PANI, 2022).

San Francisco

The Mirañas who today live in San Francisco gradually descended from the Quebradón de Ativa in the 1960s , later descending to a place known as San Francisco, which is located in the northern part of the Caquetá River in the Miritί Paraná indigenous reservation. From this location there was access to the boarding school and the Corregimiento del Miritί. Since then Mirañas (in San Francisco on the right bank) and Matapíes (in Santa Isabel on the left bank) coexist (PNNC, 2010). Currently the community has 50 inhabitants (PANI, 2022).

Las Palmas

This settlement was originally founded by the Peruvian rubber tapper Alberto Zumaeta with indigenous people from all the region's tribes, who had been displaced by the violence of the conflict with Peru. An epidemic of fever broke out there, which the indigenous people attribute to spells cast by sorcerers from the different groups present, and this settlement came to an end. In the 1980s, some Bora families who left the Cahuinarí belatedly settled downstream from the stubble of Las Palmas (PNNC, 2010). Currently, the community has a population of 44 inhabitants (PANI, 2022).

Puerto Remanso del Tigre

This community was founded in 1941 and made up of the people who lived in Cahuinarí after the war with Peru, who decided to leave for Caquetá as a result of an epidemic caused by witchcraft conflicts that killed off a large part of the population (PNNC, 2010). In this community there is a diversity of ethnic groups: Miraña, Bora, Matapí , Yucuna , Muinane , Tanimuca , Huitoto and some settlers who have formed families with people of these ethnic groups. Currently, the community has a population of 202 inhabitants (PANI, 2022).

Maria Manteca or Mariapolis

This community was founded in 1955 and is made up of Miraña-Bora indigenous people, Perea- Carijona crusaders and some Yucunas , it is located on the north side of the Caquetá River, within the Miritί Paraná reservation. (PNNC, 2010). In Mariapolis , as it is currently called, there are 135 people (PANI, 2022).

Manacaro

This is in a strip of 15 kilometers and was founded in 2013, before being a partiality of the Mariápolis community, it is located near the mouth of the Bernardo River, on the north side of the Caquetá River in the Miritί Paraná reservation. It is made up of 74 inhabitants of the Uitoto -Bora and Carijona - Uitoto families , belonging to 8 ethnic groups: Yucuna , Carijona , Bora, Miraña, Huitoto , Muinare , Puinare , Tanimuca (PANI, 2022).

2.1.6.2.2 Population evolution

Population records have been available since 2002, in which it is found that the Association had 353 inhabitants (ITTO project). In 2008 and as an input for the REM, a population census was carried out that determined that that year 411 lived in the territory, later, in 2013 the association had 364 people (Socioeconomic Diagnosis) and by 2022 it has 521 inhabitants according to the census carried out by PANI (PANI, 2022)(Table 1).

Table 1**.** Evolution of the population growth of the PANI

Community	ITTO (2002)	EMR (2008)	DSS (2012)	PANI Census (2022)
backwater port	110	157	125	202
San Francisco	54	42	fifty	fifty
Mariapolis	125	152	99	135
Quinché Metá (partiality)	N/A	28	8	25
the palms	35	32	28	44
manacaro	29		53	74
Total	**353**	**411**	**363**	**521**

Source: Prepared by Biotrade SAS (2022). Data taken from: (PNNC, 2010), (Miraña & Guiro, 2013)and (PANI, 2022).

The table shows us the time line with respect to the PANI population from 2002 to date, showing that the total PANI population increased from 2002 to 2008 and has subsequently been decreasing. The most obvious observation is that the Quinché Metá community has been reduced to 8 indigenous people after having 28; Many of them left the territory and a few others settled in other PANI communities (Miraña & Guiro, 2013). On the other hand, there is a phenomenon of a large number of inhabitants who, in search of study opportunities, income or health care, migrated to different places outside the territory. Currently, they represent 14% of the inhabitants of the PANI, for which the indigenous that belong to the PANI are 521. The following table (Table 2) shows us the place where the people who live outside the PANI live.

Table 2. Favorite destinations PANI residents who migrate in search of new study opportunities and income

Town	Total
Bogota	5
florence	one
Leticia	28
Madrid	two
Pedrera	36
Taraira	one
Villavicencio	one
Total	74

Source: Prepared by Biotrade SAS (2022). Data taken from :(PANI, 2022)

For 2013, an attempt was made to determine the behavior of migration that the PANI population has had, if it will continue to occur in the coming years. The PANI Assembly wondered why there are fewer people now than before? In a process of analysis of the Assembly, it is answered ***"that people leave because there are no alternatives and they are getting work elsewhere, where there are more opportunities. People leave to get opportunities, they get jobs abroad and they get family; people in here need money for their children's studies, to get clothes and to cover other necessities"*** . Given these answers, the authorities agree that, if this behavior persists in people, it is most likely that in the future the PANI population will be smaller (Miraña & Guiro, 2013).

2.1.6.3 Health

The Association has a secretariat that is in charge of issues related to health, it has autonomy to sign agreements to provide preventive care in the communities. This secretariat has within the territory the services of health promoters in each community, who carry out the interconsultations, with the doctors of La Pedrera or Leticia, necessary to authorize the movement of the patient from their community to the nearest health post. . The fees of the three promoters are paid by the Departmental Health Secretary, who provides them with tools and equipment to provide their services. The communities that have this service are San Francisco (which serves Las Palmas), Puerto Remanso and Mariapolis (which covers Manacaro). However, there are only two health posts, one in San Francisco and the other in Mariapolis. (Miraña & Guiro, 2013).

Although there are epidemiological records, their implementation is lacking, without rigorous data collection for morbidity in the last ten years. However, in this period there have been cases of Eda, Anger, Malaria, Gastritis, Abscess, Caries, Pneumonia, Polyparasitism, spasms, Filariosis, Ophidian accidents, Work accidents, Abortions, Fever, General body aches, Headache and Vomiting in each of the communities. There is no follow-up, although the population states that they do not have problems related to malnutrition. There are also no records of deaths that occur within the territory, however, in the last five years nine (9) people have died.

Regarding health coverage, the majority (93.1%) of the inhabitants are in the subsidized health regime, 4.5% within the contributory regime and the rest are outside these two, a majority of them minor children. a year and a minority people who are not yet registered. The MALLAMAS and the New EPS are the entities that provide health care for the people in the association, whose closest point of care is the village of La Pedrera; in which there is a first-level health post with general medicine, dentistry, clinical laboratory, pharmacy and disease prevention services. For specialized medicine care or intensive care emergencies,

patients are referred to the hospital in the city of Leticia. Thus, access to health services is largely determined by the patient's transportation to the La Pedrera corregimiento; which are summarized in:

a. Transportation to get to La Pedrera hospital.
b. Inefficiency in the La Pedrera health post: they take time to attend to patients, the care provided is done by inexperienced rural doctors and there is insufficient medication.

Traditional medicine plays an important role within the PANI communities, in which there are eleven (11) traditional doctors and six (6) midwives, the following table shows these with the diseases they have treated (Table 3):

Table 3. Traditional PANI doctors and the diseases treated.

Community	traditional medical	diseases treated
manacaro	Alberto Mosquera	Carate, Cancer in the womb, inflammation of the ovaries, fever and malaise, filiaria and malaria
	Luis Guiro Nague	Insanity, Pregnancy problem, body ache, gallbladder.
Mariapolis	Jesus Sheiva	Carate, childbirth, rheumatism
	Roberto Mirana Mirana	Diarrhoea, Family planning
backwater port	Miguel Uane	General pain, childbirth, forest perfume disease, carate, diarrhea.
	Jorge Antonio Yucuna	General pain, gastritis, childbirth
the palms	Victor Mirana	General pain, arthritis, bleeding, diarrhea.
San Francisco	Miguel Mirana	Snake bite, animal disease, lightning disease, childbirth.

Source: (Miraña & Guiro, 2013)and updated by PANI health secretary.

2.1.6.4 Education

Education is managed by the PANI through a secretariat, which under an agreement with the Government of Amazonas allows the administration of the service in two locations (Puerto Remanso and Maríapolis) and a branch (Las Palmas). The service is only for primary education, which includes a cultural component that has been built by the team of the secretary of education, the headquarters coordinators and the primary teachers. The school government is made up in conjunction with the parents, who have been decisive in PANI's own vision of education. Regarding the handling of the Miraña language, it is the older people who dominate the language, while the young populations are the ones who do it the least; of the 50% of the population that is Miraña, only 30% corresponds to people who speak their language (Miraña & Guiro, 2013).

The PANI aims to develop its own education system at all levels (secondary, technical and professional). Being able to access formal and own education is a key issue within the organization, however, within the territory there is access only to basic primary education (Miraña & Guiro, 2013).

By 2021, 83% of the people who are part of the association have some degree of schooling or are currently studying (PANI, 2022), as opposed to the 53% who had it in 2013 (Miraña & Guiro, 2013). Of these, 45% (231) have primary school or are studying, 37.6% (193) have secondary school or are studying and 0.8% (4) have studies or are studying university. 16.6% (85) of the people in the PANI do not have any degree of schooling, of which 63.5% (54) are in the range of 0 to 5 years, which are children who are below the age minimum to start their primary education (PANI, 2022).

The infrastructure available for basic primary education services is in the communities of Puerto Remanso del Tigre and Maríapolis . In the first one is the Marcelino de Castelvi school which has 3 classrooms, a library in fair condition, a 4m longhouse for the exercise of cultural activities of the school and is equipped with: 1 amplifier, 1 Floor, 30 Desks, 3 Acrylic board, 3 printer in fair condition. In the community of Mariapolis there is the Santa Teresita school, which has three classrooms, a 24 m2 large library and a 45 m2 dining room in good condition; is equipped with: 1 Amplifier, 3 Acrylic Board, 1 Amplifier, 1 Damaged Plant, 40 Desks (Miraña & Guiro, 2013).

The total quotas that the schools have is 85 students, with dropout levels between 12 and 15%, which corresponds to 10 or 11 children per year. The most common reasons for children dropping out of school, according to what was expressed by the communities, are the whims of parents who take their child out of school, reasons for the student's health and, to a lesser extent, the number of family problems. (Miraña & Guiro, 2013)For the year 2022 there was an enrollment of 79 children between the two educational venues (PANI, 2022).

Due to the fact that within the territory there is no institution that provides secondary vocational, technical, technological and university education services, people who demand this type of service migrate to places where they can find this type of service. As for secondary education, students move to La Pedrera, Leticia, Puerto Santander, Villa Betancourt and Taraira ; the majority (63.9%) go to the La Pedrera boarding school (Miraña & Guiro, 2013). Regarding university education, the PANI has experiences of people who have left the territory to study, who have not been successful because they do not have the economic resources to support themselves, and to be able to complete their studies (Miraña & Guiro, 2013).

2.1.6.5 Production systems

2.1.6.5.1 Chagra

This chagra production system is the main agricultural activity found within the territory. It is characterized by being a planting system that supplies food of plant origin to families. The chagras are areas for temporary crops that are found on the banks of the rivers, on the islands or on firm mounts; they are used for 2 or 3 years for crops and are later used as stubble to provide longer-term crops (Figure 2).

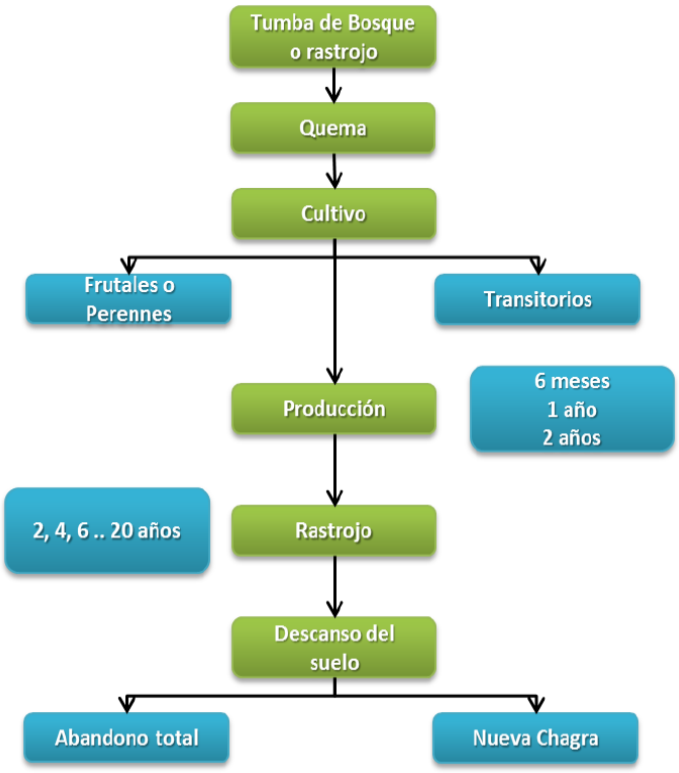


Figure 2. Traditional chagra production system. Source: Taken from: (Miraña & Guiro, 2013)

The chagra is considered a complement to the maloca, as a place of socialization and transmission of knowledge and wisdom between mother and children. The management of this production system is the responsibility of women, as well as the harvest and transformation of the food obtained, becoming the bearer of the greatest knowledge about plants, their crops and their subsequent transformation. The man participates in the tomb and planting of the chagra, inviting the neighbors of his community to do so. This system provides food security to the family, at the same time that it can be classified as a sustainable system because no agrochemicals or fertilizers are used, there is crop site rotation, with controlled burning that provides nutrients and finally it is a teaching system (Miraña & Guiro, 2013)(Figure 3).

Figure 3. Chagras in different stages of the production process, in the community of Manacaro . Source: Biotrade SAS (2022).

Each family can have between one and three chagras, depending on its size and needs, and each chagra can have an area of one (1) hectare. The felling, burning and planting are generally carried out in the summer season (September to March), while maintenance is usually done every two or three months. These are made in areas close to the communities, thus allowing accessibility to it during any time of the year (Miraña & Guiro, 2013). According to the ecological calendar, the chagra has the following management according to the season (Table 4. Management of chagras according to the ecological calendar in the PANI territory.):

Table 4**.** Management of chagras according to the ecological calendar in the PANI territory.

Epoch	Exercise	Changes presented to 2022
cold , June and July	Slash and burn of the chagras of stubble.	Sometimes it's early and sometimes it's late.
Cotton and fruit summer, fish subienda: August, September, October	Tomb and planting of chagras on the river bank. Harvest the firm mount chagra	The river has been growing more than normal since 2018
Of the fruits or output of animals: November, December and January	Sowing of the firm mount chagra.	Every time it is necessary to make a grave further away from the chagras, with the exception of the community of Mariapolis
Summer Butterfly: February and March	stubble harvest	The same is not harvested, vectors have appeared that damage plants and crops

Called, the winter frog sings: April and May.	Harvest of chagras from the river bank. E does the cleaning of chagras of firm mount.	It is being fulfilled according to the ecological calendar

Source: Prepared by Biotrade SAS (2022). Information taken from:(PNNC, 2010)

The main species planted in the chagra are cassava, banana, corn, yams, coca, tobacco, chili, cane, peanuts, pineapple, papaya, cupuazú , maraco, guama lemon, guacarí , chontaduro, among others. Most of the harvest is for family consumption, however, there is a small market for products obtained from chagra and derivatives in La Pedrera. Basically, bananas, cassava, fariña, cassava, chili powder and pineapple are sold. Of the total produced in the chagra, 94% corresponds to cassava and 3% to plantain, the remaining 3% corresponds to the other agricultural products mentioned (Miraña & Guiro, 2013).

2.1.6.5.2 hunting and fishing

Although hunting and fishing are considered extractive activities, they will be detailed within primary production as extractive productive activities. Fish is the main source of protein for the inhabitants of PANI, it is generally derived from small scale fish (Figure 4). The work of fishing is carried out by men, who daily go to the river, lakes, streams and creeks . The supply of fish grows in seasons, but is continuous throughout the year, decreasing in some quantity in dry seasons or low waters. Fishing is done in an artisanal way with a hook or with meshes that do not exceed ten (10) meters, there are agreements in the association not to use barbasco [18], dynamite and large meshes. Likewise, fishing includes the capture of reptiles such as the Taricaya (*Podocnemis unifilis)* and Charapa (*Podcnemis expansa*) turtles, which have a large cultural component within the PANI ethnic groups, are part of the diet, in the same way that the babilla (Miraña & Guiro, 2013)For the Miraña, the charapa is directly related to the origin myth of their ethnic group, their worldview says that *"one of the gods, an ancestral being, gave flesh and blood to the charapa, materializing it and giving it to all the grandchildren so that they could feed of her"* . The turtle is associated with healing activities related to places such as lakes or hatcheries, spawning beaches and ravines, which have a spiritual owner who is mean to their grandchildren, since abusing the consumption of this species brings disease (PNNC, 2010).

[18] (*Lonchocarpus utilis*) an active component is extracted from its roots that blocks the respiration of fish when diluted in the water; It is used to fish in rivers, flood plains and backwaters .

Figure 4. Fishing for Pintadillo catfish (possibly Pseudoplatystoma tigrinum) carried out in the Caquetá river in the PANI territory. Source: Biotrade SAS (2022).

Of all the meat from water animals that is extracted in the PANI, 83% corresponds to fish, 16% to charapa, and the remaining 1% to Taricaya (0.7%) and babilla (0.3%). It is clarified that, within the quantities of these meat products previously exposed, there are the quantities that are consumed in homes and those that are marketed outside the territory (Miraña & Guiro, 2013).

The hunting of wild animals is an activity that takes place at all times of the year, but in greater proportion when the river is high, since the animals find less space to inhabit and concentrate on the restingas. The variety of species obtained also depends on this behavior, since small animals are easier to obtain in the rainy season than in the dry season. More than 50% of the meat obtained from the environment corresponds to that of Danta (*Tapirus terrestris*) (34%) and Pork (*Pecari tajacu*) (26%), the other meats are from small animals such as the Armadillo (*Dasypus novemcinctus*) (11%), Guara (*Dasyprocta fuliginosa*) (6%), Cerrillo (*Tayassu pecari*) (6%) and Borugo (*Agouti paca*) (4%), as evidenced in graph 17. This hunting behavior of these latter animals could have occurred due to the fact that the time in which the records the river waters were up. In the same way that in the meat obtained from water animals, the total amount of these meats are not for family consumption and there are some quantities that were marketed (Miraña & Guiro, 2013).

There are planning and management instruments (REM [19]) that were built in concert between the communities, their authorities and the PPN Cahuinarí, which zoned and regulated the use and exploitation of natural resources within the territory of the PANI, including agreements for hunting, fishing, and forestry.

[19]Special Management Regime that is the inter-administrative agreement between PNN and PANI, for the coordination of the public function of administration of the PNN Cahuinarí. It will be detailed in numeral 2.5.3.6

In this fishing agreements are established in the Cahuinarí River, in which each fisherman can enter 4 times a year with a quota of 5 tons of fish meat per year, as well as, per community, the entry of a maximum of 10 people and 4 tons for annual salt fish. The use of barbasco (*Lonchocarpus utilis)* , toxic elements, dynamite and mesh, is not allowed. In the Caquetá river, in the special protection zones of Tres Islas and Bernardo, commercial fishing is not allowed during the charapa (*Podcnemis expansa*) season (September 1 to March 25). Meshes are not allowed in the PANI area, the allowed fishing gear is the rope, hangers and cover. (PNNC, 2010)

In the case of the Arawana fishery (*Osteoglossum bicirrhosum*), can be done from March 25 to the end of April throughout Caquetá, the fishing gear that can be used is small mesh, arrow and chapú , except for the Cahuinarí and Bernardo areas. (PNNC, 2010). For the Charapa tortoise, they are allowed to use it throughout the Caquetá river, under the jurisdiction of the PANI, defined as the protection zones of Tres Islas and El Bernardo, allowing the capture of 4 charapas for sale per family with prior permission from the authority of their community (PNNC, 2010). With regard to hunting, they can be carried out throughout the PANI territory, complying with a registry in the communities (a book of the species used is kept) and in the administrative headquarters of PPN Cahuinarí, with a limit of four tapirs for consumption or sale per year per family; can only be used for hunting: shotgun, cartridges, spears, machetes, salt, ax and stone(PNNC, 2010)

2.1.6.5.3 wood extraction

Like fishing and hunting, obtaining timber products from the forest are extractive activities, which aim to provide raw materials for houses, boats, material culture, home furnishings and articles for fishing and hunting. There are no records about the amount of wood used for these purposes, however, by 2012 it was found that 68 PANI homes have wooden roof frames, of which 45% are roofs made from the leaves of an Amazonian palm called Pui *(Lepidocaryum tenue).* As for floors, the most used woods are chestnut *(Bertholletia excelsa*), Laurel (*Laurus nobilis* L.) , while the palms most used for these are the Zancona (*Socratea exorrhiza*), bombona and açaí (*Euterpe oleracea).* For the walls, the most used wood is the Laurel tree *(L. nobilis) ,* Cedar (*Cedrela odorata)* and donkey's ear (*Enterolobium cyclocarpum*), while the palms that are most used are the Zancona (*S. exorrhiza*) and the Asaí (*E. oleracea)* (Miraña & Guiro, 2013).

The activity of use and forestry exploitation can be carried out in the scavenging [20]and chagra areas both by the Cahuinarí river, as well as by the Caquetá and Bernardo rivers. In the Special Protection zone such as Tres Islas and Bernardo, it will be carried out once the season of the charapa species ends the hatching cycle of hatchlings, from the end of March of each year until the first of September, only suitable wood, that is, healthy and adult (PNN Cahuinarí, 2021).

Any PANI person who wants to market wood must carry out a procedure that includes a forestry marketing request together with a single sales format [21], and subsequently submit the authorization to

[20]They are areas within the territory in which the PANI people are going to carry out hunting and fishing activities.

[21] It is important that said request has the approval of the Secretary of the Environment and Territory.

CORPOAMAZONIA or to whoever acts as the environmental authority, to proceed with the respective marketing. In terms of marketable quantities, each family can sell 10 timber trees per year and communities are allowed to trade 10 timber trees per year (PNN Cahuinarí, 2021).

2.1.6.5.4 Product transformation

The PANI has traditionally transformed several products for consumption or use, in food the fariña and the casabe stand out, which come from the transformation of the yucca, the chili that to facilitate its conservation is dehydrated and transformed into powder [22], the mambe and the ambil that result from a procedure carried out on the coca leaf [23]. In terms of products for use and/or decoration, the clay handicrafts stand out, made by a group of women who have pots for cooking, pots for storage, pots for serving, and ambileros in their portfolio [24]. Likewise, there are other types of products such as wood carvings, which are in demand sporadically and generate almost no income (Miraña & Guiro, 2013); additionally, there are no records or evidence of these incomes.

The production and commercialization strategies implemented for processed products have not been able to be sustained over time, due to high transportation costs, deficiencies in the development of a robust portfolio and the lack of positioning of an own brand. It is important that the strategies oriented to the commercial development of the products that are transformed by the PANI, are based on the principle of maintaining the tangible and intangible heritage of the PANI, they also require financing that allows the development of the products with an own brand positioning with its history as a common thread between each product (food or use) and specialized markets, in which price is not a variable of competition (Miraña & Guiro, 2013).

2.1.6.6 economic flows

The responsibility for generating income for the family is shared by men and women. Women spend their time in activities that are related to the production and transformation of food, the making of handicrafts, the care of the home and the children; while the man carries out fishing activities frequently (sometimes twice a day or once, or every two days) and hunting when required by the family and there is an opportunity to market, all in accordance with the hunting and fishing agreements that are in the REM. In this way and as it has been traditionally, each gender has defined activities that generate income through products obtained from the environment, others that have been transformed and jobs of the PNN Cahuinarí, such as teachers, health promoters or projects with institutional allies (Miraña & Guiro, 2013).

The main commercialized products are bush meat (tair and pork), charapa meat, fariña starch, pineapple and banana; in the Arawana season , some families market this product (especially those from Mariapolis and Manacaro). In the communities of Puerto Remanso and Mariapolis there are some stores that are managed by women, becoming sources of work that generate income. Thus, the economic income of PANI families [25]comes in three ways: a) by service payments; b) sale of products; or c) gifts they receive (Miraña & Guiro, 2013).

[22] Transformation work carried out by women.
[23] Work done by man, as part of an ancestral rite.
[24]Containers to store ambil, which in the Western world is used for decoration.

[25]The PANI defines three types of Family: Large > 8 people; median between 4 and 8 people; and small < 4 people.

2.1.7 Project Zone Map (G1.4-7, G1.13, CM1.2, B1.2)

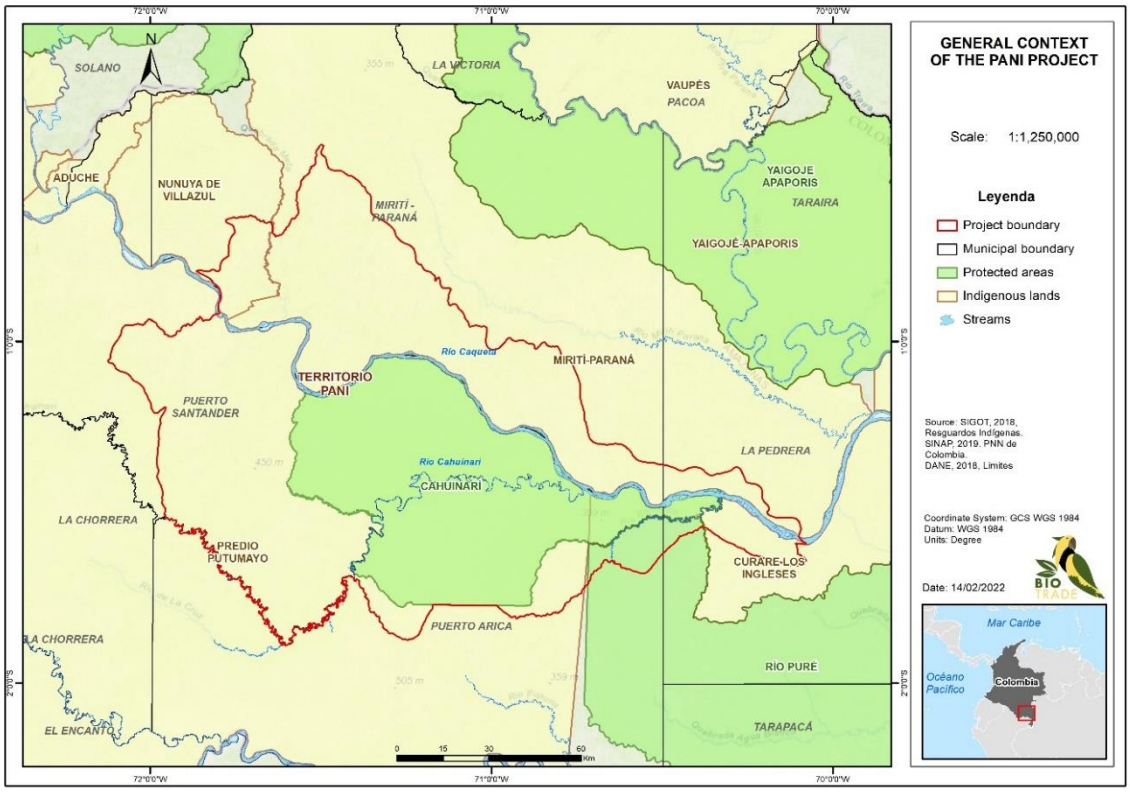


Figure 5. General context of the project area. Source: SIGOT. Indigenous reservations and SINAP areas. Scale: 1: 100,000. 2018. Prepared by Biotrade SAS (2022).

2.1.8 Stakeholder Identification (G1.5)

In the area of influence of the project, the interested parties were identified based on a timeline exercise [26], in which the PANI association described the social and environmental management carried out together with public institutions, NGOs and private companies based on the constitution of the association. The general objective of this timeline was to generate articulation between the PANI association and these actors with similar visions and interests regarding the mitigation project; this in order to socialize with them the most relevant aspects of the project and make them participate in making decisions about it.

The timeline exercise managed to identify and prioritize the institutions and NGOs that have had a presence in the area since 2008:

[26]Exercise carried out during the PANI general assembly between February 18 and 21, 2022

- **Institutions:** National Natural Parks of Colombia (PNNC) – PNN Cahuinarí; Corporation for the Sustainable Development of the South of the Amazon. (CORPOAMAZONÍA), Government of the Amazon, Amazon Institute for Scientific Research (SINCHI).
- **NGO:** Frankfurt Zoological Society, GAIA Amazonas Foundation, Amazon Conservation Team

Another product developed in the product timeline was to be able to identify the activities in the social and environmental areas that the PANI association carries out in alliance with the identified actors. The respective information on these activities was collected from these institutions, which was later confirmed by BIOTRADE SAS and completed with the primary information obtained from interviews and surveys in the five PANI communities. The primary information was collected during field visits to each of the communities, in which demographic information, housing, health, education, productive activities and species conservation were obtained. This information was then compared, analyzed and updated based on the information from the Socioeconomic Diagnosis (DSE) of the PANI carried out in 2013, with this it was possible to obtain an updated DSE that is used as a baseline for this project (Figure 6).

Figure 6. Timeline of the social and environmental management of the PANI (1993 – 2022). Source : PANI Association – BIOTRADE (2022).

The DSE identified that the inhabitants of the PANI territory are those who make direct or indirect use of natural resources or who benefit from them. Once the information in the DSE was updated, it was possible to make a description of the rights, interests and relevance of each actor (See section 2.1.9., Table 5).

2.1.9 Stakeholder Descriptions (G1.6, G1.13)

In the region of the project, there were actors from the national, regional and local levels who have had a presence at least since 2008, public institutions such as National Natural Parks - PNNC, Government of Amazonas, the SINCHI Institute; Non-Governmental Organizations such as Fundación Gaia Amazonas, Amazon Conservation Team and Conservation International (CI); and AATIs that border PANI territory such as: CRIMA, ACIMA, AIPEA and AIZA. The parties interested in the PANI REDD++ project are identified below , in which the PANI association will execute the project in accordance with the lines of action, and with the participation of these parties according to the agreements reached and the coordination spaces established for they. Table Table 5defines the stakeholders in the project, and the rights, interests and relevance for the activities to be developed. These actors were invited to participate in the project's socialization sessions (section 2.3).

Table 5. Description of the stakeholders of the PANI REDD++ project.

Type of stakeholder	Actors	Rights	Interests	Relevance
Environmental Authorities	National Natural Parks of Colombia	It administers the protected area from the executive resolution No. 190 of October 19, 1987 (INDERENA). Develops protected area management activities based on the Special Management Regime (REM) signed with the PANI association.	Coordinate the public function for the conservation of the PNN Cahuinarí	Co -manages all management activities related to PNN Cahuinarí. It manages conservation projects and initiatives that are developed in the territory.
	Corporation for the Sustainable Development of the South of the Amazon. (CORPOAMAZONIA)	Grant permits for the use of non-timber forest products from the forest. Develop and implement a Territorial Climate Change Management Plan in accordance with Law 1931 of 2018.	Grant permits for the commercial use of non-timber forest products	It monitors and controls all activities related to the use of natural resources in areas other than National Parks.
research institutes	Amazon Institute for Scientific Research (SINCHI)	In accordance with its legal constitution, it is in charge of high-level scientific and technological research, timely satisfying the needs and expectations of the communities of the region.	Part of its mission is research with the aim of informing decisions that lead to the sustainable management of natural resources.	It monitors the biophysical resources of the region. Provides technical supportCarried out the forest inventory in the PANI territory.
National government	Ministry of Environment and Rural Development	In accordance with Law 99 of 1993, its function is to direct and coordinate the activities of the CARs. In charge of the National Climate Change System that was created by Decree 298 of 2016.	Accompany the design and execution of climate change mitigation projects.	It executed three Amazon Vision projects in the PANI territory.

Type of stakeholder	Actors	Rights	Interests	Relevance
local governments	Administration of the department of the Amazon	departmental authority	Among the goals included in the development plan is sustainable development and the responsible use of natural resources. Improve the economic and social benefits of the population of the department.	Coordinates the Permanent Inter-institutional Coordination Table (MPCI) for the agreement and execution of actions in the environmental, health and education components, in this is the PANI. The PANI territory is under the jurisdiction of this department.
NGO	Frankfurt Zoological Society – Colombia	It has no legal authority in the area nor rights of ownership or use of the resources.	Work for the conservation of the Colombian Amazon	Since 2016, it has been supporting the process of implementing monitoring of the charapa turtle, together with National Parks and PANI.
	GAIA Amazon Foundation	It has no legal authority in the area nor rights of ownership or use of the resources.	Work with indigenous communities in the northeast of the Amazon biome in the construction of environmental and cultural strategies based on their traditional knowledge	It has supported the PANI in the management of actions within the MPCI and implementation of Decree 632.
	Amazon Conservation Team - Colombia	It has no legal authority in the area nor rights of ownership or use of the resources.	Collaborates with indigenous and local communities to protect the ecosystems of the Amazon through strategies that support territorial rights and management, the promotion of sustainable livelihoods and the strengthening of internal governance	It has been supporting financially and technically for more than 10 years the construction of a policy for isolated indigenous peoples. It supports the development of conservation actions in the protection zone for isolated indigenous peoples in the Manacaro sector .

Source: Prepared by Biotrade SAS (2022).

2.1.10 Sectoral Scope and Project Type

The PANI REDD++ Project belongs to scope 14 of the VCS "Agriculture*, Forestry and Other Land U* se", and type of mixed project, where the component of Reduction of Emissions from Deforestation and Degradation is included. (REDD). It is a non-grouped project that seeks to reduce deforestation, protect tropical rain forest areas and conserve organic carbon reserves associated with the Amazon rainforest. The mitigation project is classified as an Avoided Unplanned Deforestation and Degradation (AUDD) project.

The scope in which the REDD component is developed is the National Development Plan 2018-2022, the Colombian Low Carbon Development Strategy (ECDBC) and the National REDD+ Strategy (ENREDD+), the latter being coordinated under the principles and objectives of the National Policy against Climate Change and the National Forestry Policy. This component is constituted as part of the mitigation actions in the Land Use, Change in Land Use and Forestry (USCUSS) sector at the rural level.

2.1.11 Project Activities and Theory of Change (G1.8)

The project activities will be implemented gradually in accordance with the strategic plan, which is divided into four strategic lines that have been developed from the PANI planning instruments (Major Regulations and Life Plan), agreements with third parties (REM) and the construction activities of this project. This plan contemplates in its different lines to initiate, complement or continue with the activities that the PANI has been developing since its creation with allied institutions (See Section 2.1.4) and that have increased since the signing and implementation of the REM; as well as the implementation of planned activities that the association has not yet been able to develop.

To arrive at the lines of action of the project, an analysis was carried out of each of the components of the PANI life plan, as well as of the actions contemplated in the strategic plan of the REM. Said analysis was carried out through a general assembly of PANI indigenous authorities, in which not only the authorities of the five communities participated, but also the secretaries of each component, their work teams and interested families from each of the communities. communities. Based on this analysis, the assembly determined through a participatory exercise to design the four lines of action and each of the activities that are contemplated within the project. The design exercise of the lines and activities was carried out in a general assembly between February 18 and 21, 2021.

The lines of action contemplate activities aimed at the conservation of the PANI territory, from its own vision, its law of origin, oriented towards the conservation and protection of forests, biodiversity, ecosystem services and its culture. The scope of the strategic lines will provide the parties involved in the project with an income stream that will allow the preservation of the territory, the forests, the rescue of the culture and the improvement of the good life of the communities. As self-governance and environmental governance are strengthened, institutional, environmental and productive projects are implemented.

Table Table *6*describes each of the project activities and their expected products, results and impacts. For the construction of the scopes by project activity, the Theory of Change (ToC) approach was used, in order to explain how the activities will achieve the expected benefits of the project for the climate, the community and biodiversity. In the Theory of Change analysis for the project activities, it was determined by the PANI association [27], based on an analysis of the current situation of each activity (in terms of activities or initiatives already implemented in the project area) in a participatory work with the five communities that are part of the association, with the support of documents from the institutions that have carried out actions within the PANI territory (See Section 2.1.4) and based on the objectives that are intended to be achieved

[27]PANI General Assembly February 18-21, 2022

in the short term (10 years), medium (10 – 20 years) and long term (30 years). From this, goals were defined by activity and the importance of those goals to achieve the project objectives with respect to climate, community and biodiversity.

In this exercise, PANI agreed on an implementation schedule for each activity in the project's accreditation period (see Section 2.1.13). For the evaluation of the theory of change, they combined a number of sources of information on the processes, namely:

- Assessment of needs in the project area according to the experiences of the PANI process and of their communities;
- Objectives, programs, projects and actions contemplated in PANI planning instruments such as its major regulations and life plan, as well as the document of agreements with the PNN Cahuinarí (REM);
- Evaluations carried out in PANI general assembly spaces and community assemblies.
- Relevant views and input from other stakeholders

When it was possible to have clarity about the current situation and the goals that the project proposed to generate for each activity, an evaluation of the expected impacts for each intervention was made; this, with the objective of analyzing the goals, objectives and impacts (Table 6); as well as, generate indicators that allow its monitoring in the project accreditation period. The results shown in Table 6are from activities that have been implemented since 2008, and each of the project activities and their expected products, results and impacts are described.

Table 6. Short, medium and long term scope of the strategic lines of the PANI REDD++ project.

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
Consolidation of self-government	*1.1. Political, technical and administrative adaptation of the own government for the autonomous management of the territory*	Develop local actions and with interested parties that allow identifying and prioritizing actions for cultural, social and environmental management for PANI territory, taking as reference the major regulations, the ecological calendar and the agreements within the REM.	Design and implementation of strategies for the cultural, social and environmental management of the PANI territory	The organization makes decisions on the use and exploitation of its territory, biodiversity and its ecosystem services in a timely, effective and efficient manner.	• **Climate:** Reduces pressure on forests and prevents conversion to other land uses through actions that increase the capacity to manage and control the territory. • **Community:** Improves the management capacity of leaders for the exercise of governability and governance in the environmental management of the territory • **Biodiversity:** Improves the rules on the use and exploitation of goods and services of the territory.
		Put into operation the PANI indigenous council (decree 632 of 2018) with the capacity to administer the territory.	Recognition of the PANI association as an Indigenous Territorial Entity	Transparent management of information and administrative and financial processes within the PANI and with third parties.	
		Promote the training and education of young people and women in leadership and environmental management of the territory	Strengthening the management and decision-making capacity of young people and women from the PANI	Increase in the participation of young people and women in decision-making spaces in the Association is full and effective.	
		Consolidate the PANI agenda at regional, national and international levels in its different components (economy, health, education, government, ITEGWA, environment)	Establishment of an intersectoral table with all third parties for the management of the PANI territory.	Increased capacity to manage your own agenda before third parties.	
		Carry out activities and strengthen capacities for	Strengthening of the capacities to administer a	Improvement of the system of clear norms of coexistence, use and	

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
		the administration of justice for the PANI.	system of own justice in the PANI territory.	exploitation of goods and services of the territory	
		Carry out activities and strengthen capacities for the formulation of an economic policy for the PANI.	Strengthening of capacities from traditional and technical knowledge for the establishment of an economic policy of the PANI.	Distribution of resources to the PANI government components according to their needs.	
		Manage spaces at the departmental and national level for the implementation of the SIPSI in the PANI	Strengthening of technical capacities of the PANI health secretariat for the implementation of the SIPSI	Maintenance of preventive and curative actions in the health of the inhabitants of the PANI.	
		Strengthen the capacities of the members of the PANI secretariat work team on issues related to traditional knowledge in education, pedagogy, and educational administration at all levels.	Establishment of an education policy that includes levels of secondary, technical and university education from the territory.	Increase in the number of children and young people who are prepared at different educational levels without uprooting their cultural and traditional training, strengthening the conservation of the territory.	
	1.2. Capacity building for the autonomous management of the territory	Train teams in administrative, economic, accounting and financial areas for the effective development of PANI's own government	Technical strengthening of work teams from the different PANI secretariats.	Increased governance capacity and environmental governance of the territory.	• **Climate:** Increases the management capacity of the PANI for the management and control of the territory. • **Community:** strengthens the capacities of men and women for decision-making in the environmental management of the territory • **Biodiversity:** Improves the implementation of regulations on the use and exploitation of goods and services of the territory-
Strengthening traditional knowledge	*2.1. Strengthen the cultural in government spaces*	Carry out activities to identify and prioritize the components of traditional knowledge for the construction of policy guidelines for the PANI	Strengthening of PANI components from traditional knowledge	Permanence of guidelines of traditional knowledge in the policies and actions of the PANI's own government.	• **Climate:** Improves the knowledge of the territory and the forests by the inhabitants of the PANI, as a fundamental value for the protection of the forest and its ecosystem services. • **Community:** Incorporates traditional

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
		Define, carry out and disseminate communication mechanisms from the traditional, of the different actions that PANI develops in all its cultural, social, economic and self-government components in internal and external spaces	Design and implementation of an internal communications strategy and for third parties	Dissemination of PANI actions from the traditional in internal and external spaces.	knowledge about the use and exploitation of goods and services derived from the territory and the forest in the political and operational actions of the PANI association and the improvement of the good life of its inhabitants. • **Biodiversity:** Species management actions are carried out based on traditional knowledge.
	2.2. Transmission of cultural knowledge	Build school fields for the transmission of traditional knowledge of PANI women associated with children, youth and ecotourism participants.	Strengthening of self-knowledge learning actions with the women of the PANI	Transmission of traditional knowledge from women to children, youth and ecotourism participants	• **Climate:** Keeps alive the traditional knowledge of the territory and the forests in the inhabitants of the PANI, as a fundamental value for the protection of the forest and its ecosystem services. • **Community:** The inhabitants of PANI Internalize traditional knowledge about decision-making on the use and exploitation of goods and services derived from the territory and the forest. • **Biodiversity:** Transmits behaviors on actions for the management of species based on traditional knowledge, which considers animals, plants, water, saltwater, ravines and others as an integral part of the territory.
		Create spaces that allow strengthening the representativeness of indigenous governments at the regional level.	Design and execution of a program for the management of local and intercultural cultural spaces	Participation in representative spaces of indigenous governments at the regional, national and international levels.	
		Prepare and disseminate visual, audio and/or written material on traditional and cultural practices of the PANI	Establishment of national and international alliances for the development of cultural and traditional practices	Participation in national and international scenarios with traditional and cultural representations of PANI	
		Prepare literary, academic and didactic material for the teaching and learning of the inhabitants of PANI	Implementation of a communications strategy associated with one's own language	Appropriation of the native language in all written and virtual communication media of the PANI.	
		Carry out activities to incorporate traditional knowledge of forest goods and services for the prevention and treatment of diseases	Strengthening traditional knowledge associated with the prevention and treatment of diseases	Recover own knowledge about procedures for the traditional and intercultural treatment of diseases	

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
		Diagnose and propose actions for the maintenance of cultural practices and other elements that belong to the chagra	Strengthening of the chagra as a cultural element for the food sovereignty of the PANI	It maintains cultural practices associated with the chagra.	
	Own and participatory research	Prioritize and promote own research from the demand of the different PANI sectors.	Design and execution of own research plan	Increased self-knowledge in the inhabitants of PANI	• **Climate:** Recovers traditional knowledge about the territory and the forests, as a fundamental value for the protection of the forest and its ecosystem services. • **Community:** Creates new behaviors based on traditional practices on decision-making on the use and exploitation of goods and services derived from the territory and the forest. • **Biodiversity:** Incorporates actions for the management of species based on traditional knowledge, which considers animals, plants, water, saltwater, ravines and others as an integral part of the territory.
Actions for the sustainable development of the PANI territory	*3.1. Improvement of the social, cultural and productive infrastructure for the sustainable development of PANI*	Carry out activities of design and/or improvement and/or construction of physical infrastructure and provision for the social and productive welfare of the PANI	Design and implementation of a plan to improve the social and productive infrastructure of PANI	Improvement of the quality of life of the inhabitants of the PANI	• **Climate:** Reduces the pressure of forest deforestation to avoid a change in land use due to wood extraction or the development of intensive production systems to improve the social welfare of PANI. • **Community:** Improvement of social services for PANI families. • **Biodiversity:** Incorporates actions for the management of species based on traditional knowledge, which considers animals, plants, water, saltwater, ravines and others as an integral part of the territory.
	3.2. Education, Research and technological development	Grant support scholarships for the training and education of PANI people at the high	Design and implementation of a support scholarship system for training and education.	Increased technical capacity for governability and governance of the territory.	• **Climate:** Generates qualified local human talent with traditional knowledge about the territory and the forests, as a fundamental value for the protection of the

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
		school, technical and university levels			forest and its ecosystem services. • **Community:** Creates new knowledge that translates into behavior based on traditional practices on decision-making on the use and exploitation of goods and services derived from the territory and the forest. • **Biodiversity:** Incorporates actions for the management of species based on traditional knowledge, which considers animals, plants, water, saltwater, ravines and others as an integral part of the territory.
		Grant support scholarships for intercultural research of PANI people in areas related to PANI components.	Design and implementation of a support scholarship system for intercultural research.	Consolidation of intercultural research for territorial environmental management	
		Promote the development of enterprises based on sustainable economic alternatives for the PANI territory	Creation and operation of the PANI entrepreneurship unit for sustainable enterprises.	Establishment of responsible entrepreneurship as a basis for the positioning of own brands of products and services.	
	3.3. Sustainable production and commercialization of goods and services of the territory	Identify and prioritize actions for the commercial use of non-timber forest products within the PANI territory.	Design and implementation of business plans for non-timber forest products	Increase in forest management actions for the environmental management of the territory	• **Climate:** Promotes the development of productive activities and/or sustainable use of the forest as a measure to prevent the change of land use from forest to non-forest. • **Community:** Improves the income of PANI families by making use and exploitation of the goods and services derived from the territory and the forest. • **Biodiversity:** Prevents unsustainable and/or illegal activities from establishing themselves within the territory and endangering biodiversity and associated ecosystem services.
		Develop actions for the consolidation of ecotourism in the PANI territory.	Implementation of the Okajimo expedition	Economic empowerment and increased income of PANI families	
		Identify, prioritize and implement sustainable economic alternatives based on the development of productive and business capacities.	Design and implementation of productive alternative ventures developed by people from PANI.	Economic empowerment and increased income of PANI families	
		Prioritize and carry out actions to maintain the chagra as a space for food production	Strengthening of chagra spaces as food supply areas.	Recognition and promotion of traditional production systems.	
	3.4. Conservation of biodiversity and ecosystem services	Design and implement management plans for PIC species.	Capacity building for species management.	Permanence of actions for the conservation of the biodiversity of the PANI territory.	• **Climate:** creates conservation actions for species with high conservation value • **Community:** Incorporate conservation elements to carry out activities for the use

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
		Restore timber species for use and exploitation by PANI families	Design and execute a restoration plan for a kind of use and exploitation.	Forest enrichment with species used for use and exploitation.	and exploitation of the forest and the territory. • **Biodiversity:** Prevents unsustainable and/or illegal activities from establishing themselves within the territory and endangering biodiversity and associated ecosystem services.
		Develop productive agroforestry activities in spaces of abandoned chagras.	Strengthening of food security from abandoned chagra spaces.	Recovery of abandoned chagra areas	
Monitoring and Control	*4.1. Control, surveillance and monitoring of PANI actions*	Carry out actions for the prevention, control, surveillance and monitoring of the PANI territory.	Design and execution of the prevention, control, vigilance and monitoring program of the PANI territory.	Increase in the capacity of territorial governance and the management of the territory under a common objective of conservation.	• **Climate:** Diagnoses the current state of the forest in the PANI territory and generates actions that strengthen its protection, conservation and management. • **Community:** Builds capacities so that the PANI association and families have information to make their decisions on the conservation, use and exploitation of the territory • **Biodiversity:** Monitors and reports changes in the population dynamics of the species of flora and fauna considered of high conservation value.
		Implement monitoring actions for the PICs [28]agreed in the REM.	Design and implementation of monitoring programs for the PICs agreed upon in the REM.	Self-management of the PIC conservation activities agreed in the REM Generation of actions that help resolve socio-environmental conflicts and promote the protection of PICs.	
	4.2. Administrative monitoring of the project	Train and carry out actions for the development of a technical, administrative and financial management system for the PANI.	Technical, administrative and financial strengthening for the management of PANI resources.	Transparency and access to information for all interested parties. Balance of the success of the project activities and feedback	• **Climate:** Controls project investments related to the current state of the forest in the PANI territory. • **Community:** Generates information for decision-making on investments in conservation, use and exploitation of the territory • **Biodiversity:** Generates information for decision-making on investments related to changes in the population dynamics of flora and fauna species. fauna considered of high conservation value.

[28]Comprehensive Conservation Priorities (PIC).

Strategic Line	Program	Climate, Community and biodiversity			Relevance to project objectives
		short-term departures	Medium-term results	Long-term impacts	
	4.3. PQRDS	Establish a PQRSD system for the development of the project.	Operation of the PQRSD system of the project	Transparency and access to information for all interested parties. Resolution of conflicts and differences related to the project.	• **Climate:** Allows PQRDS on negative project actions related to the current state of the forest in the PANI territory to be received and forwarded to the appropriate person. • **Community:** Allows to have a direct channel of participation and communication with people and interested parties about the development and effects of the project • **Biodiversity:** Allows receiving and forwarding PQRDS on negative actions of the project related to changes in population dynamics to the appropriate person. of the species of flora and fauna considered of high conservation value.
	4.4. Monitoring of social and environmental safeguards	Monitor compliance with the project's social and environmental safeguards.	Strengthening of capacities for the implementation of a mechanism for monitoring the social and environmental safeguards of the project.	Transparency and access to information for all interested parties. Resolution of conflicts and differences related to the project.	• **Climate:** Allows monitoring compliance with environmental safeguards related to forests. • **Community:** Guarantee the full and effective participation of PANI families • **Biodiversity:** Guarantee the compatibility of the measures with the conservation of biodiversity.

Source: Prepared by Biotrade SAS and PANI (2022).

2.1.11.1 Consolidation of self-government

The consolidation of self-government has as its objective that the PANI association has all the necessary conditions to exercise good governance, in such a way that there is a direction from the greater regulation, with norms oriented to regulate the different internal problems, the good administration of resources, to the correct management and environmental control of the territory that consolidates the ordering of its territory, participation and social and environmental control with gender and intergenerational equity, as well as having human talent with the necessary capacities for the exercise of governance and governance of its territory. On the other hand, it seeks to strengthen the relationship of the PANI government with other AATIs , public institutions, NGOs and private sector actors, in which the practices related to the ordered, regulated and planned action of the PANI territory are articulated to these . Local spaces such as indigenous tables of the middle and lower Caquetá, the permanent inter-institutional coordination table (MPCI) with the government of Amazonas, among other spaces that are already being carried out with limitations in the execution and monitoring of the activities agreed upon in these.

These actions not only strengthen PANI's own government, but also strengthen the ***environmental governance*** of the territory, both at an institutional and community level. Therefore, the harmonization of planning instruments such as life plan, REM, use agreements signed with other AATIS, agreements with public entities (administrative and environmental) and alliances with private sector actors will be promoted, as well as being in the agenda of regional and national spaces for indigenous participation and representation. Another important aspect for the consolidation of PANI's own government is to create and consolidate its own education policy, which goes beyond primary education and involves the processes of secondary, technical and professional education, for which it is expected to design, implement a strategy that contributes to the appropriation of the process with the different social groups of the territory. Finally, the consolidation of its own health system is sought, focused on primary care and with the technical and human capacity to continuously attend to the needs of the communities.

To achieve these things, it is hoped to form and train men and women in intercultural knowledge (formal, non-formal and traditional education) in environmental, social, administrative and commercial areas, among others, so that they are determining actors in the instances of coordination and decision-making of the PANI.

The expected impacts in terms of climate, community and biodiversity are:

- **Climate:** Reduces pressure on forests and prevents conversion to other land uses through actions that increase capacity in the administration and management of the territory.
- **Community:** Improves the management capacity of the association by strengthening the capacities of men and women for decision-making for governance and environmental governance of the territory.
- **Biodiversity:** Improves the application of its own regulations on the use and exploitation of goods and services in the territory.

2.1.11.2 Strengthening traditional knowledge

The loss of tangible and intangible values of the culture of the Bora and Miraña peoples has been great, not only due to the passage of the different stages from the conquest to the present, but also due to the continuous incorporation of cultural elements of the "whites" or “western” that have incorporated the PANI communities to a different extent. With the strengthening of traditional knowledge, it is sought to maintain cultural practices at all levels within the territory, both in their daily lives and in self-government actions. For this reason, the design and implementation of actions that consolidate the major regulation and the ecological calendar in actions for the good management of the territory are proposed in this line.

It is proposed that there be a rescue of traditional knowledge in aspects of the mother tongue, traditional arts, cultural and productive activities in such a way that the Bora and Miraña people value and respect this knowledge. On the other hand, actions are proposed to rescue and/or generate new knowledge from own and participatory research in own lines of research (traditional medicine, chagra, use of biodiversity, among others).

Finally, actions are proposed so that there are spaces for interethnic and intercultural interaction, developing the community communication strategy proposed in the REM, as well as integrating traditional knowledge and products in own research into the different PANI education spaces.

The expected impacts in terms of climate, community and biodiversity in this line of action are:

- **Climate:** Incorporates the traditional knowledge of the territory and the forests as a fundamental value for the protection of the forest and its ecosystem services.
- **Community:** Incorporates traditional knowledge into the guidelines for the use and exploitation of goods and services derived from the territory and the forest.
- **Biodiversity:** Develops species management actions based on traditional knowledge and the ecological calendar, which considers animals, plants, water, saltwater, ravines and others as an integral part of the territory.

2.1.11.3 Actions for sustainable development

The search for the path for the sustainable development of the PANI territory requires establishing optimal infrastructure, technical and operational conditions for the improvement of the good life of the PANI families; as well as, encourage in its inhabitants the development of necessary capacities to achieve this purpose. Additionally, promoting the development of initiatives for the commercial use of Non-Timber Forest Products (PNMB), sustainable production projects to improve family income and the consolidation of collective work.

The PANI considered that in the first instance it is important to provide social and cultural infrastructure to the communities, in such a way as to improve their living conditions in housing, malocas, home public services, communications, health, education and administrative headquarters, among others. At the same time, actions are proposed that seek to strengthen their own educational processes and forge new talents through scholarships for secondary, technical and university education in strategic areas for the sustainable development of PANI (administration, business, health, social sciences, among others).).

At the same time, actions are proposed for the development of research for the environmental, social, economic and institutional strengthening of the PANI that leads to its own technological developments applied to the needs of the territory and its communities. Anchored to these developments and in search of improving the income of PANI families, actions are proposed for the design and execution of sustainable economic alternatives and productive models for the use of goods and services of the territory and the forest.

The expected impacts in terms of climate, community and biodiversity are:

- **Climate:** Reduces the pressure of forest deforestation based on a broad knowledge of forest management by PANI families and developing activities for sustainable use and exploitation that avoid the presence of extractive activities.
- **Community:** Improves the income of PANI families from the development of productive projects associated with the chagra, the sustainable use of the forest and sustainable economic activities.
- **Biodiversity:** Prevents non-sustainable and/or illegal activities from establishing themselves within the territory and endangering biodiversity and associated ecosystem services.

2.1.11.4 monitoring and control

The PANI association plans to develop activities that allow it to obtain information on the different components of its own government, actions with allies (PNN, Amazon Government, NGOs, among others) and the project to analyze it and make decisions according to the variables prioritized to monitor. The horizon that is projected in this strategic line is framed, on the one hand, to monitor compliance with social and environmental safeguards (COP Cancún, 2010), the current state of ecosystems, develop control, surveillance and monitoring instruments for both its territory as those contemplated within the REM for the PNN Cahuinarí and the generation of knowledge to implement actions in the short, medium and long term facilitate the prioritization of problems, and direct new actions for the conservation of the PANI territory.

Initially, the PANI seeks to establish a control, surveillance and monitoring system for the actions it develops throughout its territory. With this, it is expected to contribute to the objectives of the project by strengthening and expanding to its territory the monitoring activities of the PICs agreed with the PNN Cahuinarí in the REM. Likewise, designing, adjusting and executing prioritized control, surveillance and monitoring protocols and carrying out evaluation and follow-up procedures for these actions. Finally, provide infrastructure, equipment, human talent and resources necessary for the fulfillment of the actions agreed in the REM and its strategic plan.

Regarding the project, the PANI proposes to design, implement and sustain a reliable, efficient, transparent and equitable resource management system that allows it not only to monitor the project's actions, but also to apply it to the administrative and financial management of its own government. As part of this system, it is proposed to establish a mechanism for dealing with Petitions, Complaints, Claims, Suggestions and Denunciations (PQRSD), which will be linked to the mechanisms that the Ministry of Environment and Sustainable Development (MADS) has for REDD+ issues. . Finally, the social and environmental safeguards monitoring system will be part of this system, in accordance with the Cancun safeguards (2010) and their subsequent national interpretation.

The expected impacts in terms of climate, community and biodiversity are:

- **Climate:** Diagnoses the current state of the forest in the PANI territory and generates actions that strengthen its protection, conservation and management.
- **Community:** Generates capacities so that the association and the PANI families have information to make their decisions on the conservation, use and exploitation of the territory
- **Biodiversity:** Monitors and reports changes in the population dynamics of flora and fauna species considered to be of high conservation value.

2.1.11.5 Implementation of safeguards

REDD+ social and environmental safeguards are the set of mechanisms aimed at preventing and mitigating possible effects on the rights of a social, economic or environmental nature of communities and their territories, as well as the occurrence of negative impacts due to the design and implementation of activities of REDD+ actions (Camacho, et al., 2017). The safeguard guidelines established by the United Nations Framework Convention on Climate Change (UNFCCC) at COP 16 are known as the Cancun Safeguards. However, since 2013 Colombia has been working on the national interpretation of REDD+ safeguards, and in 2017 the *First Summary of Safeguards Information was delivered to the UNFCCC with an emphasis on the Amazon* (Camacho, et al., 2017). In this way, the proponent of the PANI REDD++ Project details below in *Table 7*the safeguards and their respective compliance according to the Cancun safeguards and the national interpretation that Colombia presents before the UNFCCC as part of the adoption of the measures mentioned in paragraph 70 of decision 1/CP.16 of the UNFCCC.

Table 7. REDD+ safeguards and their compliance within the framework of the PANI REDD++ Project.

Safeguard Cancun	National Safeguard	Description	Compliance
A. In accordance with national forest programs and international agreements	1. Correspondence with the National legislation	The initiative is developed within the framework of the National Forestry Development Plan, of the international conventions and agreements signed by Colombia on: Forests, Biodiversity and Climate Change, as well as the national policies corresponding to these agreements. All REDD+ Policies, Actions and Measures that are proposed must be in correspondence with: •The international agreements signed by Colombia. •National legislation (the Constitution, laws and decrees). • National policies, programs and projects.	The Project complies with the provisions of the National Policy for REDD+ Projects, as indicated in the Regulatory Framework. In terms of territorial planning, by virtue of Article 330 of the Political situation in Colombia, and ILO Convention 169, the Indigenous Reservations have autonomy in terms of territorial planning, and constitute a special figure for territorial and environmental planning (See section 2.5.1.1, Table 22). The strategic lines and programs of the PANI REDD++ Project related to the preservation and sustainable use of ecosystems, zoning and management of forest reserves and intersectoral coordination are consistent with the objectives of the National Forest Plan (especially with objectives 4 and 5) and with the strategic lines of the Policy for the Comprehensive Management of Biodiversity (PGIBSE).
B. Transparency and effectiveness of forest governance structures	2.Transformation and access to information	The interested actors have transparent, accessible and timely information related to REDD+ actions in the platforms or means of information that are determined. If there are ethnic groups involved, and they do not speak Spanish well, it must be guaranteed that in the consultation and information spaces there are interpreters of their language, as well as adequate material that facilitates their understanding. Be clear in reporting on: • The entity in charge of formulating and implementing the measure. • What are the benefits that are going to be delivered to the communities in the territory. • The commitments acquired by the parties involved in the implementation of the measures.	Socialization spaces have been held with the communities. These spaces have been developed in appropriate language for the understanding of the participants. Issues related to project activities, their implications and responsibilities have been addressed; and such documents have been disclosed to interested parties (see Section 2.3). There is a letter of invitation signed by the authorities of the communities of the Indigenous Reservation to advance with the formulation of the REDD+ project (**¡Error! No se encuentra el origen de la referencia.**)

Safeguard Cancun	National Safeguard	Description	Compliance
	3.Accountability	The institutions and actors present reports on their management around REDD+ before the partners involved, the institutions and the general public and include information on the application and respect of the safeguards. Those in charge of the implementation of REDD+ activities must convene accountability spaces where their management reports are presented: what has been done, how, how much has been spent and how the resources have been invested, what results are there. The actors involved have the commitment to attend these informative spaces. Accountability reports must be public and accessible to the various actors. Information on the status of application of the Safeguards to reduce risks and promote benefits must be included.	During the implementation of the PANI REDD++ Project, the representatives of the community and project implementers will present the pertinent reports and documents to carry out an adequate rendering of accounts, as appropriate, in accordance with what is established in the implementation plan and the monitoring of the project (see Section 2.3 .two).
	4. Recognition of forest governance structures	REDD+ actions are developed in accordance with the existing forest governance structures established by the regulations and/or establishing the necessary ones among the actors involved in the process (the strengthening or creation of a new structure can be a governance implementation mechanism). In some cases where various actors are involved, it may be necessary to establish new arrangements or coordination mechanisms for decision-making. These can be forest boards, monitoring committees or enable spaces for dialogue within the framework of community action boards.	The project has an appropriate governance structure that addresses the ethnic particularities, knowledge and traditions of the communities participating in the project, and that is in accordance with the forms of governance and guidelines related to compliance with safeguard 14. Coexistence with the territory and its forests are an intrinsic part of the traditional ethnic forms that characterize the community. Therefore, the forms of administration of the territory apply to the entire reservation, including its wooded areas.
	5.Capacity building	The strengthening of the technical, legal and administrative governance capacities of the actors directly involved is guaranteed, so that the parties can make documented, analyzed and informed decisions. It is necessary to have programs that contribute to strengthening the capacities of the actors involved as required in each case: • Technical capacities: training in REDD+ issues, climate change, forest governance, sustainable forest management, conservation, monitoring, and implementation of sustainable production models, among others.	In the development of the workshops for structuring and defining the components of the REDD+ Project, issues of climate change, REDD+, sustainable management, monitoring, social and environmental safeguards, among others, have been addressed. One of the strategic lines of the project is based on capacity building (see Section 2.1.11, Table 6) .

Safeguard Cancun	National Safeguard	Description	Compliance
		• Legal skills: training in national legislation and international agreements related to these issues. • Administrative skills: training in tools for project monitoring, resource management and accountability.	
C. Respect for traditional knowledge and rights of communities	6. Free, Prior and Informed Consent	When a measure or action affects or may directly affect one or several ethnic groups, the national provisions regarding consultation and prior, free and informed consent established in the legislation and jurisprudence, as well as the guidelines given by the Ministry, must be applied. of the Interior as the competent entity in this matter with the accompaniment of the control organisms.	The REDD++ PANI project complies with the provisions of current regulations regarding consultation and relationship with indigenous communities. The REDD+ activities and the theory of change respond to the prioritization of the interventions that the members recognized and confirmed during the structuring sessions that took place in the territory, specifically with respect to the Life Plan. The project was approved in the framework of a community Assembly, this being the highest decision-making body (see Section 2.3.7).
	7. Respect for traditional knowledge	They are recognized, respected and promoted, in accordance with the provisions of national legislation and compliance with international agreements; traditional knowledge systems and the visions of the territory of ethnic and local peoples and communities. For the development of any initiative to reduce deforestation, the different cultures that inhabit the territories must be taken into account, respecting their ways of understanding and relating to the environment, so that traditions, uses and customs of the communities.	The regulations for consultation and relationship with indigenous communities are obeyed (see Section 2.5.1.1, Table 22). During the formulation and execution of the project, the cosmovision, culture, knowledge and capacities of the communities participating in the project have been respected and valued.
	8. Profit distribution	The fair and equitable participation and distribution of the benefits generated by policies, measures and actions to reduce deforestation for ethnic and local peoples and communities, and of all those benefits derived from traditional knowledge, innovations and practices, is guaranteed for the conservation and sustainable use of forests, their diversity and ecosystem services.	The Benefit Distribution System (SDB) details the income derived from project activities, and aims to guarantee fairness and transparency among PANI REDD++ Project participants, considering the project's own risk and profit levels (see Section 2.3. 4, Table20).

Safeguard Cancun	National Safeguard	Description	Compliance
	9.Territorial rights	The collective and individual territorial rights of ethnic and local peoples and communities are respected; its use and cultural, economic and spiritual significance. For this, it is necessary to know what the forms of land tenure are in the areas in which it is expected to implement REDD+ measures and actions and make decisions accordingly.	The project is aligned with the regulations for consultation and relationship with indigenous communities (See section 2.5.1.1, Table 22). In addition, during the formulation and execution of the project, the cosmovision, culture, knowledge and capacities of the communities participating in the project have been respected and valued.
D. Full and effective participation	10.Participation	The right to full and effective participation of all the actors involved is respected to guarantee governance and adequate decision-making on REDD+. The structures of participation of each interest group, especially of the communities, must be recognized and respected, according to national legislation and the international agreements signed by Colombia.	All interested community representatives have been involved in the participation process for the formulation of the project, taking into account the applicable regulations and considering the organizational structure of the indigenous reservation (see Section 2.3).
E. Conservation and benefits	11. Conservation of forests and their biodiversity	REDD+ initiatives support the conservation of forests and the implementation of measures established for this purpose. The REDD+ initiatives that are developed in the country must not be detrimental to the conservation of forests and the biodiversity that they harbor.	The objectives of the PANI REDD++ project seek the conservation of forests and biodiversity (see Section 2.1. and 2.1.11, Table 6).
	12. Provision of environmental goods and services	REDD+ initiatives support the provision of ecosystem services and the enjoyment of them. The implementation of REDD+ initiatives should not directly or indirectly affect the benefits provided by ecosystems, which are known as ecosystem services (supply, support, regulation and cultural) for example: water supply, soil, biodiversity, among others.	It is estimated that the project will improve the provision of ecosystem resources (see Section 2.1. and 2.1.11, Table 6).

Safeguard Cancun	National Safeguard	Description	Compliance
F. Prevent reversal risks	13.Environmental and territorial planning	REDD+ initiatives support the consolidation of territorial and environmental planning instruments provided for in the legislation, under a conservation and sustainable forest management approach. It is necessary that the REDD+ initiatives carried out in the country recognize, respect, adapt or strengthen the measures and instruments of territorial and environmental planning that are defined by national legislation. Similarly, it is ideal to encourage citizen participation in the formulation and adjustment of these instruments, according to land use. The own forms of territorial ordering of ethnic groups and local communities must also be recognized so that their permanence over time can be supported.	The PANI REDD++ Project has taken into account the territorial and environmental planning instruments of the indigenous community, applicable programs and plans. Within the framework of strengthening forest governance, the development of a Land Management Plan is contemplated, taking into account the forms of management defined by the members of the Reservation.
	14.Sector planning	Sector-type REDD+ actions are proposed based on environmental and territorial ordering instruments, as well as legislation related to the conservation of forests and their biodiversity. When a sector defines and implements REDD+ actions, these must be articulated with the national legislation that protects forests, their conservation and the diversity they harbor	The project is articulated with the Regional Development Plan, with its general approach to address unsatisfied basic needs and address the Sustainable Development Goals (See section 2.1.12).
G. Avoid displacement of emissions	15.Forest control and surveillance to avoid the displacement of emissions	REDD+ initiatives incorporate measures to reduce the displacement of emissions in their design and timely monitoring and control are guaranteed when displacement of emissions occurs. Community monitoring, articulated with deforestation early warning systems, and the activation of protocols that allow timely responses to be generated, can be decisive in ensuring that the problems associated with forest loss and degradation do not spread to other places.	One of the objectives of the project is to contribute to the monitoring and conservation of the forests and the biodiversity present in the territory through the development of actions aimed at monitoring and controlling the territory. The project also defined a leakage area that recognizes the dynamics of mobilization of deforestation agents and monitoring schemes were established for the permanence of the project, as well as for the forest cover associated with the project limits.

Source: Prepared by Biotrade SAS (2022) based on (Camacho, et al., 2017).

2.1.12 Sustainable Development

On September 25, 2015, world leaders adopted a set of global goals to eradicate poverty, protect the planet and ensure prosperity for all as part of a new agenda, known as the 2030 Agenda, which includes the 17 Development Goals Sustainable Development (SDG) [29]established by the United Nations Organization. Each of these goals has specific goals to be achieved in the next 10 years.

Colombia, with a view to developing the 2030 Sustainable Development agenda, has intensified efforts to end poverty, reduce inequalities, have the guarantee of being able to live in an environmentally sustainable territory, and the security of having a peaceful, inclusive society. and resilient. However, the pandemic has generated an unexpected crisis in various social and economic aspects that have a significant impact on the most vulnerable population.

In this national scenario, it is necessary for the communities to think about how to deal with the reduction of monetary and multidimensional poverty that are sensitive to the policies and circumstances that the country is going through. And that makes the territories also more vulnerable to the exploitation of natural resources, continuing the cycle of ecosystem degradation and increased poverty.

The reduction of poverty, without a doubt, must be related to a more dynamic and diversified economy that promotes formal employment and sustainable development, addressing informality in a structural way. For this reason, it is necessary that the economic challenges be thought of in terms of generating competitive processes and that can be part of the current process of global innovation, but all this can be constituted and achieved from the actors themselves who are the ones who know their strengths and weaknesses and can provide solutions based on their needs and that are adjusted to their social environment, cultural and structural.

From the PANI association, geographically located in a remote region with difficult access where the coverage of basic needs such as drinking water, health and education are very limited, it is important to generate conditions and capacities so that the indigenous population can improve their quality of life in a sustainable way, under their knowledge, customs and uses of natural resources in the territory they inhabit. The REDD++ PANI project has designed an intervention strategy that seeks alternatives as a result to direct local social and environmental goals articulated with the achievement or fulfillment of the SDGs. For this reason, from the PANI territory, it is proposed to address this issue as shown in the following Table 8:

Table 8. Objectives and indicators of sustainable development considered by the PANNI REDD++ project.

Sustainable Development Goals (SDG)	goals	Indicators	Associated project activities
	End all forms of discrimination against all women and girls everywhere.	➢ Promote the participation of women and girls in all spaces of construction and dialogue. Support and make visible the work of ITEWA	All

[29]Available at: https://www.un.org/sustainabledevelopment/es/goals-for-sustainable-development/

Sustainable Development Goals (SDG)	goals	Indicators	Associated project activities
	Ensure the full and effective participation of women and equal opportunities for leadership at all decision-making levels in political, economic and public life.	➢ Proportion of women employed. ➢ Women in the Network Council and its different coordinations, Directive coordination, technical coordination and the oversight and control committee.	All
	Quality education for all the girls and boys of the PANI association	➢ Number of boys and girls who finish primary school and continue on to secondary school. ➢ Number of girls and boys who finish their high school. ➢ Number of young people who start a technical and/or professional career and finish it	Education, Research and technological development
	By 2030, develop and implement policies to promote sustainable employment that creates jobs and promotes local culture and products.	➢ Strengthening of the production and marketing chain of PANI manufactured products, establishing its own brand. ➢ Proportion of jobs in the different economic sectors developed by the REDD ++ PANI project.	Implementation of sustainable productive projects in the PANI territory and its marketing channels.
	Redouble efforts to protect and safeguard the world's cultural and natural heritage.	➢ Total, of expenditure (public and private) destined to the preservation, protection, monitoring and conservation of all the cultural and natural heritage that exists in the PANI territory.	All those who have the conservation and management of the forest for their food. Also those related to the management of chagras such as the management of soil health and fertility. A ctivities to strengthen governance and cultural rescue with the community in general.
	Improve education, awareness and human and institutional capacity regarding Climate Change mitigation, adaptation to it, reduction of its effects and early warning.	➢ Number of events to improve institutional, systemic and individual capacities to implement adaptation, mitigation and technology transfer activities, and development measures.	Strengthening of local governance/ Providing staff with knowledge for the implementation and monitoring of project actions.

Sustainable Development Goals (SDG)	goals	Indicators	Associated project activities
	By 2030, promote the sustainable management of all types of forests, end deforestation, restore degraded forests, and increase afforestation and reforestation globally.	➢ Forest area under sustainable forest management as a percentage of forest area.	Recovery and rehabilitation of forest areas and monitoring Reforestation of forest species of important domestic use.
		➢ Total investment in conservation and sustainable use of biodiversity and ecosystems. ➢ Chagras area with restoration process and enrichment of forest species.	Recovery and conservation of monitoring areas, encouraging the sustainable use of the forest

Source: prepared by Biotrade SAS based on CONPES 3918 of 2018[30]

2.1.13 Implementation Schedule (G1.9)

The implementation schedule for the PANI REDD++ Project has not yet been definitively defined. However, below (Table 9) we present the key dates and milestones in the development and implementation of the project, such as dates of introductory meetings (see Section 2.3.3) , and start and end dates of the GHG accounting period (see Section 2.1.15) .

Table 9. Key dates and milestones in the development and execution of the PANI REDD++ project.

Date	Milestone(s) in the project's development and implementation
18,19,20/12/2021	Introductory meetings
02/18,19,20/2022	General Assembly of the PANI Association
02/21,22,23,24/2022	Field visits to socialize the project with the communities and gather information
02/25/2022	Socialization meeting of the project with institutions
01/01/2018	Start period of the first monitoring report
01/01/2022	End period of the first monitoring report
01/01/2018	Home GHG accounting
01/01/2047	End of GHG accounting

[30]Strategy for the implementation of the Sustainable Development Goals (SDG) in Colombia - CONPES 3918 of 2018. Available at: https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3918.pdf

2.1.14 Project Start Date

The mitigation project began on January 1, 2018.[31]

2.1.15 Benefits Assessment and Crediting Period (G1.9)

For the first instance of the REDD++ PANI project, the accreditation period runs from January 1, 2018 to December 31, 2047, and contemplates a duration of 30 years.

2.1.16 Differences in Assessment/Project Crediting Periods (G1.9)

For the REDD++ PANI project, there are no differences between the GHG emissions accounting period and the resilience, community, and biodiversity assessment periods.

2.1.17 Estimated GHG Emission Reductions or Removals

Year	Estimated GHG emission reductions or removals (tCO_2e)
2018	3,777,789
2019	3,761,696
2020	3,745,672
2021	3,729,715
2022	3,713,825
2023	3,698,002
2024	3,682,245
2025	3,666,555
2026	3,650,931
2027	3,635,373
2028	3,619,880
2029	3,604,453
2030	3,589,090
2031	3,573,792
2032	3,558,559
2033	3,543,389
2034	3,528,284
2035	3,513,242
2036	3,498,263
2037	3,483,348
2038	3,468,495
2039	3,453,705
2040	3,438,977
2041	3,424,311
2042	3,409,706
2043	3,395,164
2044	3,380,682
2045	3,366,261

[31]The documents that support the selection of the project start date are available in the *Project start date folder*

Year	Estimated GHG emission reductions or removals (tCO_2e)
2046	3,351,901
2047	3,337,602
Reducción de Emisiones (RE) total	106,600,907
Periodo de acreditación (años)	30
Promedio anual de RE	3,553,364

2.1.18 Risks to the Project (G1.10)

The risk analysis of the REDD++ PANI project was carried out using the guidelines of the *Non-Permanence Risk Tool, version 4.0*. The risk ratings were based on an assessment of the risk factors that add up to determine the total risk rating.

Risk factors were classified into three categories: internal risks, external risks and natural risks, and later, into subcategories such as project management, financial viability and community engagement. The project was evaluated according to each of the risk factors suggested by the tool, a description of the applicability or not of the risk factor was made and a score was assigned to each factor by category and subcategory.

Where applicable, mitigation activities or plans were presented by risk factor to decrease the assigned risk score. These activities or plans were presented considering both the strategic lines and activities of the project.

Finally, the total risk rating for each category (internal, external and natural) was determined by adding the scores of each subcategory.

Detailed information from the risk analysis can be found in the *Non-Permanence-Risk-Report document.* Table 10Table 10 summarizes the identified risk factors and the actions to mitigate them.

Table 10. Identification of REDD++ PANI project risks and actions for their mitigation.

RISK IDENTIFICATION Project Management	Acciones Necesarias para Mitigar el Riesgo	Acciones implementadas en el Periodo de Verificación para Mitigar del Riesgo
INTERNAL RISKS		
The implementation activities are developed by companies with significant experience in the development of forestry projects at a regional level.	The steering and technical committee of the project was formed by the PANI Association that has the experience of developing activities and projects at the local level; likewise, a committee of oversight and control was assigned to ensure the transparency and participation of the interested parties. The technical managing partner BIOTRADE S.A.S has experience in the development of environmental consultancies and GHG mitigation projects of forest origin in the AFOLU sector for more than 15 years. This sum of local and technical experiences means that the methodologies in the field make it possible to achieve the objectives in concert with the community in a more dynamic, direct and effective way. All this promotes the effectiveness and efficiency of the implementation of the activities.	A system of distribution of benefits for the development of the project, according to the lines of action and investment, programs and prioritized projects. A POA and a monitoring and control plan taking into account the committees formed for the implementation of the project An internal regulation for the operation of the steering committee, the technical committee and the oversight and control committee.
Management team does not maintain a presence in the country or is located more than a day of travel from the project site, considering all parcels or polygons in the project area	The project management team is made up of people from the territory and a professional team that accompanies the execution with a day of travel from the capital of the country Bogotá to the project area. Within the technical and operational team there is the expert consultant who lives and belongs to the community of Mariapolis with experience in support of environmental issues, participation in decision-making and technical spaces of the territory. Each community has its environmental promoter (Puerto Remanso, Manacaro, Mariapolis, San Francisco and Las Palmas), this work has been worked for 10 years in developing and programming field activities on conservation issues. The group of women from the Manacaro community who have been monitoring species for 4 years with the support of Amazon Conservation Team.	Develop the manual of functions for each execution profile. Create training routes according to the role performed for each of the people who make up the local and regional work team.

RISK IDENTIFICATION Project Management	Acciones Necesarias para Mitigar el Riesgo	Acciones implementadas en el Periodo de Verificación para Mitigar del Riesgo
Financial Viability		
Project cash flow breakeven point is greater than 10 years from the current risk assessment	Given that the potential impact against the economic is a reality, the project is aimed at strengthening the life plan of the Association of Traditional Indigenous Authorities PANI, which are part of its construction as its own government and which is the baseline to safeguard its territory, its identity and every living being that is inhabiting the territory of PANI, as well as the uncontacted or naturally isolated peoples (PIAN) that inhabit this territory. On the other hand, the process of formulation, validation and verification of the project has begun to begin with the commercialization of carbon credits derived from the reduction of emissions generated by it. In this way it is expected to reduce or eliminate the financial barriers of the project, decrease the opportunity cost compared to alternative scenarios such as 1. Illicit crops, illegal mining, livestock among others, which are latent pressures in the region, because there are no other opportunities to obtain sustenance; 2. The overfishing and hunting of animals such as the Danta, 3. Deforestation by felling timber species. These are intended for the sale of products outside the territory. For this reason, it is a priority for PANI to ensure the continuity and permanence of the activities that strengthen the life plan, and that have been developed for the conservation of its territory. Other mitigation strategies identified with respect to these risks have to do with the alliance with the company BIOTRADE S.A.S that has experience in the development of methodologies in the field and allow to achieve the objectives in concert with the community in a	The construction of a life plan is a process of more than 10 years where the importance of this life plan has been agreed and internalized for the different groups that make up this association, which is based on its own government to achieve the proposed goals with real and concrete actions. Such as agreements on the use of natural resources with neighbors 1. on the number of individuals allowed for the hunting of *tapirs (Tapirus terrestres*) (4 individuals for cultural gatherings, 2 for consumption and sale), fishing by the Cahuinari river, fishing for individuals of Arawana (*Osteoglossum bicirrhosum*) and the care and consumption of the Charapa turtle (*Podocnemis expansa*) agreement between ACIMA (with the community of Santa Isabel) and PANI. 2. Agreement on the use of natural resources hunting, fishing and timber between PANI and AAIPEA in the sector that includes from the Manacaro ravine to the mouth of the Bernardo river, the area is free for family consumption and community activities in terms of fishing and hunting, for sale it is only allowed for extreme necessity. The extraction of wood and Puí palm *(Lepidocaryum tenue*) for sale is not allowed. 3. Agreement on the use and control of natural resources between CRIMA AND PANI: In the area between: Aduche indigenous reservation, Nonuya de Villa Azul and the Quinché Metá Community. With the above, the commitment of the community to carry out the REDD project from its own effort and the support of several organizations that have helped to consolidate its life plan and the implementation of the AGREEMENTS of the REM As a source of financing Biotrade S.A.S has arranged the necessary resources to develop the project in to safeguard indigenous communities and territory.

RISK IDENTIFICATION Project Management	Acciones Necesarias para Mitigar el Riesgo	Acciones implementadas en el Periodo de Verificación para Mitigar del Riesgo
	more dynamic and effective way. Obtaining short-term results.	And in the formation of an ideal technical team, to be able to carry out the necessary management to obtain the carbon credits and sale to be able to inject significant capital to the project of conservation of the forest and its biodiversity.
Opportunity Cost		
NPV from the most profitable alternative land use activity is expected to be at least 100% more than that associated with project activities	Considering that the project achieves a positive Net Present Value (NPV) with conservative selling prices for carbon credits (around USD 5), the alternative land use NPV is more cost-effective by more than 100% so the opportunity cost with respect to the project's conservation activities is much higher.	
There exist disputes over access/use rights (or overlapping rights)	The traditional territory of the Association of indigenous authorities of the Miraña and Bora people of the middle Amazon called GOD OF THE CENTER AND HIS GRANDCHILDREN that in PIINE ***AYVEJU NIIMU'E IAACHIMU'A*** language known by its acronym PANI, has a zoning. The organization has made tours that allowed to delimit its territory; the location of the Clans and mythological sites, references of great importance for indigenous culture. This process has been carried out since the legal formation of the association with each of the indigenous peoples and adjacent associations. There are use and conservation agreements with the overlapping area of the traditional territory with the area of the Cahuinarí National Natural Park, agreed within the framework of the Special Management Regime.	Indigenous territories are recognized as territorial entities, the guarantee of their possession through the collective ownership of the reservations and their non-sizeable, imprescriptible and inalienable character (Political Constitution: Art. 63 and 329); To self-government and self-determination, by recognizing and guaranteeing the existence of systems of government of each people as public entities of a special nature, in accordance with their uses and customs, promoting the ability to decide autonomously matters of their interest (Political Constitution: Art. 287 and 330). Decree 632 of 2018 on the indigenous territories located in non-municipalized areas such as the PANI, which are put into operation, will be political-administrative organizations of a special nature, for the exercise of the public functions established in this decree, through their own authorities. To the environment, by recognizing their rights over the natural resources existing in their territories, which implies their right

RISK IDENTIFICATION Project Management	Acciones Necesarias para Mitigar el Riesgo	Acciones implementadas en el Periodo de Verificación para Mitigar del Riesgo
	Likewise, in the process of agreement and socialization of the REDD++ PANI project, a meeting was held.	to participate in environmental planning, management and conservation. Their exploitation and use must be without affecting their cultural, social and economic identity (Convention 169: Art. 4, 7, 32; UN Declaration: Art. 29); The REM establishes as an instance of coordination between the PANI and the Park and the local committees, which are carried out between the traditional authorities and the head of the protected area. These are carried out four times during the year and there the monitoring and evaluation of the EMN Strategic Action Plan is carried out, while planning the necessary activities to comply with it. The mechanism for PANÍ to manage PNN resources is currently being sought. For this agreement, the parties jointly created the strategic action plan for five years, which contemplates four lines of action that allow the fulfillment of the agreements. They are, territory, government, culture and management.
Project Longevity		
What is the project Longevity in years?	The project is proposed for a period of 30 years of permanence under an alliance contract for the development of the REDD project	
EXTERNAL RISKS		
Are the ownership and resource access/use rights held by the same of different entities?	The resource from the financial contributions for the transaction of the VCU derived from the activity of the REDD ++ PANI project reaches the PANI Community through a Trust where it is available to be invested in the activities, agreed within the REDD++ PANI project action plan, these activities are aimed at strengthening the life	The creation of accounts in a financial institution "Fiducia", which is responsible for managing money, for the choice and understanding of the management of the Trust will be held a workshop per community for the management of money through the Trust.

RISK IDENTIFICATION Project Management	Acciones Necesarias para Mitigar el Riesgo	Acciones implementadas en el Periodo de Verificación para Mitigar del Riesgo
	plan of indigenous peoples, to dignify their life in a jungle environment.	
in more than 5% of the project area, there exist disputes over land tenure or ownership	The agreements of the limits of the territory were ratified with their neighbors that are the community ACITMA, CRIMA, AIZA AND AIPEA	Acts of ratification of the limits
Community		
Less than 50 percent of households living within the project area who are reliant on the project area, have been consulted	If more than 80% of the population living within the project area has been consulted. Measure participatory meetings as described in detail in the section (2.3.3 Briefings with stakeholders) Families and people who have migrated to cities and other territories have been consulted in a smaller percentage.	Visits and meetings have been held with the communities of Manacaro, Mariapolis, Puerto Remanso del Tigre, San Francisco and Las Palmas that make up the PANI community
NATURAL RISKS		
Fire	The possibility of fires is associated with the advancement of agricultural activities, but above all the use of fire in the practice of slash, grave and burn and, to the bad practices of fire management that additionally cause forest fires especially in summer time.	The community is very aware at the beginning of the chagra and they are very careful with the management of the fire, within the activities described for this project a participatory study is proposed for the management of the chagra.
Extreme Weather (W)	Global warming causes the times of flooding and drought to vary in the jungle affecting both indigenous peoples and the jungle ecosystem, especially due to the strong winds that occur in summer.	Forest Management Plan

Source: prepared by BIOTRADE S.A.S (2022).

2.1.19 Benefit Permanence (G1.11)

The benefits in the territory, community, climate and biodiversity are sought to be maintained with the project over the duration time (30 years) by improving the quality of life of its inhabitants, improving governance and thus the defense of its territory. , strengthening its economy. The project activities described in Section 2.1.11 aim to consolidate a self-government seeking autonomy to manage its territory, regulation of the activities carried out in it, through sustainable development that allows continuing with the maintenance of ecosystems with those that have been counted so far, with productive activities that generate maintenance over time of the family economy that extends beyond the duration of the project.

The programs served by the project will generate a solid government structure with economic policies and sustainable developments that maintain their governance structure and territorial protection over time, allowing compliance with the REM guidelines while conserving the territory and everything that inhabits it.

2.1.20 Financial Sustainability (G1.12)

The activities proposed within the project are aimed at environmental and cultural conservation of the PANI territory, in which the good living of its inhabitants is improved. To achieve this, the project seeks to ensure that there are technical, political and operational conditions in the PANI's own government in such a way that there is effective governance of the territory with active environmental governance from the permanence of cultural practices in decision-making and its daily life. Likewise, ensure that there is a sustainable development of their territory based on their own knowledge and information built from participatory monitoring and control strategies.

For this reason, a financial evaluation of the actions proposed in the project is required to guarantee the technical and operational execution, in such a way that it preserves its sustainability. In this sense, the analysis in which the initial investment of the project, sources of financing, income and expenses are identified, making a consolidation in a flow of funds that includes this economic information. It is important to bear in mind that the investments to be made differ in value from those that can be made in regions close to consumption centers, since the distances and modes of communication (air and water) considerably increase the values to be invested.

The base information taken to carry out the economic and financial analysis of the project was obtained from theoretical bibliographic sources and official sources such as: The Bank of the Republic of Colombia (BANREP), the National Customs and Tax Directorate (DIAN), the National Department of Statistics (DANE), among others.

2.1.20.1 Parameters to estimate financial projections

The fund flow is made at 30 years, this is the projection period that begins in the year 2018 (validation and verification date) and ends in the year 2047 . For this period of time, the inflation target for the

year 2023 of BANREP is taken as a base, which is 3.4% +/- 1%, that is, 4.4% [32]as the Weighted Average Cost of Capital (WACC) [33]of the project. Regarding the projection of the exchange rate, the CCPP of Colombia is taken as a base and the projection of the inflation rate of the United States for 2023 is subtracted, which is 2.7%, in this case the devaluation of the peso with respect to the dollar it would be at 1.7%. On the other hand, a discount rate of 16.4% and a risk rate of 10% are assumed for the project, the first based on the discount rate of social projects in Colombia, which is 12% (Castillo & Zhangallimbay, 2021)plus 4.4 % of the CCPP, while for the second it corresponds to the risk assumed when investing in a long-term project in the Colombian Amazon (Table 11).

Table 11. Parameters used for the financial analysis of the REDD++ PANI project .

Parameters	used value
Weighted Average Cost of Capital (WACC)	4.9%
risk premium	10%
Discount rate	16.4%
COP/USD devaluation	1.7%
Benefits and labor expenses year	53%
Depreciation Method	Straight line
Useful life of machinery, equipment, furniture and fixtures	10 years
Useful life of computer equipment	5 years

Source: Prepared by Biotrade SAS (2022).

2.1.20.2 Project revenue estimate

The resources derived from the projection of the sale of carbon credits annually are the income that the project will have, these are subject to a sale price that is regulated by the conditions of supply and demand of the voluntary market. For the calculation of the income, the sources of financing that are involved in the development of the project were taken (Table 12).

[32]In accordance with Law 31 of 1992, the Banco de la República must define and announce the inflation target, which controls the growth of the prices of the family basket and watches over the purchasing power of the currency. Information taken from https://www.banrep.gov.co/ .

[33]The WACC item is the "weighted average cost of capital" or better known as WACC (for its acronym in English). Which is interpreted as the rate of return that weights the costs of financing with each of the sources of capital, that is, of financing with own resources or those of third parties (call it banks, suppliers or others) and is the profitability that an investor or company expects future cash flows to return. If these cash flows generate a return lower than the WACC, an investor or company would choose not to invest in the project since it would not recover the costs of financing either with its own resources or with third-party resources.

Table 12. Sources of financing 2018 – 2047 of the REDD++ PANI project .

Annual Funding Sources	Cumulative 2018-2047 (USD)	Participation with respect to total financing (%)
NIBP	$127,921,086	92%
BIOTRADE	$10,660,091	8%
Total	**$138,581,177**	**100%**

Source: Prepared by Biotrade SAS (2022).

2.1.20.3 Initial investment estimate

To determine the initial capital required for the implementation of the project, depreciable fixed assets and non-depreciable fixed assets are estimated, in which the former lose their value over time, such as office, computer and telecommunications equipment, machinery and equipment. other equipment; while non-depreciable fixed assets do not lose their value, however, the purchase of land was not contemplated for the project. 53% of the initial investment of the project is made in the construction of the administrative and operational infrastructure that the project requires. The initial investment of the project is mainly represented by the purchase of machinery and equipment (68%), followed by signs with 18%, office equipment with 9% and computer and communication equipment with 5%. These goods or assets are not intended for sale and are intended for the development of the administrative activities of the Project (Table 13).

Table 13. Investment budget for the period 2018 – 2047[34]

Depreciable fixed assets	Cumulative 2018 - 2047 (USD)	Share with respect to total fixed assets (%)	Depreciation (Years)
Infrastructure	$420,000	13%	Four. Five
Office team	$365,166	eleven%	10
Computer and communication equipment	$1,658,012	51%	5
Machinery and equipment	$782,499	24%	10
Others – signs	$52,167	two%	5
Total	**$3,277,844**	**100%**	

Source: Prepared by Biotrade SAS (2022).

[34] Projected investment figures are illustrated at future value, which is meant to represent the amount of money an investment will be able to fetch at a future date earning interest at a WACC rate of 4.9% per annum.

Depreciation was calculated using the straight-line method in which a fixed annual depreciation fee was calculated, which divides the value of the asset by its useful life [35]as follows:

$$Depreciación\ (anual) = \frac{\text{Valor del activo}}{\text{Vida útil en años}}$$

2.1.20.4 Project Cost Estimate

The costs necessary to sustain the project activities were estimated, estimating fixed costs and variable costs; being fixed those that are generated regardless of the number of bond issuance units for the project: human talent, public services, publications, stationery and office supplies; in the case of the variables, they are those that derive from carrying out the actions of the project.

The variable costs represent 70% of the total costs of the project, since these are related to its development throughout its entire period of time. The execution of the lines of action were associated, which are 59% of the costs of this. On the other hand, the fixed costs are 30% of the total costs that represent the costs of personnel, administration and the execution of non-recurring programs for the operation of the Project (Table 14).

Table 14. Cost projection of the Project 2018 – 2047.

Detail	Cumulative 2018 - 2047 (USD)	%
Fixed costs		
Project Coordinator	$1,297,780	1.5%
Community authorities (5)	$3,243,822	3.8%
NIBP Secretaries (5)	$972,767	1.1%
NIBP advisor	$1,621,517	1.9%
secretarial equipment	$1,134,750	1.3%
Consulting professionals (5)	$8,106,180	9.6%
Administrative support (5)	$3,243,822	3.8%
Operational supports (5)	$3,243,822	3.8%
Administration - Services provided (internet, energy and others)	$848,357	1.0%
Stationery and office supplies	$191,549	0.2%
Non-recurring special programs of the REDD++ PANI project	$1,306,489	1.5%
Subtotal fixed costs	**$25,210,855**	**30%**

[35]The legal useful life for tax purposes is the period of recognition of the use of assets, which is set by article 1.2.1.18.4 of Decree 1625 of 2016, which establishes that the useful life of depreciable fixed assets , acquired after 1989 will be as follows: Real estate (including pipelines) is 20 years; Ships, trains, airplanes, machinery, equipment and personal property, 10 years and Motor vehicles and computers, five years.

Variable costs		
Air and land tickets (for area team)	$2,475,600	2.9%
Accommodation costs	$2,873,866	3.4%
Food expenses	$1,149,771	1.4%
Taxis and other travel expenses	$470,625	0.6%
fuels	$784,074	0.9%
Other operating costs (Assemblies, workshops)	$1,271,484	1.5%
Others and identification – Publications	$618,226	0.7%
Actions related to the strategic lines, programs and projects of the REDD++ PANI project	$50,000,000	58.9%
Subtotal variable costs	**$59,643,646**	**70%**
total costs	**$84,854,501**	**100%**

Source: Prepared by Biotrade SAS (2022).

2.1.20.5 Projected Cash Flow

The project's 30-year cash flow projection was carried out, estimating the initial investments and during the project, the income from the sale of carbon bonds and the expenses for the costs of carrying it out and depreciation. It makes it possible to demonstrate more clearly the financing and investment requirements in the project, so that the inflows and outflows of money reported by the project during this period are displayed. Table XX shows that the contributions generate profit after taxes, thus reaching to cover the needs of the project.

The financial viability analysis shows that the income corresponds to the resources obtained from the projection of the sale of carbon credits annually, which is subject to a sale price. In order to provide evidence of the projected income from the reduction of GHG emissions and/or other sources from the project activities, the following was considered:

- Annual average generation projection of 3,700,000 tCO2e,
- Average sale price to 2022 of 4 USD (80% of the taxable base and rate in force as of February 2022 of the carbon tax in Colombia – Article 2 of Resolution 000019 of January 28, 2022 of the Directorate of National Taxes and Customs -DIAN [36]) assuming that the GHGs will be marketed for non-causation of the Colombian Carbon Tax in light of Decree 926 of 2017.
- The annual growth (national inflation) of 4.9% in the taxable base and rate of the carbon tax according to the information of the Consumer Price Index (CPI for 2022)-

Under the above assumptions, average annual income of USD 13,208,770 could be expected for the period 2018 - 2022; projections that from the perspective of the project could vary according to the age of the project, revalidations of the baseline and changes in project design, changes in national policies on GHG mitigation initiatives, permanence of project activities and their effectiveness, among others, and from the perspective of the market. The projections are summarized in Table 15.

[36]Available at: https://actualicese.com/resolucion-000019-del-28-01-2022/

Table 15. Expected income from the commercialization of the project's GHG.

Year	Estimated net GHG emission reductions or removals (tCO_2e)	Expected value of carbon tax in Colombia (COP)	Expected sale price (COP)	Estimated net GHG sales (COP)	Estimated net GHG sales (USD)
2018	3,777,789	$15,000	$12,000	$45,333,468,000	12,252,289
2019	3,761,696	$15,450	$12,360	$46,494,562,560	12,566,098
2020	3,745,672	$15,914	$12,731	$47,685,401,098	12,887,946
2021	3,729,715	$16,391	$13,113	$48,906,723,394	13,218,033
2022	3,713,825	$18,829	$15,063	$55,942,088,740	15,119,483
2023	3,698,002	$19,394	$15,515	$57,374,856,038	15,506,718
2024	3,682,245	$19,976	$15,981	$58,844,296,211	15,903,864
2025	3,666,555	$20,575	$16,460	$60,351,368,241	16,311,181
2026	3,650,931	$21,192	$16,954	$61,897,023,674	16,728,925
2027	3,635,373	$21,828	$17,462	$63,482,254,720	17,157,366
2028	3,619,880	$22,483	$17,986	$65,108,061,412	17,596,773
2029	3,604,453	$23,157	$18,526	$66,775,505,183	18,047,434
2030	3,589,090	$23,852	$19,082	$68,485,619,547	18,509,627
2031	3,573,792	$24,568	$19,654	$70,239,520,332	18,983,654
2032	3,558,559	$25,305	$20,244	$72,038,333,946	19,469,820
2033	3,543,389	$26,064	$20,851	$73,883,174,422	19,968,426
2034	3,528,284	$26,846	$21,477	$75,775,266,799	20,479,802
2035	3,513,242	$27,651	$22,121	$77,715,783,473	21,004,266
2036	3,498,263	$28,481	$22,784	$79,705,968,827	21,542,154
2037	3,483,348	$29,335	$23,468	$81,747,123,048	22,093,817
2038	3,468,495	$30,215	$24,172	$83,840,509,815	22,659,597
2039	3,453,705	$31,121	$24,897	$85,987,495,899	23,239,864
2040	3,438,977	$32,055	$25,644	$88,189,434,623	23,834,982
2041	3,424,311	$33,017	$26,413	$90,447,738,556	24,445,335
2042	3,409,706	$34,007	$27,206	$92,763,829,788	25,071,305
2043	3,395,164	$35,027	$28,022	$95,139,248,915	25,713,311
2044	3,380,682	$36,078	$28,863	$97,575,437,502	26,371,740
2045	3,366,261	$37,161	$29,729	$100,073,985,519	27,047,023
2046	3,351,901	$38,275	$30,620	$102,636,496,368	27,739,594
2047	3,337,600	$39,424	$31,539	$105,264,552,082	28,449,879
Total	**106,600,905**				**599,920,305**

Source: Prepared by Biotrade SAS (2022).

Table Table 16shows a positive cash flow in all the years of the project, having a Net Present Value of 485,289 which means that the project is financially viable. Additionally, with respect to other sources from project activities, there are no financial analyzes or projections for these activities yet.

Table 16. Projected cash flow to 2047 (Millions of USD).

Period	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	Cumulative 2019-2028 (USD)
Income (USD)																															
Sale of VCUs	14.1	14.5	15.0	15.5	16.0	16.6	17.1	17.7	18.3	18.9	19.6	20.4	21.3	22.3	23.3	24.3	25.4	26.5	27.7	28.9	30.2	31.6	33.0	34.5	36.0	37.6	39.3	41.0	42.8	44.8	774.4
Total income	*14.1*	*14.5*	*15.0*	*15.5*	*16.0*	*16.6*	*17.1*	*17.7*	*18.3*	*18.9*	*19.6*	*20.4*	*21.3*	*22.3*	*23.3*	*24.3*	*25.4*	*26.5*	*27.7*	*28.9*	*30.2*	*31.6*	*33.0*	*34.5*	*36.0*	*37.6*	*39.3*	*41.0*	*42.8*	*44.8*	774.4
Expenses (USD)																															
Variable costs	2.2		2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.5	4.7	5.0	5.2	5.5	5.7	6.0	6.3	6.6	6.9	7.3	7.6	8.0	8.4	8.8	143.7
Fixed costs	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.5	25.2
Investments	1.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	5.1
Total expenses	3.7	2.7	2.8	3.0	3.1	3.5	3.4	3.6	3.8	4.0	5.3	4.4	4.6	4.8	5.1	5.6	5.6	5.8	6.1	6.4	8.6	7.1	7.4	7.8	8.2	9.0	9.0	9.4	9.9	10.4	174.0
Deficit/surplus (USD)	10.3	11.8	12.2	12.5	12.9	13.1	13.7	14.1	14.5	14.9	14.2	16.1	16.7	17.5	18.2	18.7	19.8	20.7	21.6	22.5	21.6	24.5	25.6	26.7	27.8	28.6	30.3	31.6	33.0	34.4	600.4
Income tax	3.4	3.9	4.0	4.1	4.3	4.3	4.5	4.7	4.8	4.9	4.7	5.3	5.5	5.8	6.0	6.2	6.5	6.8	7.1	7.4	7.1	8.1	8.4	8.8	9.2	9.4	10.0	10.4	10.9	11.4	198.1
profit after tax	6.9	7.9	8.2	8.4	8.7	8.8	9.2	9.4	9.7	10.0	9.5	10.8	11.2	11.7	12.2	12.6	13.3	13.9	14.5	15.1	14.5	16.4	17.1	17.9	18.7	19.2	20.3	21.2	22.1	23.0	402.3
Net cash flow after tax	6.9	7.9	8.2	8.4	8.7	8.8	9.2	9.4	9.7	10.0	9.5	10.8	11.2	11.7	12.2	12.6	13.3	13.9	14.5	15.1	14.5	16.4	17.1	17.9	18.7	19.2	20.3	21.2	22.1	23.0	402.3

Source: Prepared by Biotrade SAS (2022).

2.1.21 Grouped Projects

The PANI REDD++ project is not a cluster project, as specified in section 2.1.10.

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Land Use Scenarios without the Project (G2.1)

2.2.2 Most-Likely Scenario Justification (G2.1)

2.2.3 Community and Biodiversity Additionality (G2.2)

2.2.4 Benefits to be used as Offsets (G2.2)

The PANI REDD++ Project does not consider any other type of climate, community or biodiversity benefit that can be used as compensation.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

The PANI Association ensures the active participation of all communities in the project with the structuring and implementation of the organizational chart of operation of the REDD++ PANI project, where its base structure is based on three committees that are the following:

a) **Steering Committee** made up of the council of elders, authorities, project coordinator and technical professional advisors; those who are in charge of choosing the projects, must make known to the community the execution report, financial and accounting information, accountability and resolution of conflicts or controversies.
b) **Technical Committee**, led by the Secretaries of Government, Health, Education, Environment and Culture (these secretaries are part of the governing organization of the PANI Association), community teams and professional advisors. This committee is in charge of formulating the projects, you carry out: internal and external management, purchases and contracting, execution reports and / or accountability.
c) **Oversight Committee** that is the General Assembly of the PANI who will follow up on the POA for the correct execution of the project and / or request accountability from the committees when it deems it necessary. This organizational chart was designed to ensure the management and transparency of the execution of all project activities, in addition to ensuring the active participation of the different actors of all communities.

Stakeholders will be able to access the PdD project design document and all the annexed documents in their latest version and complete, as well as the Monitoring Reports of the project. These will be consolidated in digital format and stored in databases, via email or agreed websites, where each person can make the queries they consider pertinent, according to their search and information needs, in addition to making suggestions and contributions to the material through channels provided for this purpose.

For groups of local actors who do not have access to the internet, printed copies of the documents, monitoring reports or reports that are generated will be available, with the environmental promoters of each community (Manacaro, Mariapolis, Puerto Remanso del Tigre, San Francisco and Las Palmas) and collaborators of the project (technical coordinator).

Access to information before, during and after each activity carried out in the different areas of the project will not depend on the willingness of the entities in charge of its implementation to make them available to the public; however, it will be necessary for the persons in charge of these activities to generate immediate reports and reports (rapporteurships, attendance report, photographic record or material worked) and in a prudent period more elaborate analysis documents , which account for each step in the construction and progress of the execution of the activities of the project , so that interested parties can have timely information on the activities that are being implemented within the framework of the project.

Calls will be made to all interested parties when appropriate and resources are allocated to make the participation of interested parties effective. When necessary, meetings (workshops, conversations, informative talks) will be arranged with the different audiences, in order to inform about the call, management of the project and the difficulties in its implementation. These spaces will also contribute so that communication is transparent and fluid and to be able to provide necessary information on the steps to follow and the programmed activities, as well as the agreed commitments, functions, duties and rights for each of the parties involved.

Finally, all documents related to the certification process with the VCS standard will be available in the official project database of the program from the moment the validation[37] and verification process begins. This database is the storage center for all projects and programs validated according to the VCS criteria and in it you can find information of each Verified Carbon Unit (VCU) issued with the VCS Program, as well as the complete documentation of the project, including the PdD and monitoring reports. All interested parties will be informed about the respective links to make the query in the project profile.

2.3.2 Dissemination of Summary Project Documents (G3.1)

The dissemination of the summary documentation of the project will be done through the website that will allow free access to all public documents of the project except commercially sensitive ones. The hard copy of the PdD and the Monitoring Reports, as well as the validation and verification reports that the OVV Generates, will also be available in the PANI. The main project documents will also be disseminated at open events, workshops and public consultation meetings that will be organized by the project's technical committee. The annual monitoring reports of the POA will be distributed to governmental and non-governmental entities such as the Mayor's Office of Leticia, the Government of the Amazon CORPOAMAZONIA, Cahuinarí National Natural Park, Amazonian Institute of Scientific Research SINCHI, Amazon Conservation Team ACT, Zoological Society of Frankfurt and NGOs working in the region. Other means of dissemination such as social networks, paper folders, etc. can be used to give total transparency to the management of the project.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Four meetings were held with stakeholders for the structuring of the REDD++ PANI project, from the end of 2021 to the beginning of 2022. The meetings were as follows Table 17:

[37] VCS Project Database: https://www.vcsprojectdatabase.org/#/home

Table 17. Time and place of development of the meetings for the consultation of stakeholders of the REDD++ PANI project.

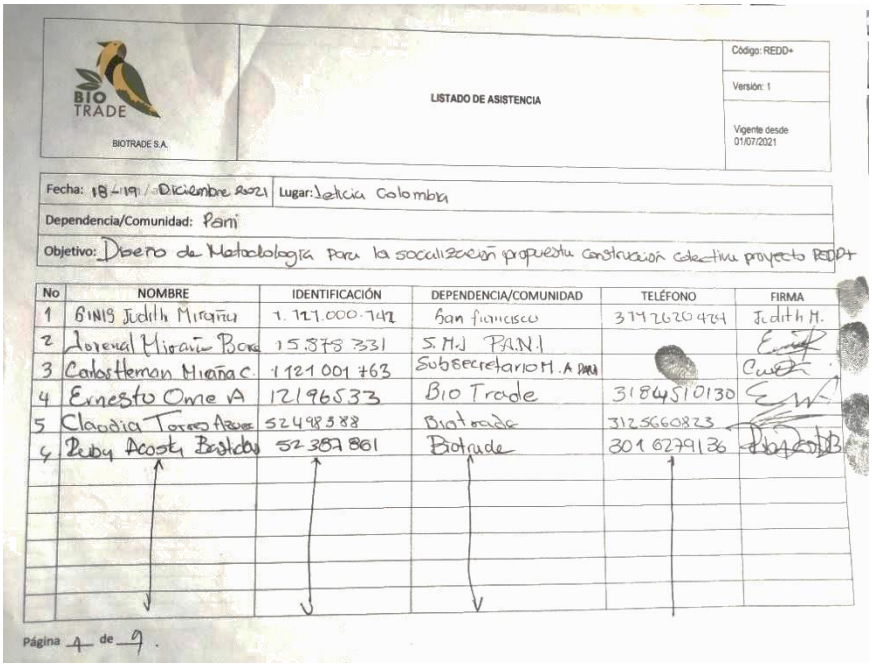
Type of meeting	Date	Type of actors summoned	Place, Municipality	Duration
Meeting 1. Meeting between PANI Environmental Secretary, PANI Environmental Promoters and BIOTRADE S.A.S.	18, 19 and 20 - December - 2021	Environmental Leaders of PANI: Environmental Secretary (Juvenal Miraña), and environmental promoters (Carlos Hernán Miraña and Ginis Judith Miraña), and representatives of BIOTRADE S.A.S.	Hotel Tapir, Leticia (Amazonas)	4 days full day
Meeting 2. General Assembly of the PANI Association	18, 19 and 20 - February - 2022	Assembly of PANI and BIOTRADE SAS.	Maloka de Puerto backwater of the tiger	3 days full day
Meetings 3. Field visits in the different communities that make up the PANI association by BIOTRADE SAS	21, 22 and 23 - February - 2022	Leaders of the PANI and BIOTRADE SAS communities.	Different communities	3 days full day
Meeting 4. Socialization with Institutions Related to the territory of PANI	25 – February - 2022	PANI and governmental and non-governmental entities such as the Mayor's Office of Leticia, the Government of the Amazon, Cahuinarí National Natural Park, Amazonian Institute of Scientific Research SINCHI, Amazon Conservation Team ACT, Zoological Society of Frankfurt and GAIA.	Hotel Yurupari, Leticia, (Amazonas)	3 hours

Source: prepared by Biotrade S.A.S. (2022).

Meeting 1. Meeting between PANI Environmental Secretary, PANI Environmental Promoters and BIOTRADE S.A.S.

The topics discussed in this meeting by BIOTRADE SAS, were agreed with the representatives of PANI, the first objective of the meeting was to understand the environmental importance of REDD projects and their contribution to strengthening the governance of indigenous territories, cultural preservation, as well as the environmental care of them . It began by making clear about what the carbon cycle is, its importance for life on earth and how it is related to climate change, emphasizing what climate change is and why it occurs on planet earth. And to be able to show the relationship between deforestation and climate change. With this clear information from the participants, we proceeded to explain where REDD+ projects are born from and what is the importance of implementing it in the territory, and an introduction was made to the stages of the project (Figure 7 and Figure 8).

Figure 7. Technical and social proposal meeting for the formulation and joint structuring of a REDD project of the PANI communities of the Predio Putumayo Reservation. Source: Biotrade S.A.S. (2021)



BIO TRADE
BIOTRADE S.A.

LISTADO DE ASISTENCIA

Código: REDD+
Versión: 1
Vigente desde 01/07/2021

Fecha: 18-19 / Diciembre 2021 | Lugar: Leticia Colombia
Dependencia/Comunidad: Pani
Objetivo: Diseño de Metodología para la socialización propuesta construcción colectiva proyecto REDD+

No	NOMBRE	IDENTIFICACIÓN	DEPENDENCIA/COMUNIDAD	TELÉFONO	FIRMA
1	BINIS Judith Miraña	1.121.000.742	San Francisco	3147620474	Judith M.
2	Jorenal Miraña Bora	15.878 331	S.M.J PANI		
3	Carlotteman Miraña C.	1121 001 763	Subsecretario M.A PANI		
4	Ernesto Ome A	12196533	Bio Trade	3184510130	
5	Claudia Torres Abon	52498588	Biotrade	3125660823	
6	Ruby Acosta Bastidas	52 387 861	Biotrade	301 6279136	

Página 4 de 9.

Figure 8. List of attendance at socialization meeting 1 and proposed construction of a REDD project. Source: Biotrade S.A.S. (2021)

After having finished with this theme, the proposal of the REDD PANI AND BIOTRADE SAS project for the formulation of the project was discussed, but the final decision of the implementation of a REDD project and the association would be discussed in the General Assembly within the territory of PANI, as it is the only entity authorized for decision-making of such magnitude. For this reason, dates and agenda to be developed for the general assembly are agreed, as well as the physical logistics (field trips) and economic for the proposed meeting. Agreements are also made at this meeting, such as the documentary compilation of the process of territorial boundary agreements with the neighboring indigenous organizations ACITMA,

CRIMA, AIZA and AIPEA, to begin with the corresponding calculations. Because the PANI would hold a pending meeting on December 27, 2021 for the ratification of the limits for the issue of defining the polygons for the non-municipalized areas on Decree 632. It was requested that they present the evidence of the meeting, that is, the minutes where the Association of Traditional Authorities of Alto Miritíí (ACITMA) ratifies the traditional limit, which is the same as that of the PANI so far.

To ensure the transparency of the entire process, six folders were available, so that each community leader kept in it all the information related to the REDD project and is available so that anyone in the community can be informed and / or resolve concerns. The folder was delivered by the environmental secretary, with a copy of the minutes, letter of invitation addressed to the authorities as appropriate from: **Puerto Remanso del Tigre** (Jhon Andrés Córdoba), **Mariapolis (**Audor Miraña Bora) **Manacaro** (Jesús Alberto Carijona), **Las Palmas** (Salomon Bernaza), **San Francisco** (Daniel Aurelio Rivas), **Quinche** (Edgar Cahullari Miraña) It was possible to socialize the REDD project proposal in January 6 to 9, 2022, but this was postponed by PANI to February 18, 19 and 20, 2022.

Meeting 2. General Assembly of the PANI Association

First Day

The meeting of the Assembly of PANI and BIOTRADE SAS, begins after the *mambeadero* space, the proposed agenda was evaluated at the first meeting (in December). The House approved the agenda. The first day of the meeting was initiated by the company BIOTRADE SAS, with the explanation of what global warming is and evidence of the relationship between deforestation and climate change. Lugo se proceeded to explain how he initiated the political and technical construction of REDD projects in the world and what the global importance as a mitigation effect of climate and local change; evidencing the benefits in the territories where the conditions for developing them; emphasizing that REDD is a mechanism for the reduction of greenhouse gases due to forest degradation and deforestation, through the conservation and improvement of the forest's carbon sequestration capacities.

This mechanism is put in place with the communities that live in a territory to be conserved, to reduce the pressure for degradation and deforestation of the forest. Actions must be carried out that demonstrate recovery and/or conservation during the stay of the REDD project through periodic monitoring and analysis of the results. For these demonstrable actions every 3 years, the reductions of emissions avoided by degradation and deforestation that will be reflected in VCU's Carbon Credits that have a commercial value will be counted. Those who buy it are companies that do not have the possibility of reducing emissions and are obliged for legal reasons or to promote a sustainable image and / or social responsibility. The value of the bonds is the payment for the forest conservation service in the project area i.e. the collective territory of PANI. This money when it reaches the community must be reinvested in the conservation and well-being processes of the communities that inhabit the territory.

A space for questions and answers was given within the framework of the joint work sessions that helped to understand what a REDD project is; and analyze what would be the potential socio-environmental risks and benefits; and what would be the lines of action within the community to finally have tools in decision making: whether to apply to be part of this type of project and initiate a possible structuring in the territory of PANI. When ensured that the participants resolved their doubts about the REDD mechanism and its objectives. The chronological scheme of a REDD project was presented where the necessary steps are to achieve certification, from the project idea, requirements, costs, to the issuance of the credits associated with each of the stages to be worked for the consultation of the interested parties.

BIOTRADE SAS explained how this accompaniment would be carried out, what those conditions would be for both parties and what they commit themselves to in the event that the PANI decides to continue the process.

The PANI Assembly in an autonomous space spoke for more than three hours about the doubts, benefits and risks of continuing with the REDD project with the company BIOTRADE SAS. Deciding to start the

participatory construction of the REDD project but under certain specific conditions that were included in the alliance contract for the development of the project between PANI and BIOTRADE S.A.S.

In this assembly, organizational aspects were defined for the administration and execution of the project that will be mentioned later.

Second Day:

Three working groups were organized on different topics to diagnose and coordinate the benefit-sharing system.

Work group 1. **Development of timeline of PANI management with institutions and neighbors.**

This table constructed the line in time since the constitution of the PANI and the joint work agreements, relevant in the field of institutional management in social and environmental aspects (Figure7 and Figure8). These results were the inputs for the search for documentary evidence, to make the projections of socialization meetings of the REDD project with actors of interest and to have the evidence of the REDD actions that the PANI has carried out, within the temporal limits of the project specifically from the start date, since these actions are those that are manifested within the project document.

Figure7 Construction on the work table of the timeline between the communities that make up the territory of PANI. Source Biotrade S. A. S. (2022).

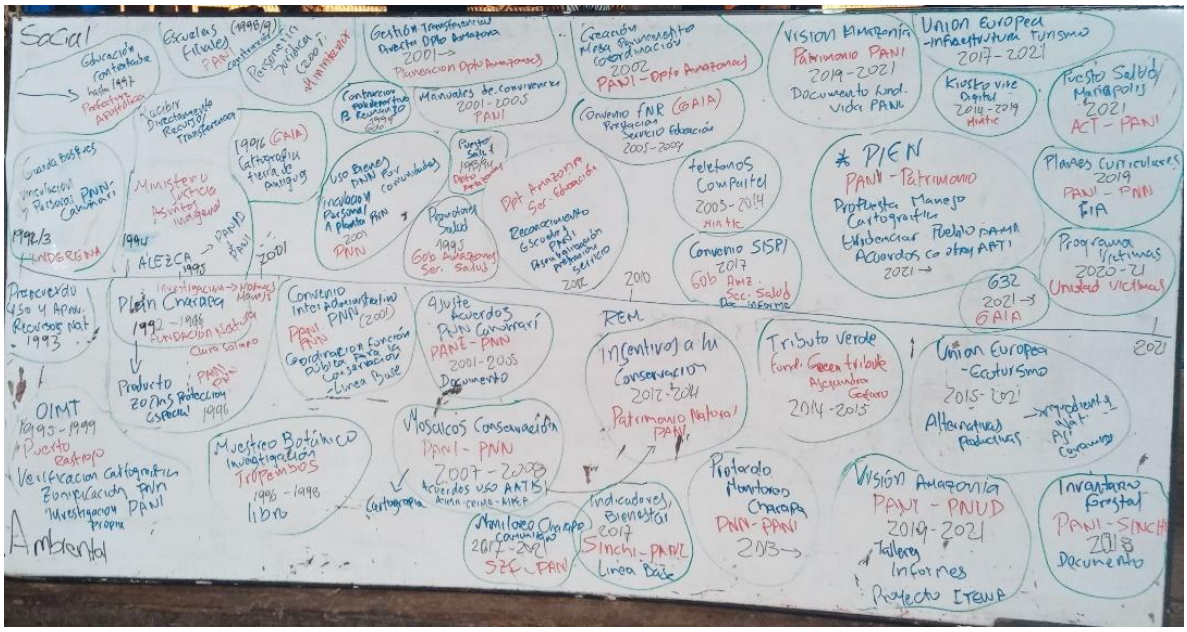


Figure8 Construction of line in time management of PANI with institutions and neighbors. Source Biotrade S. A. S. (2022).

Work group 2. Historical analysis of deforestation and its social and environmental effects.

This table focused on a territorial analysis of loss of biodiversity and forest cover, that is, analysis of agents of direct and indirect causes of degradation and deforestation in the area of the project, area of leaks and reference area of the project. The historical periods for the construction of the baseline were analyzed, taking into account deforestation actors and activities, the causes that drove this process in the territory, the analysis of pressures and threats and their location (Figure9 andFigure10), as well as the projection of this trend if the activities of the REDD project.

This was the main input to limit the reference area and the leakage area since the participants provided data on agent mobility by hunting, fishing, non-timber and timber products. Among the timber products there are spices for the construction of houses that are less and less frequent more than two days away from the point.

The illegal logging of some species, likewise the community gave relevant information on the use of the ecosystem for the production of chagras, use of wood and palms for the construction of Malokas houses and other minor constructions, and use of forest species within the territory for food as bush meat and, pressures from illegal mining and coca as well as pressures.

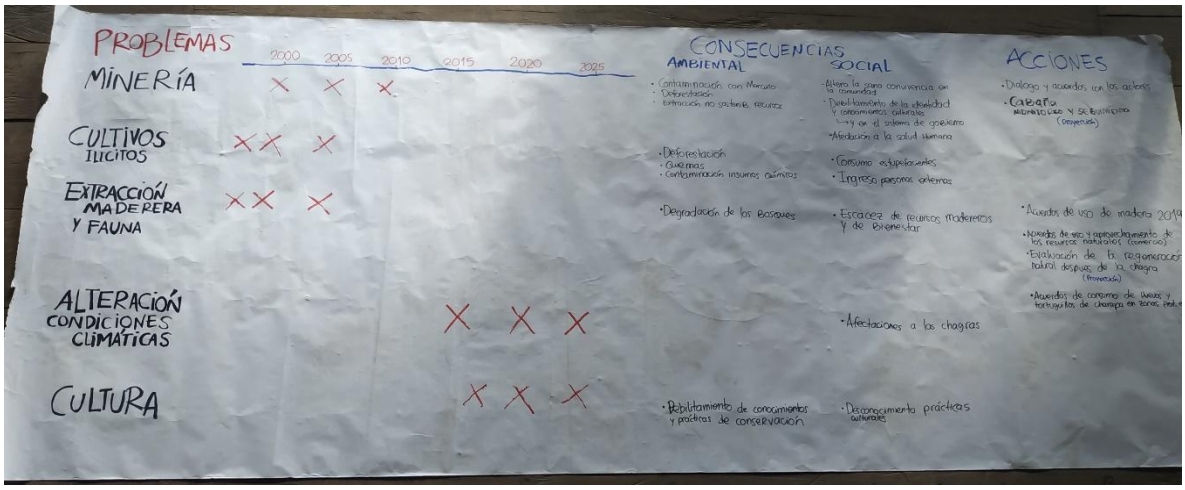


Figure9 Historical analysis of deforestation and its social effects and environments in the PANI territory. Source: Biotrade S. A. S. (2022).

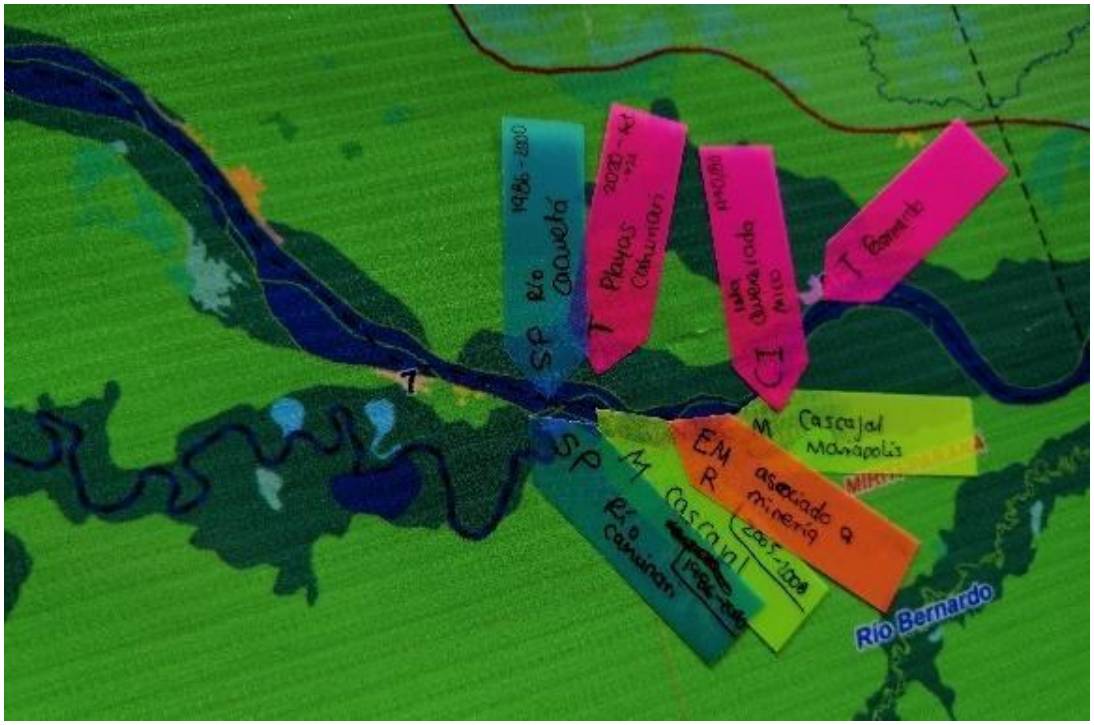


Figure10 Location on the PANI map of environmental problems or threats. Source: Biotrade S.A.S. (2022).

Work group 3. Theory of change

This table aimed to build the analysis of the problems faced by the PANI community, and build the possible ways of change, impact; analyzing the scenarios without Project (current) and with Project (Figure11).

Figure11 . Analysis of the problems faced by the PANI community. Source Biotrade S. A. S. (2022).

In the evening, each work table carried out the socialization of the results that was in charge of a member of the work table and contributions will be made by the entire assembly (Figure12). This facilitated communication and collective construction to continue with the next day's work.

Figure12 . Socialization of results by work table of the REDD++ PANI project. Source: Biotrade S.A.S. (2022)

Third day

The objective of this day was the development of the theory of change, the Hivos Theory of Change guide[38] was used as a methodological basis (Van Es, Guijt, & Vogel, 2015), carrying out the eight (8) steps that allowed the analysis of the PANI Life Plan, the lines of action, the strategic lines of the REM, to identify the actions that would be carried out by the REDD+ Project. + PANI, and its budgetary distribution. For this, the participants were divided into four (4) groups according to the pillars (baskets) identified to develop the REDD project, which were the following:

1) Consolidation of self-government;
2) Strengthening traditional knowledge;
3) Actions for sustainable development in the PANI territory;
4) Monitoring and control.

Each participant of the group contributed according to their vision that programs and activities should be in each of the pillars (baskets) understanding the why? And for what? , the logic of intervention in the territory was also discussed; this discussion took place in each of the groups. At the end of the activity, each group made a presentation to improve and specify the system of distribution of intervention benefits of the REDD++ PANI project, in this plenary the lines of action, programs and projects on which the REDD actions of the Project, finally the intervention design or SDB was approved (Figure 26) the development of the methodology the results obtained with the community were described in detail in section 2.1.11.

It is necessary to clarify that the theory of change on which the design of the intervention strategy of the REDD++ PANI Project is based obeys a process of adaptive evolution, that is, the actions generate changes and these changes generate inputs to create new intervention actions, for this reason the POA will be carried out, s to evaluate the effect of the actions executed, and evaluate the progress of the fulfillment of the goals and objectives, every three years in the MRV process an analysis and adjustment of the benefit distribution system will be carried out , since it is possible that new actions will be developed and that many of the actions undertaken will be completed.

Se defined the name of the "**REDD++ PANI Project**" and the project coordinator was chosen in an autonomous space of the PANI Assembly, leaving Juvenal Miraña Bora. Finally, the agreements were formalized with the technical and financial advisory company of the project (BIOTRADE SAS) with the signature of the Legal Representative within the framework of the assembly after making a reading and joint analysis of the contract in the assembly, some parts of the contract were adjusted with the support of all the participants.

Meetings 3. Field visits in the different communities that make up the PANI association by BIOTRADE SAS

Field visits were made by the professional team of BIOTRADE S.AS with the accompaniment of the PANI leaders for three days. Se distributed the staff in two field crews, each with two people from the community and three professionals from Biotrade S.A.S. The First Crew visited the communities of Las Palmas, Quinche and San Francisco and the Second Crew visited the communities of Puerto Remanso del Tigre, Mariapolis and Manacaro (Figure13).

Each crew conducted questionnaire-type surveys of the families, which were selected in a randomly manner. Interviews were also conducted according to each sector: education, health and leadersTable18. The results of the surveys and the interviews served to collect primary information necessary for the

[38] Organization of cooperation international with office global in The Hague Holland. Hivos provides support to Organizations of the society civil that works in Africa, Latin America, Orient Middle, and Asia.

structuring of the PdD in addition to corroborating information for the analysis of Drivers of deforestation and degradation.

There were visits to the chagras (planting sites) to learn about the products sown, the management and distribution of the sowings in the sites.

During the tours, talks were also made with different people about how they perceived the project and what their expectations were. That consisted of small meetings in the communities to discuss the vision of the territory and the intervention strategy of the project.

Table18 Number of surveys and interviews conducted during field visits

Community	Number of Surveys	Number of Interviews
Las Palmas	4	3
Quinche	0	1
San Francisco	4	1
Puerto Remanso del Tigre	8	3
Manacaro	8	3
Mariapolis	8	1

Source: prepared by Biotrade S.A.S. (2022).

Figure13 Interview by Claudia Torres with Promotora Ambiental Delia M. Mosquera of the community of Manacaro. Source: Biotrade S.A.S. (2022).

Meeting 4. Socialization with Institutions Related to the territory of PANI

As part of the fulfillment of socialization of the project with stakeholders, the relevant ones were identified by the PANI leaders. The convening process was made fifteen days before the meeting, to governmental and non-governmental entities such as the Mayor's Office of Leticia, the Government of the Amazon, Cahuinarí National Natural Park, Amazonian Institute of Scientific Research *SINCHI, Amazon Conservation Team ACT,* Zoological Society of Frankfurt and GAIA with whom the PANI has had a communication and a historical work, within the territory. And that with the REDD project it is possible to strengthen and / or structure new works that support the community in general and the environment.

This meeting was held on February 25, 2022 with the aim of socializing the construction of a REDD project in the PANI. The meeting was chaired by the legal representative of the PANI Association and by the coordinator of the REDD++ PANI project, who explained all the methodology developed, to become

managers of this project that strengthens different aspects that will be consolidated with accordingly to the life plan: **Own government** within the framework of autonomy, Implementation of the life plan and the REM, Strengthening of inter-institutional and economic relations (Figure14). At the meeting, the importance of this type of project in the territory was evident.

The importance of attending to the development and execution of the project under the safeguards of CANCÚN was informed with regard to numeral **d** "*During the formulation process and within the execution, the **full and effective participation** of the relevant stakeholders, in particular indigenous peoples and local communities, will be sought, that the actions are consistent with the conservation of natural forests and biological diversity, ensuring that REDD+ actions are not used for the conversion of natural forests but to encourage the protection and conservation of those forests and their environmental services and enhance other social and environmental benefits*." And that for this reason they were summoned to ensure effective participation in the construction of the project.

A meeting was made of the social and environmental activities that PANI has advanced in conjunction with different institutionsFigure15). Evidenced the specific actions that make the PANI can be a manager of such magnitude.

Figure14 . Socialization meeting of the REDD ++ PANI project to institutions. Source: Biotrade S.A.S. (2022)

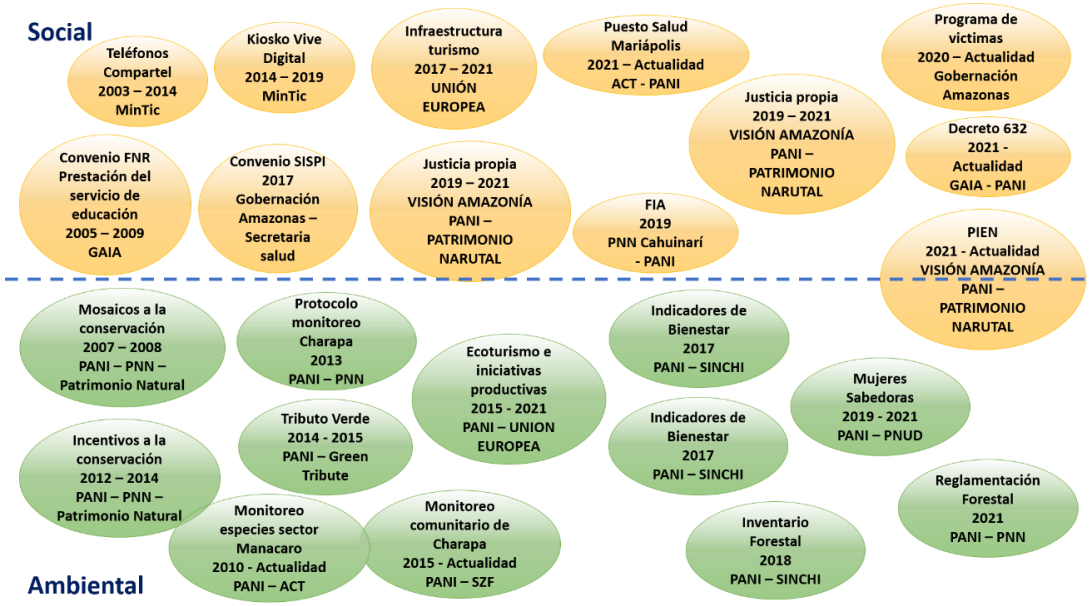


Figure15 . Historical count of actions implemented in the PANI from 2008 to 2022. Source: Biotrade S.A.S. (2022).

The representatives of the PANI presented what from within the Association they defined as the four strategic lines of the project and its programs that were as follows:

Consolidation of Self-Government:

- Political, technical and administrative adaptation of self-government for the autonomous management of the territory
- Capacity building for autonomous territory management

Strengthening traditional knowledge:

- Strengthening culture in government spaces
- Transmission of Cultural Knowledge
- Own and participatory research

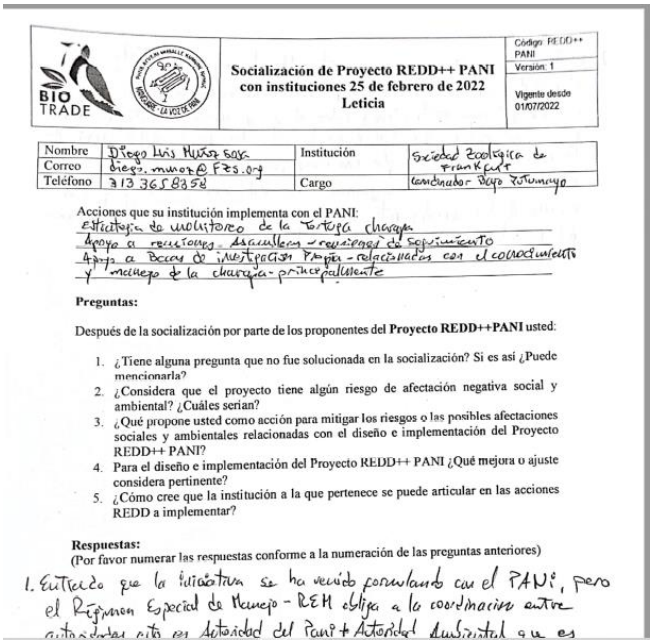
Actions for the sustainable development of the PANI territory

- Improvement of the social, cultural and productive infrastructure for the sustainable development of PANI
- Education, Research and technological development
- Sustainable production and marketing of goods and services in the territory
- Biodiversity conservation and ecosystem services

Monitoring and Control

- Control, surveillance and monitoring of PANI actions
- Administrative monitoring of the project
- PQRDS
- Monitoring of social and environmental safeguards.

After the detailed explanation of why the distribution of strategic lines and programs is necessary, space was given to questions and answers. And it continued with the explanation of the monitoring report from 2018 to 2021, where several of the organizations present have accompanied. The other question and answer space was left and a format of questions was delivered, suggestions to receive opinions from the institution and the academy in the construction of the REDD ++ PANI project (16)



BIO TRADE

Socialización de Proyecto REDD++ PANI con instituciones 25 de febrero de 2022 Leticia

Código: REDD++ PANI | Versión: 1 | Vigente desde 01/07/2022

Nombre	Diego Luis Muñoz Sosa	Institución	Sociedad Zoológica de Frankfurt
Correo	diego.munoz@fzs.org		
Teléfono	313 365 8358	Cargo	Coordinador Diego Fernando

Acciones que su institución implementa con el PANI:
Estrategia de vigilancia de la tortuga charapa
Apoyo al monitoreo. Asesoría y seguimiento de seguimiento
Apoyo a líneas de investigación propia - relacionados con el conocimiento y manejo de la charapa - principalmente

Preguntas:

Después de la socialización por parte de los proponentes del **Proyecto REDD++PANI** usted:

1. ¿Tiene alguna pregunta que no fue solucionada en la socialización? Si es así ¿Puede mencionarla?
2. ¿Considera que el proyecto tiene algún riesgo de afectación negativa social y ambiental? ¿Cuáles serían?
3. ¿Qué propone usted como acción para mitigar los riesgos o las posibles afectaciones sociales y ambientales relacionadas con el diseño e implementación del Proyecto REDD++ PANI?
4. Para el diseño e implementación del Proyecto REDD++ PANI ¿Qué mejora o ajuste considera pertinente?
5. ¿Cómo cree que la institución a la que pertenece se puede articular en las acciones REDD a implementar?

Respuestas:
(Por favor numerar las respuestas conforme a la numeración de las preguntas anteriores)

1. Entiendo que la iniciativa se ha venido formulando con el PANI, pero el Régimen Especial de Manejo - REM obliga a la coordinación entre autoridades ante la Autoridad del Pani + Autoridad ambiental que es

16 12. REDD++PANI Project Socialization Format with Institutions February 25, 2022

2.3.4 Community Costs, Risks, and Benefits (G3.2)

The costs of the formulation are assumed by the managing partner BIOTRADE SAS, such as the payment of the payroll of professionals for the structuring of the project and the field coordinator, the costs of mobilization, logistics, materials, validation audit and verification among others.

Information on the costs and benefits that the project brings to PANI was discussed by the five communities at the General Assembly. The risks were analyzed by the leaders of each community knowing that this process demands commitment and effort from all PANI members. Due to this, five strategic lines of the REDD++ PANI project were defined, which are: 1) Consolidation of self-government; (2) Strengthening traditional knowledge; 3) Actions for sustainable development in the PANI territory; 4) Monitoring and control. To define the programs that will benefit the population and the territory, the participatory workshop was held and as a result the programs to be implemented were defined (Figure17). The general distribution of benefits of the REDD++ PANI project was established according to Table 10:

Figure17 Workshop on the construction of strategic lines and their programs. Source: Biotrade S. A.S. (2022).

Table19 Distribution of benefits approved by the PANI General Assembly

REDD+ Project Strategic Line	Benefit sharing (%)
Consolidation of self-government	30
Strengthening traditional knowledge	20
Actions for the sustainable development of the PANI territory	40
Monitoring and control	10
Total	100

Source: prepared by Biotrade S.A.S. (2022).

The same benefit-sharing exercise was carried out for each of the strategic lines of the project and their respective programs, taking into account the proportion assigned in a general way to the REDD++ PANI project. This is how each strategic line defined the distribution of benefits according toTable20 . Distribution of general benefits by programs approved by the PANI General AssemblyTable20:

Table20 . Distribution of general benefits by programs approved by the PANI General Assembly

Strategic line	Programs	Benefit sharing (%)
Consolidation of self-government	Political, technical and administrative adaptation of self-government for the autonomous management of the territory	60%
	Capacity building for autonomous territory management	40%
Strengthening traditional knowledge	Strengthening culture in government spaces	20%
	Transmission of Cultural Knowledge	40%
	Own and participatory research	40%
	Improvement of the social, cultural and productive infrastructure for the sustainable development of PANI	40%

Strategic line	Programs	Benefit sharing (%)
Actions for the sustainable development of the PANI territory	Education, Research and technological development	30%
	Sustainable production and marketing of goods and services in the territory	20%
	Biodiversity conservation and ecosystem services	10%
Monitoring and Control	Control, surveillance and monitoring of PANI actions	76%
	Administrative monitoring of the project	20%
	PQRDS	2%
	Monitoring of social and environmental safeguards	2%

Source: prepared by Biotrade S.A.S. (2022).

2.3.5 Information to Stakeholders on Validation and Verification Process (G3.3)

The community and stakeholders will receive advance information on the audit visit process and agenda. The schedule on the audit, validation and verification process of the REDD++PANI project will be socialized in the PANI by the project coordinator and the environmental promoters of each community. For interested external parties will be used channels such as websites social networks, radio messages, CCB & VCS project description version 3. CCB Version 3, VCS Version 3CCB v3.0, VCS v3.3 52. Likewise, a document of the answers to the questions or requirements of the interested parties in the public consultation process established by the CCB will be announced.

2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

In the process of Verification and Validation the technical committee is the organizer of the relationship with the auditors of the OVV, an audit plan was made that contains the specific schedule for the review of documentation, visits and field trips , interviews with leaders, people from the communities and actors of institutional interest. This audit plan was consulted with the indigenous leaders of each community, which allows to establish the necessary logistics and schedule to facilitate the visit to the auditor's site.

2.3.7 Stakeholder Consultations (G3.4)

This project was born from the initiative of the Environmental Secretary of PANI, who invited the company BIOTRADE SAS to the structuring of a REDD (Appendix 1), the company accepted the invitation and prepared a material to publicize the necessary steps to develop the REDD projects. The conformation of the project was carried out by the PANI Assembly who decided after discussing the pros and cons of this type of projects for the territory to start with the structuring of the REDD project Figure18. Being el PANI the proponent and manager.

From the territory and with the actors, the organizational aspects were discussed, taking into account the organizational chart of the PANI and for the execution of the resources. The organizational structure of the REDD++ PANI project was formed with the management and technical committees, its members, functions and responsibilities and the oversight committee in charge of ensuring transparency in all processes (Figure Figure19

It was made the selection of the coordinator of this project by the PANI which was elected by internal vote among the leaders and elders. The PANI Assembly recognizes the need for training in administrative and financial matters. Due to this, it was important to invest resources in the hiring of qualified personnel.

Figure18 PANI Assembly Meeting in Puerto Remanso del Tigre. Source: Biotrade S. A. S. (2022).

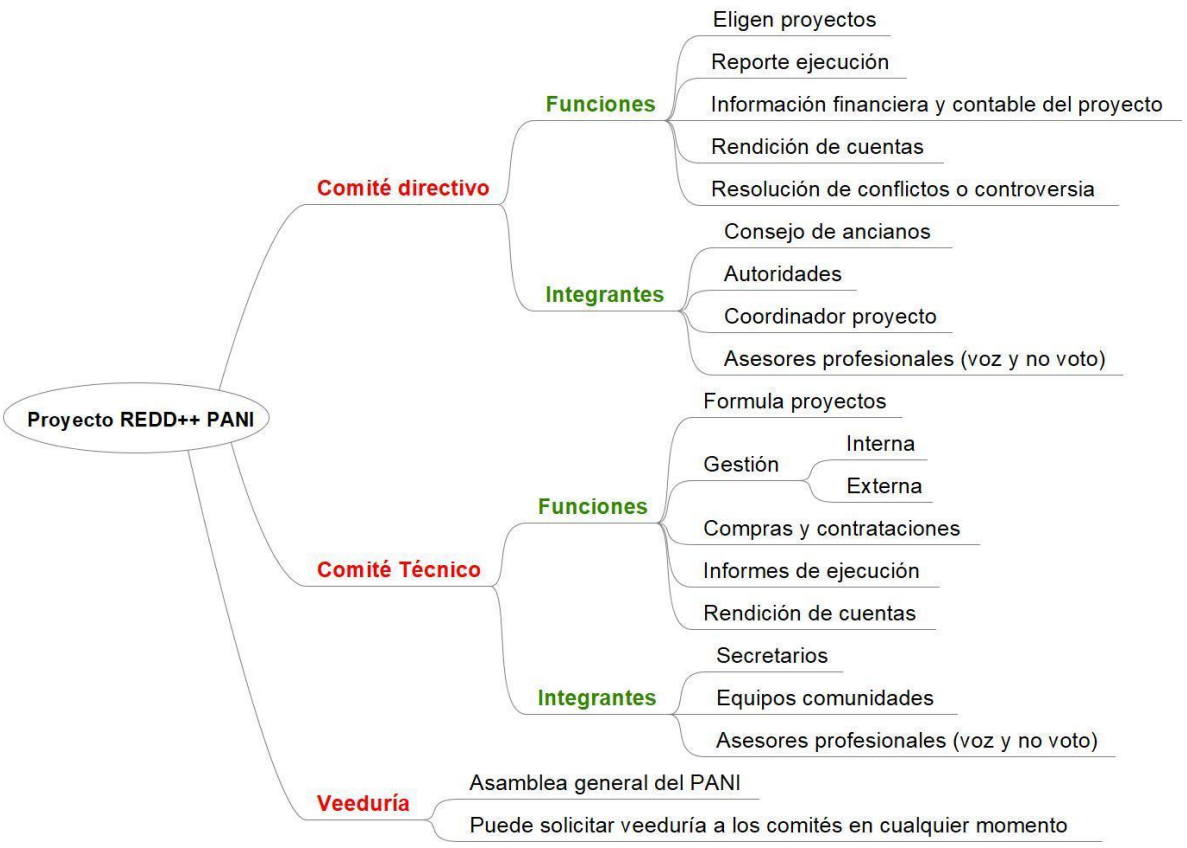


Figure19 . Organizational structure of the REDD++ PANI project. Source Biotrade S. A. S. (2022)

2.3.8 Continued Consultation and Adaptive Management (G3.4)

The plan to maintain ongoing communication with communities includes:

- A communication channel that attends to possible PQRSD
- Training activities within the framework of the implementation of strategic lines and project activities
- Dissemination of project information by environmental promoters, project coordinator.
- Accountability of the REDD++PANI project annually at the Assembly
- Other events related to the project, such as briefings and consultation processes

This plan will be used during the accreditation period of the project and with the inputs obtained from each strategy it is expected to generate feedback processes in the project that allow an adaptive management of it.

2.3.9 Stakeholder Consultation Channels (G3.5)

The start of the construction of the project was made from the environmental leaders, who in their search to advance in the protection of the environment and the well-being of their people were interested in the REDD projects. They contacted the company BIOTRADE S.A.S to be advised on REDD issues. The communication was made by telephone and after the formal invitation by means of a letter, the first meeting was given in the city of Leticia.

The formulation of the REDD project was consulted and approved by the PANI Assembly, as it is the only entity authorized by the communities of Puerto Remanso del Tigre, Mariapolis, Manacaro, Las Palmas, San Francisco, Quinche that make up the PANI association, to make this decision.

The consultation of the times and requirements was in this same assembly, where all the attending population and belonging to these communities had the opportunity to participate and comment on the structuring of the Project this is found in greater depth in numeral 2.3.3.

For the consultation of external entities, governmental and non-governmental entities such as the Mayor's Office of Leticia, the Government of the Amazon, Cahuinarí National Natural Park, the Amazon Institute of Scientific Research SINCHI, Amazon Conservation Team ACT, the Zoological Society of Frankfurt and GAIA were invited to socialization and participation in the construction of the project. Que have carried out important tasks in the Project area and are fundamental actors in the territory with which specific actions can be articulated in the future that help enrich the processes.

2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

To guarantee the effective participation of the entire community as internal actors (women and men, both adults and young people), it begins with an adequate call of the inhabitants of the different communities that make up the territory of PANI, ensuring the largest number of participants.

The participation of external actors is necessary to identify all those who influence and / or can contribute to the different spaces addressed by the project.

Each meeting is planned defining the objectives, topics to be discussed, agenda, times and place for the development of the consultations, since the territory is difficult to access and great distances, which determines that the meetings must be used for decision making.

It also takes into account other organizations that have developed work on the site such as PNN for the advancement of the REM and other work carried out in the territory with the communities with other external actors.

2.3.11 Anti-Discrimination Assurance (G3.7)

Within the framework of the REDD++ PANI Project, no discrimination has been identified, resulting in all participants having a say. This association has representatives of each community and of different types of ethnicities and ages (Miraña in 49%, Bora 13% and the minority Carijona, Matapi, Kubeo). For the inhabitants it is important to have the point of view of the elderly and knowers. And that in these decision-making processes young people, children and children are linked.

On the other hand, the ITEWA association that actively participates in all decisions and is the women's organizational representation of PANI integrated by different women from all over the territory and who have led conservation processes of great importance for the Colombian Amazon. In this way, there is full participation of all the representatives of the territory except for the PIA (Indigenous Peoples in Voluntary Isolation) who are represented by all the leaders of the community.

Biotrade SAS, as technical manager of the project, undertakes to defend a set of human rights principles and implement implementation measures, which include relevant policies, improved implementation capacity and appropriate mechanisms to consider compliance with the following:

The elimination of all forms of racial discrimination, protected by Law 1752 of 2015 of Colombia. The purpose of this Law is to ensure the protection of the rights of a person, group of persons, community or people, which are violated through acts of racism or discrimination (race, ethnicity, religion, nationality, political or philosophical ideology, sex or sexual orientation, disability and other grounds of discrimination).

2.3.12 Feedback and Grievance Redress Procedure (G3.8)

The coordination of the project establishes the methods for the attention of petitions, complaints, claims, suggestions and denunciations (PQRSD by its acronym in Spanish) for the project. During the consultation meetings with the interested parties, two main procedures were defined, field contact and telephone access, with the aim of facilitating communication channels between the project coordination and the community, thus, according to the particularities of each case, one or the other method will be easier to access and use, and an auxiliary procedure, access by email, especially for institutions and local authorities that more effectively handle digital media.

The PQRSD attention mechanism will be enabled throughout the accreditation period of the project and its operation must be socialized and agreed with the interested parties of the instances that are subsequently linked to the project.

The official in charge of receiving the request will be known as the REDD Coordinator and has the responsibility of receiving the PQRSD, documenting them through the use of the registration form model and sending it to the respective instances to solve it (either, technical committee, steering committee) considering the maximum response times established for the mechanism. Once it receives a response from the decision-making bodies, it must inform the applicant and share the satisfaction survey form, which must

be completed by the person, representative of the community group or private entity that puts the request first, once it has been resolved.[39]

Although the forms that are submitted request the name of the person who puts the petition first, so that additional information can be requested (if deemed necessary) or communicate the final decision in the face of doubt; the REDD coordinator in charge of receiving the request must ensure confidentiality in the treatment of each particular case. This implies care in the handling of records and in the information that is shared. Only in strictly necessary cases or under the approval of the claimant, your identity may be publicly disclosed.

Each of the methods is described below and its main advantages and limitations are presented.

2.3.12.1 Procedures for PQRSD attention

2.3.12.1.1 Field contact

Description

Having a contact in the field is the best option for this area of difficult access for communication

The field coordinator and the captains of each community are those who are in the field and in interaction with the community will be the people in charge of receiving the PQRSD. They will have the responsibility of communicating to technicians or professionals about the record of the comments received during their field visits.

As mentioned above, any contact between field professionals and local stakeholders should be communicated and recorded using the model form provided. Similarly, the response given by the project bodies to that request. The field professional must confidentially handle the identity of the person who puts the request first.

Advantages of the method

- Easy to understand.
- Its implementation allows respect for local customs and facilitates the management of conflicts.
- It allows to have the possibility of accessing community participation and the discussion of problems.

Limitations of the method

- It may not be accessible to stakeholders or all groups due to non-continuity in visits to communities in the project area.
- It requires building trust between stakeholders, the social worker, and the community.
- Limitations for the use of the "email access" method.

[39] Nor will be a specific official since several officials may receive requests from the community at any time. The project will ensure that all officials of these institutions who are involved in some way with the implementation and management of this are aware of the mechanism and procedures associated with it.

- It presupposes the existence of internet access for all interested parties.
- It provides smaller channels of discussion with the community due to the individualization of claims (it is recommended to encourage the discussion of such claims in official community meeting spaces).

2.3.12.1.2 Dial (telephone)

This methodology for the territory of the PANI is difficult to access, given that the telephone signal of the territory is almost zero and only one operator has a signal in places near the territory, the internet point is limited for most inhabitants and communities. There is only an internet point of the headquarters of the Cahuinarí National Natural Park, in which several inhabitants when they have the opportunity connect to Wifi point. The Access to the radio telephone provided in each community does not apply to this section. However, for Biotrade SAS as a technical manager there will be a telephone number with Whatsapp to attend PQRS.

2.3.12.2 PQRSD attention

The periodicity established for the receipt of claims or contributions must be respected by the persons designated for this purpose. An official notice will be available notifying the communication channels, the person responsible for the receipt of requests and the instructions to duly follow up on any request filed. Once the participation of other bodies in the project is decided, the periodicity and mechanism of complaints and contribution of complaints must work in the same way as it was established for the first instance.

Once the requests are formally received, they can be attended by one of the instances described below:

- In the first instance and depending on the type of request, all requests may be attended by the official who receives the request, as long as it is related to the implementation of the project activities and has authorization from the steering committee.
- If the official considers that the request exceeds his functions, he must extend the request to the formal instances of the project as appropriate (steering or technical committee, to the institution). The steering committee will be able to assess whether there are (extreme) cases that merit participation that are part of the governance structure of the project and whether the participation of external actors is required.

On the other hand, conflicts or serious claims that cannot be resolved within the framework of the proposed mechanism will be dealt with by an instance that will serve as the resolution of conflicts and serious claims.

Depending on the nature of the request, five types of requests are considered, considering the categories of the Colombian Public Procurement System and its mechanism for the attention of PQRSD:

- *Petition*: respectful requests to the authorities for reasons of general or particular interest and to obtain their prompt resolution.
- *Complaint*: manifestation of protest, censorship, discontent or disagreement formulated by a person in relation to conduct that he considers irregular of one or more public servants in the performance of their functions.
- *Claim*: demand, claim or demand a solution, whether for general or particular reason, regarding the improper provision of a service or the lack of attention to a request.
- *Suggestion*: manifestation of an idea or proposal to improve the service or management of the entity.

- *Request for access to public information*: request that, orally or in writing, including electronic means, can be made by anyone to access public information. In no case may the request be rejected for reasons of inadequate or incomplete substantiation.
- *Complaints*: applies only to complaints of corruption allegedly committed by public servants in Colombia.

2.3.13 Accessibility of the Feedback and Grievance Redress Procedure (G3.8)

The official responsible for responding to the request shall specify to the applicant in the reply the changes made to the project, activity or procedures, due to the observations made; explain the causes or reasons why the observation cannot be addressed or determine its irrelevance. In cases where it is not possible to achieve the result desired by the interested parties, the official should demonstrate with the response issued that he has considered the opinions of the interested parties, and as far as possible, recommend alternative solutions or concessions.

Finally, the officials in charge of receiving the requests should take into account the response times agreed by the project steering committee and validated with the communities during the stakeholder consultation (Table Table 21).

Table 21. Response times established for requests from the PQRSD care mechanism.

Type of request	Minimum response time	Maximum response time
PQRSD on the planning and coordination of activities in the territory.	15 business days	25 business days
PQRSD on situations of inequity in the allocation of resources or distribution of benefits.	20 business days	30 business days
PQRSD for affecting autonomy/self-determination in processes of social participation, conflicts over the use of family or communal lands and resources, and claims for the effects of project activities on individuals or communities outside the territory.	20 business days	45 business days
Situations of failure or alleged administrative irregularity.	20 business days	60 business days
In case the intervention, participation or mediation of all the institutions that are part of the governance structure of the project is considered necessary.	20 business days	60 business days.

Source: prepared by Biotrade S.A.S. (2022).

2.3.14 Worker Training (G3.9)

For the training of workers, it begins with the elaboration of the POA from the technical table. The plan aims to strengthen PANI's internal capacities, because the project's activity requires a specific type of training.

The trainings in each particular theme of the activities to be developed, as well as the training in basic topics of the project will be carried out periodically, while the optimal development of the activities by the communities in the project area will be verified.

All communities are invited to participate in the different training activities on the topics of interest of the project.

2.3.15 Community Employment Opportunities (G3.10)

In the execution of the project activities that are already being developed but that must be strengthened and increased, there will be permanent jobs and / or temporary jobs. In case of permanent or long-term jobs, designed with the aim of developing coordination actions or for the provision of professional/technical/operational services for specific projects that are developed in the area and that aim to meet the objectives of the Management and Monitoring Plans. The call will be made open to the entire community. In this sense, candidates are subject to a selection process, which is disseminated by public call, using the means of the organizations involved and with which the terms of the call and the profile of the candidates are specified. The profiles of the candidates are evaluated objectively, identifying the adjustment of their profile to the needs of the project, seeking that people from the same territory are employed.

In the case of project activities that require support from community groups, the call for participation is made in a broad and inclusive manner, with a direct invitation to all organizations with the necessary profile for the development of the proposed activities. In order to achieve efficient participation and coverage of the project, all associations have equal rights around participation.

2.3.16 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

The REDD ++ PANI project will meet the formal requirements of proper management of labor matters with workers, providers of goods and services as part of the execution of contracts. In this way, THE PANI complies with the regulations on rights and duties with the workers in its charge and with the provisions of the Substantive Labor Code[40]

2.3.17 Occupational Safety Assessment (G3.12)

For the development of the project, "The General System of Occupational Risks" will be implemented, which has the following objectives:

a) Establish promotion and prevention activities aimed at improving the working conditions and health of the working population, protecting them against the risks derived from the organization of work that may affect individual or collective health in the workplace, including physical, chemical, biological, ergonomic, psychosocial, sanitation and safety risks.

b) Make the affiliation to the ARL (Administrator of Occupational Risks) of each worker

Within the proposed project activities there are some that are developed directly in the ecosystems. Considering the conditions, there are certain risks associated with the development of the activities that can generate a negative impact on the health and safety of the participants in the implementation of the project activities. Potential risks include:

- Accidents due to improper manipulation of tools such as axes and machetes used in the activities.
- Sunstroke

[40] https://www.mintrabajo.gov.co/web/empleosinfronteras/derechos-y-deberes-empleadores
http://www.secretariasenado.gov.co/senado/basedoc/codigo_sustantivo_trabajo.html

- Insect and spider bites
- Dehydration
- Falls, which can lead to bruises, fractures, sprains, etc.
- Overturning of boats
- Drowning
- Snakebite

To reduce the risk associated with each activity, the project proponent and its partner organizations implement meetings prior to the development of the activity, in which, in addition to discussing technical issues, both the existing risks and the measures to mitigate them are recalled. The proposed measures to minimize risks are designed in such a way that they are aligned with the cultural practices of the community, in such a way that these security measures are easily accepted and complied with by the communities involved.

In addition to their discussion, through written communiqués, the communities are reminded of the need to comply with these measures.

2.4 Management Capacity

2.4.1 Project Governance Structures (G4.1)

The Governance structure of the project has three components. The first is a steering committee that chooses projects; reports execution, financial reporting and accounting information; accountability and conflict resolution. The second, technical committee, which will be in charge of coordinating activities and providing logistical and technical support; the third is Oversight.

2.4.1.1 Steering Committee

It is made up of the council of elders, authorities, project coordinator, professional technical advisers with voice and no vote (BIOTRADE SAS).

The general functions of the steering committee include:

- **Financial affairs**
  - Administration and distribution of financial resources
  - Acquisition of additional funds
  - Negotiation of carbon certificates
- **Project planning and development**
  - Selection of project activities
  - Identification of actors and their roles within the framework of the project.
  - Determination of the general and specific objectives of the project in the short, medium and long term.
  - Project schedule design
- **Oversight**
  - Verification of work

- Accompaniment during the verification process.
- Conflict resolution

2.4.1.2 technical committee

Made up of the secretaries of Government, Health, Education, Environment and Culture (these secretaries are part of the government organization of the PANI Association), community teams and professional advisers with voice and no vote (Equipo Biotrade SAS). Their actions will be directly guided by the decisions made by the steering committee regarding the implementation of project activities and the distribution of funds. Its main role is to provide technical support to the executors so that they carry out the project activities and monitor their execution.

2.4.1.3 query instances

Query instances have two main components:

- Local institutions and authorities: the Ministry of Environment and Sustainable Development (MADS); Mayor's Office of Leticia, the Government of Amazonas, Cahuinarí National Natural Park, Amazonian Institute for Scientific Research *SINCHI, Amazon Conservation Team ACT,* Frankfurt Zoological Society and GAIA etc.
- Community and self-government actors: the secretariats of government, territory and environment, ITEWA, health and education , community in general.

All these actors were identified as relevant stakeholders that should be consulted and with whom the decisions made by the steering and technical committees regarding the project should be socialized. All this in order to establish information, dialogue and joint construction strategies and thus guarantee their participation in project design and decision-making.

2.4.2 Required Technical Skills (G4.2)

The monitoring of carbon stocks of deforestation rates, afforestation and restoration activities, and greenhouse gas emissions produced or avoided during the project will be carried out by BITRADE SAS by personnel linked to the company such as forest engineers. with the experience and capacity on the methodology and procedures for the measurement of carbon stocks. Likewise, BIOTRADE SAS will be in charge of the assessment and monitoring of biodiversity. The Biodiversity and Ecosystems Program, made up of biologists and ecologists, but with the active participation of the people who are part of PANI, since they have in situ knowledge and monitoring experience.

The PANI Association has the necessary skills to guarantee community participation and monitoring of socioeconomic and biodiversity indicators. Within his experience in these matters, he has spent several years building and organizing his own government. In biodiversity and monitoring, the women of Manacaro and some men have been working since 2019 with the monitoring of wild species in the territory. n work team, the association has forest engineers, social workers and other professionals who have lived their entire lives in the area and They have been working with the conservation community for many years and have a team of biologists who can provide support for monitoring biodiversity in the area.

2.4.3 Management Team Experience (G4.2)

2.4.3.1 PANI

2.4.3.2 BIOTRADE SAS

The professional and technical team of the project has extensive experience in formulating REDD+ projects, in participatory work methodologies with indigenous and Afro-descendant communities, this is important when carbon standards and markets are increasingly demanding compliance with social safeguards and environmental; Likewise, the work team has experience in carbon quantification in the AFOLU sector and GIS geographic information systems, which guarantees quality in the project formulation process.

Ruby Acosta, general director, is an auditor of forest carbon projects. It has been part of the construction of the REDD+ policy in Colombia for 11 years, and has provided technical support to Colombian institutions such as IDEAM, the SINCHI research institute, the Ministry of Environment and Sustainable Development MADS, National Natural Parks PNN, Natural Heritage, among others, to develop technical and social capacities in the process of building the National Forest Strategy; the last 3 years she has been an auditor at INCONTEC and AENOR. The support team has skills in working with communities for sustainable development, and has participated in the development of REDD+ projects in Honduras and Colombia. It is important to clarify that for the project there are local personnel (they belong to the same communities) with knowledge of the social process and technical or professional studies, they streamline the process of collecting primary and secondary information.

2.4.4 Project Management Partnerships/Team Development (G4.2)

2.4.5 Financial Health of Implementing Organization(s) (G4.3)

2.4.6 Avoidance of Corruption and Other Unethical Behavior (G4.3)

2.4.7 Commercially Sensitive Information (*Rules* 3.5.13 – 3.5.14)

Indicate whether any commercially sensitive information has been excluded from the public version of the No sensitive business information was presented in this version of the document.

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

2.5.1.1 Political Constitution, recognition of the rights of indigenous communities

In the period of 1980-1990 there is a process of recognition of the territory of the indigenous peoples, generating as a result the creation of Resguardos, based on the conservation and management that the indigenous peoples have had in their territory. In the Amazon, the first titled reservations were those of Vaupés in 1982 (3,375,125 hectares), and those of Vichada in the years 1986-87 (194,517 hectares), both in the Amazonas department. Between 1986 and 1990, during the government of Virgilio Barco, an additional 13,000,000 hectares were titled as indigenous reservations in the departments of Amazonas and Guainía, thus constituting a continuous indigenous territory of 20 million hectares, an area that represents half of The Colombian Amazon [41]In the 1991 constitution, a group of collective and individual rights were

[41]https://www.territorioindigenaygobernanza.com/web/col_02/

consolidated, strengthened with the recognition of principles of ethnic and cultural diversity of the nation, and pluralism (Table 22and Table 23).

Table 22. Articles of the national constitution that recognize and protect the rights of the indigenous peoples of Colombia.

Art.	Appointment	Complete article
one	Pluralist State, with autonomy of its territorial entities	Colombia is a social State of law, organized in the form of a unitary, decentralized Republic, with autonomy of its territorial entities, democratic, participatory and pluralistic, founded on respect for human dignity, on the work and solidarity of the people who integrate and in the prevalence of the general interest.
7	The State recognizes and protects the ethnic and cultural diversity of the Colombian Nation.	The State recognizes and protects the ethnic and cultural diversity of the Colombian Nation.
8	It is the obligation of the State to protect cultural wealth	It is the obligation of the State and of the people to protect the cultural and natural wealth of the Nation.
9	Respect for the self-determination of peoples	The foreign relations of the State are based on national sovereignty, on respect for the self-determination of peoples and on the recognition of the principles of international law accepted by Colombia. Similarly, Colombia's foreign policy will be oriented towards Latin American and Caribbean integration.
10	The languages and dialects of the ethnic groups are also official in their territories, and in the communities with their own linguistic tradition, education will be bilingual.	Spanish is the official language of Colombia. The languages and dialects of the ethnic groups are also official in their territories. Teaching provided in communities with their own linguistic traditions will be bilingual.
63	The communal lands of ethnic groups and the resguardo lands are inalienable, imprescriptible and unattachable	Assets for public use, natural parks, communal lands of ethnic groups, protected lands, the archaeological heritage of the Nation and other assets determined by law, are inalienable, imprescriptible and unattachable.

Art.	Appointment	Complete article
68	The members of ethnic groups shall have the right to an education that respects and develops their cultural identity.	Individuals may found educational establishments. The Law will establish the conditions for its creation and management. The educational community will participate in the management of educational institutions. Teaching will be in charge of people of recognized ethical and pedagogical suitability. The Law guarantees the professionalization and dignity of the teaching activity. Parents shall have the right to choose the type of education for their minor children. In State establishments, no person may be forced to receive religious education. Members of ethnic groups shall have the right to training that respects and develops their cultural identity. The eradication of illiteracy and the education of persons with physical or mental limitations, or with exceptional abilities, are special obligations of the State.
70	Culture in its various manifestations is the foundation of nationality. The State recognizes the equality and dignity of all those who live in the country.	The State has the duty to promote and encourage access to culture for all Colombians with equal opportunities, through permanent education and scientific, technical, artistic and professional education at all stages of the process of creating identity. national. Culture in its various manifestations is the foundation of nationality. The State recognizes the equality and dignity of all those who live in the country. The State will promote research, science, development and dissemination of the cultural values of the Nation.
72	It is recognized that the ethnic groups settled in territories of archaeological wealth have special rights over these cultural heritages, which must be regulated by law.	The cultural heritage of the Nation is under the protection of the State. The archaeological heritage and other cultural assets that make up the national identity belong to the Nation and are inalienable, unattachable and imprescriptible. The law will establish the mechanisms to reacquire them when they are in the hands of individuals and will regulate the special rights that the ethnic groups settled in territories of archaeological wealth may have.

Art.	Appointment	Complete article
96	It recognizes as Colombian nationals the indigenous people who share border territories, on condition of reciprocity.	Are Colombian nationals: 1. By birth: a) Colombian natives, with one of two conditions: that the father or the mother have been Colombian natives or nationals or that, being children of foreigners, one of their parents was domiciled in the Republic at the time of birth. b) The children of a Colombian father or mother who were born in a foreign land and then domiciled in the Republic.2. By adoption: a) Foreigners who request and obtain a naturalization letter, in accordance with the law, which will establish the cases in which Colombian nationality is lost by adoption. b) Latin Americans and Caribbean by birth domiciled in Colombia, who, with the authorization of the Government and in accordance with the law and the principle of reciprocity, request to be registered as Colombians before the municipality where they settle. c) Members of indigenous peoples who they share border territories, applying the principle of reciprocity according to public treaties. No Colombian by birth may be deprived of their nationality. The quality of Colombian national is not lost by the fact of acquiring another nationality. Nationals by adoption shall not be obliged to renounce their nationality of origin or adoption. Those who have renounced Colombian nationality may recover it in accordance with the law.
171	There will be an additional number of two senators elected in a special national constituency by indigenous communities	Article 171. The Senate of the Republic will be made up of one hundred members elected in national constituencies. There will be an additional number of two senators elected in a special national constituency by indigenous communities. Colombian citizens who are or reside abroad may vote in the elections for the Senate of the Republic. The Special Circumscription for the election of senators by the indigenous communities will be governed by the electoral quotient system. The representatives of the indigenous communities who aspire to integrate the Senate of the Republic must have held a position of traditional authority in their respective community or have been the leader of an indigenous organization, quality that will be accredited by means of a certificate from the respective organization, endorsed by the Government Minister.
176	The law may establish a special district to ensure participation in the House of Representatives of ethnic	The House of Representatives will be elected in territorial districts and special districts. There will be two representatives for each territorial constituency and one more for every two hundred and fifty thousand inhabitants or fraction greater than one hundred and twenty five thousand that they have in excess of the first two hundred and fifty thousand. For the election of representatives to

Art.	Appointment	Complete article
	groups.	the Chamber, each department and the Capital District of Bogotá will form a territorial constituency. The law may establish a special circumscription to ensure the participation in the House of Representatives of ethnic groups and political minorities and of Colombians residing abroad. Through this constituency, up to five representatives may be elected.
246	It establishes that the authorities of the indigenous peoples may exercise jurisdictional functions within their territorial scope, in accordance with their own norms and procedures, provided that they are not contrary to the Constitution and laws.	The authorities of the indigenous peoples may exercise jurisdictional functions within their territorial scope, in accordance with their own rules and procedures, provided that they are not contrary to the Constitution and laws of the Republic. The law will establish the forms of coordination of this special jurisdiction with the national judicial system.
329	formation of indigenous territorial entities	The formation of the indigenous territorial entities will be subject to the provisions of the Organic Law of Territorial Planning, and their delimitation will be done by the National Government, with the participation of the representatives of the indigenous communities, prior concept of the Territorial Planning Commission . The reservations are collective ownership and not alienable. The law shall define the relations and coordination of these entities with those of which they are a part.
330	the indigenous territories will be governed by councils formed and regulated according to the uses and customs of their communities and designate functions	Article 330. In accordance with the Constitution and the laws, the indigenous territories will be governed by councils formed and regulated according to the uses and customs of their communities and will exercise the following functions: 1. Ensure the application of legal regulations on land use and settlement of their territories. 2. Design policies and plans and programs for economic and social development within its territory, in harmony with the National Development Plan. 3. Promote public investments in their territories and ensure their due execution. 4. Receive and distribute their resources. 5. Ensure the preservation of natural resources. 6. Coordinate the programs and projects promoted by the different communities in their territory. 7. Collaborate with the maintenance of public order within its territory in accordance with the instructions and provisions of the National Government. 8. Represent the territories before the National Government and the other entities to which they are integrated, and 9. Those indicated by the Constitution and the law. Paragraph. The exploitation of natural resources in the indigenous territories will be done without detriment to the cultural, social and economic integrity of the indigenous communities. In the decisions that are adopted regarding said exploitation, the Government will encourage the participation of the representatives of the respective communities.

Source: Prepared by Biotrade SAS (2022).

Table 23. *Regulatory regulations for the recognition and protection of the rights of the indigenous peoples of Colombia.*

Law/Decree/Document	abstract/quote
Law 89 of 1890	It makes fundamental contributions to the protection and conservation of indigenous peoples and their territories, determines the way in which indigenous peoples should be governed, establishes that indigenous communities have the full right to organize Cabildos in accordance with their forms of traditional organization, reservations, art. 14 to 22.
Decree 2164 of 1995	Partially regulates Chapter XIV of Law 160 of 1994 in relation to the endowment and titling of land to indigenous communities for the constitution, restructuring, expansion and sanitation of the Indigenous Reservations in the national territory. In this sense, it indicates competition rules, definitions, socioeconomic, legal and land tenure study; procedure to establish, restructure, expand and clean up indigenous reservations.
Law 1454 of 2011	Dictates organic regulations on land use planning and modifies other provisions. Legislative reform initiatives the special bill that regulates matters related to the formation of the Indigenous Territorial Entities, in strict compliance with the special mechanisms of prior consultation, with the participation of the representatives of the indigenous communities and of the communities affected or benefited in said process.
Decree 1953 of 2014	It establishes a special regime in order to put into operation the Indigenous Territories with respect to the administration of the systems of the indigenous peoples, meanwhile the law is issued, which is dealt with in article 329 of the Political Constitution. The functions, financing, control and surveillance mechanisms are defined, as well as the strengthening of the special indigenous jurisdiction. Defines its scope of application, associations for the joint administration of the special allocation of the General Participation System; delimitation, population census, general principles, competencies, health system, among other provisions.
Law 1753 of 2015	Adopts the National Development Plan 2014-2018 "Everyone for a new country". National entities are ordered to identify specific budget allocations for indigenous peoples; the elaboration of budgets in which the budget items are specifically indicated, including within the SINERGIA the strategies and goals agreed with the indigenous peoples, as well as the elaboration of the public policy for the protection of the rights of families, women, children indigenous young and old. (Articles 114 to 117).

Law/Decree/Document	abstract/quote
Law 1819 of 2016	Gives permanence of ownership to the exemptions, benefits, treatments and special rules applicable to them within the framework of the CPC of 1991, international treaties, laws, decrees and other rules consistent with their special nature or others that are issued for their safeguard. to the Reservations and the Indigenous Councils, as well as the Associations of Councils created by Decree 1088 of 1993.
Decree 2001 of 1988	Regulates law no. 135 of 1961 in relation to the constitution of indigenous reservations in the national territory ratifies the indigenous reservation as a legal and sociopolitical institution of a special nature, made up of an indigenous community or partiality, which, with community property title, owns its territory and governs the management of this and its internal life by an organization adjusted to the indigenous jurisdiction or to its cultural guidelines and traditions, likewise, it determines the procedure to establish indigenous reservations on vacant land and on land owned by the National Agrarian Fund.
Decree 1953 of 2014	Creates a special regime in order to put into operation the Indigenous Territories with respect to the administration of the systems of the indigenous peoples. Structure, object, scope of application and general principles for the operation of indigenous territories, the general competences of indigenous territories and their own authorities, the administration of the Own Indigenous Educational System - SEIP, the Intercultural Indigenous Health System - SISPI, the conditions of drinking water and basic sanitation and mechanisms for strengthening the special indigenous jurisdiction.
Decree 4633 of 2011	It generates the legal and institutional framework of the public policy of comprehensive care, protection, comprehensive reparation and restitution of territorial rights for indigenous peoples and communities as collective subjects and their members individually considered, in accordance with the Political Constitution, the Law of Origin, Natural Law, Major Law or Proper Law, human dignity, the constitutional principle of ethnic and cultural pluralism and respect for difference.
Decree 2893 of 2011	Modifies the objectives, organic structure and functions of the Ministry of the Interior and integrates the Administrative Sector of the Interior. It provides that the Ministry of the Interior shall have as its objective, within the framework of its powers and the law, to formulate, adopt, direct, coordinate and execute public policy, plans, programs and projects in the area of human rights, international humanitarian law, integration of the Nation with the territorial entities, security and citizen coexistence, for ethnic matters, within its directorates is the Directorate of Indigenous, Roma and Minority Affairs, and the Directorate of Prior Consultation.

Law/Decree/Document	abstract/quote
Law 1381 of 2010	It dictates regulations on the recognition, promotion, protection, use, preservation and strengthening of the languages of the ethnic groups of Colombia and on their linguistic rights and those of their speakers. It guarantees the recognition, protection and development of the individual and collective linguistic rights of ethnic groups with their own linguistic tradition, as well as the promotion of the use and development of their native languages.
Agreement 326 of February 15, 2006	It adopts some guidelines for the organization and operation of the Subsidized Regime for indigenous peoples. Likewise, it determines the criteria for the affiliation procedure and the adequacy of the Obligatory Subsidiary Health Plan for the indigenous population.
Decree 1397 of 1996	The National Commission of Indigenous Territories and the Permanent Table of Agreement with indigenous peoples and organizations are created and other provisions are issued. Which determines that no environmental license can be granted without economic, social and cultural impact studies on indigenous peoples or communities, which will be part of the environmental impact studies. No work, exploitation or investment may be carried out in indigenous territory without prior agreement with the indigenous authorities, communities and their organizations. It creates the Permanent Table of Agreement with the indigenous peoples, attached to the Ministry of the Interior, determines the functions, appoints the permanent members and rules of consultation and agreement are dictated.
Decree 715 of 1992	Creates the National Committee for Indigenous Rights, which aims to defend, protect and promote the human rights of indigenous communities and their members.
Decree 0436 of 1992	The National Council for Indigenous Policy is formed and assigned the functions of advising the National Government on the study, formulation and application of indigenous policy, recommending the inclusion of investment projects in health, education, nutrition, agricultural activities and others that tend to benefit the indigenous communities in the National Economic and Social Development Plan, advising the National Government on the bills that develop the constitutional provisions referring to indigenous peoples, advising the Government on the definition of policies that must be followed with the non-governmental organizations that carry out activities with indigenous communities.

Law/Decree/Document	abstract/quote
Law 31 of 1967	Approves the International Labor Convention, relative to the protection and integration of indigenous and tribal populations in independent countries, adopted by the Fortieth Meeting of the General Conference of the International Labor Organization (Geneva, 1957). In its part II Article 11 "...recognizes the right of collective or individual property, in favor of the members of the populations on the lands traditionally occupied by them." Nor can indigenous peoples be moved from their usual territories and strangers will not be able to obtain ownership or use of the lands that belong to them.
Law 21 of 1991	Approves Convention number 169 on indigenous and tribal peoples in independent countries, adopted by the 76th meeting of the ILO General Conference, Geneva 1989. It is the revised version of Convention 107, it seeks to ensure the rights of indigenous and tribal peoples to their territory and the protection of its cultural, social and economic values
Law 145 of 1994	Approves the Constitutive Agreement of the Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean, signed in Madrid on July 24, 1992, establishes a mechanism aimed at supporting the self-development processes of indigenous peoples, communities and organizations.
Law 165 of 1994	Approves the "Convention on Biological Diversity", done in Rio de Janeiro on June 5, 1992. Conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits derived from the use of the resources.
Law 17 of 1981	Approves the "Convention on International Trade in Endangered Species of Wild Fauna and Flora", signed in Washington, DC on March 3, 1973, the contracting parties agree to make efforts to promote the harmonious development of their respective Amazonian territories tending to achieve equitable and mutually beneficial results, as well as for the preservation of the environment and the conservation and rational use of the natural resources of those territories.
Law 22 of 1981	Approves "The International Convention on the Elimination of all forms of Racial Discrimination", adopted by the General Assembly of the United Nations in Resolution 2106 (XX) of December 21, 1965, and opened for signature on March 7, 1966 Through which the states party to the convention undertake to prevent, prohibit and eliminate all practices of this nature.

Law/Decree/Document	abstract/quote
Decree 2333 of 2014	It establishes the mechanisms for the effective protection and legal security of the lands and territories occupied or owned ancestrally and/or traditionally by indigenous peoples. Speed of the processes of protection of the possession of ancestral and/or traditional lands and territories, special relationship of the indigenous peoples with the lands and territories, respect for the law of origin, natural law, greater right or right of the peoples indigenous, ancestral and/or traditional territorial identity.
Decree 1232 of 2018	Regulates Law 21 of 1991 in relation to special measures for the prevention and protection of the rights of Indigenous Peoples in Isolation or Natural State and creates the National System for Prevention and Protection of the rights of Indigenous Peoples in Isolation or State Natural. Addition to Decree 1066 of 2015, Sole Regulatory of the Administrative Sector of the Interior, to establish special measures of prevention and protection of the rights of Indigenous Peoples in Isolation or Natural State and the National System of Prevention and Protection of the rights is created and organized of Indigenous Peoples in Isolation or Natural State.
Decree Law 4633 of 2011	In its article 17 that "the State will guarantee the right of uncontacted indigenous peoples or in voluntary isolation to remain in said condition and live freely, according to their cultures in their ancestral territories. Therefore, as subjects of special protection, in no case may they be intervened or dispossessed of their territories nor will they be the object of policies, programs or actions, private or public, that promote contact or carry out interventions in their territories for any purpose. In the same way, Article 71 of the aforementioned Decree Law maintains that prevention, attention, protection and precautionary measures must be arranged for the immediate and definitive protection of the social, cultural structures and ancestral territories of the uncontacted indigenous peoples or in voluntary isolation.
Decree 632 of 2018	Dictates fiscal regulations and other necessary to put into operation the indigenous territories located in non-municipalized areas of the departments of Amazonas, Guainía and Vaupés, strengthens autonomy and self-government systems. With the principles of self-development, cultural and environmental diversity, governance and sustainable economy, self-determination, coordination, cultural protection, social equity and territorial balance, inclusion and protection, prevalence of their own regulatory systems.
Decree 1088 of 1993	Regulates the creation of associations of councils and/or traditional indigenous authorities, these being entities of Public Law of a special nature, with legal status, their own assets and administrative autonomy.
Law 60 of 1916	It gives faculties to demarcate the territories inhabited by indigenous people that were considered vacant.

Law/Decree/Document	abstract/quote
Law 135 of 1961	(Agrarian Social Reform), indicates in its Article 29 that "...the adjudication of uncultivated lands that are occupied by indigenous people may not be made, unless it is accepted by the Division of Indigenous Affairs."
Law 30 of 1988	It establishes that the territories traditionally occupied by indigenous people must be recognized to the communities under the collective title of Resguardo.
Decree 1142 of 1978	It recognizes ethnic pluralism and the right of indigenous communities to receive education in accordance with their socio-cultural and economic particularities, strengthening their social capacity to decide on their own destiny.
Resolution 10013 of 1981	It seeks to articulate western medicine with traditional medicine and for this purpose it is established that health programs in indigenous communities must adapt to their organization, economy and culture.
Decree 2230 of 1986	Creates the National Aboriginal Linguistics Committee, to advise the Government in the formulation of policies related to the Amerindian languages existing in the territory
ILO Convention 169	On Indigenous and Tribal Peoples in Independent Countries, United Nations Declaration on the Rights of Indigenous Peoples. Approved by Colombia through Law 21 of 1991 (Constitutional Court Judgment of unification SU 510 of 1998). Its basic postulates are: the right of indigenous peoples to maintain and strengthen their own cultures, ways of life and institutions, and their right to participate effectively in the decisions that affect them. These premises constitute the basis on which the provisions of the Convention must be interpreted. Likewise, the Convention also guarantees the right of indigenous and tribal peoples to decide their own priorities regarding the development process, to the extent that it affects their lives, beliefs, institutions and spiritual well-being and the lands they occupy. or use in any way, and to control, as far as possible, their own economic, social and cultural development.

Source: Prepared by Biotrade SAS (2022).

2.5.2 Recognition of Property Rights (G5.1)

2.5.2.1 Indigenous territories of the Amazon region

The indigenous reservations of the Colombian Amazon are a legal figure that establishes a particular type of land ownership. Its purpose is to guarantee the conservation of the territories of the indigenous peoples in a way that enables the cultural, social and physical reproduction of these peoples. (SINCHI, 2009). According to article N0. 63 of the political constitution of Colombia these territories of collective belonging are inalienable, imprescriptible and unattachable, They are governed by councils formed and regulated according to the uses and customs of their communities, in accordance with their own rules and procedures , according to article No. 330 of the political constitution of Colombia (see section 2.5.1.1) .

Thus, the indigenous reservations are not only the formal recognition of the collective property of the indigenous territories, but they are also defined as political-administrative institutions for the exercise of Self-Government, in order to materialize the exercise of the rights of the autonomy and self-determination that are configured as fundamental of these populations (CPC, Art. 246; Decree 2164 of 1995, Art. 21). It should be noted that the reservations as a legal and sociopolitical institution do not have the connotation of being territorial entities, but rather are their area of jurisdiction and the institution through which their fundamental right to collective property is guaranteed (CC, Judgment T-380 /93); and, in some cases, its geographical delimitation does not coincide with the jurisdiction of the indigenous authorities, that is, with the political organization of each people.(Herrera, et al., 2021)

In the Colombian Amazon there are 212 indigenous reservations with a global extension of about 26 million ha (54% of the region) and individual extensions ranging from less than 100 ha to about 6 million ha. Six reserves, with a size greater than 1 million ha, occupy about 16.5 million ha, and another seven, with an area between 500,000 and 1 million ha, about 5.3 million ha. Together, these 13 reservations located in areas in a good state of conservation in the eastern and southern Amazon (departments of Vichada, Guainía, Vaupés, Guaviare and Amazonas) account for 83% of the total area of reservations in the region. At the other extreme, more than half of the reservations (123) have an area of less than 5,000 ha and, together, add up to 137,070 ha. These are found mainly in the western end of the region (Caquetá, Putumayo and part of Guaviare and Meta) in areas highly affected by deforestation processes.(Herrera, et al., 2021)

The relationship between the state and indigenous peoples has been changing over time, along with the ways of organizing within organizations and communities, these changes are more drastic since the political constitution of Colombia of 1991, when the reservations they obtain the right to receive resources from the general participation system, establishing and strengthening new forms of indigenous organization (political and administrative). Currently, the indigenous peoples of the Amazon have two types of organization to exercise their property rights over the territory and relationships with external actors: Cabildos and the Association of Traditional Indigenous Authorities (AATI).

2.5.2.2 Councils

Defined in Article 2 of Decree 2164 of 1995 as "a special public entity, whose members are members of an indigenous community, elected and recognized by it, with a traditional socio-political organization, whose function is to legally represent the community, exercise the authority and carry out the activities attributed to it by the laws, its uses, customs and the internal regulations of each community. The councils are directed by a higher authority (governor, cacique mayor, cabildo mayor) and by a councilor (councils minors, captains, captains minors, among others) elected by each community or settlement. The councils have responsibilities associated with the adjudication, conservation and defense of the lands of the reservations,

the resolution of legal problems and to stimulate the exercise of their own justice, among others. (Herrera, et al., 2021)

2.5.2.3 Associations of Traditional Authorities

Decree 1088 of 199313 recognized the associations of councils and/or traditional indigenous authorities (AATIs), the latter as transitory figures that promote the freedom of association of indigenous communities with the aim of representing them and administering their territories. Thus, an AATI can represent several stubs or a stub can be represented by several AATIs . Both reservations and AATIs can occupy municipalities of the same department or even different departments (for example, Amazonas-Vaupés). The AATIs are constituted as councils of authorities representing communities, captaincies and/or indigenous peoples that make decisions regarding the collective development of their peoples, which are registered in the life plans or equivalent documents as planning and negotiation instruments against the implementation of projects in their territories and the transfer of resources from the General Participation System. For this reason, the AATIs are defined as public entities of a special nature with the capacity to contract and establish agreements with public and private entities to directly manage matters related to the interests that frame the life plans of the indigenous communities. In addition, it is through these political-administrative organizations that the indigenous peoples exercise their dialogue with the State and stimulate prior consultation regarding administrative measures and natural resource extraction projects with the purpose of taking management measures that do not affect (or directly or indirectly) their territories, their subsistence or their natural resources.

On the other hand, having the character of transitory figures while the Indigenous Territorial Entities (ETIs) are formed within the framework of the Organic Law of Territorial Planning (Law 1454 of June 28, 2011 and decree 632 of 2018), the AATIs can exercise the public powers and functions that were later established in Decree 1953 of 2014. Taking into account that in the Colombian Amazon there are multicultural territories, where different ethnic groups live and that can be legalized as a reservation or characterized as traditional or ancestral territory , the figure of the AATIs is of vital importance for political representation before the State and autonomy in their territories. (Herrera, et al., 2021).

2.5.2.4 The association of traditional indigenous authorities of the Bora Miraña people – "PIÑE AAWEJU NIMUE LACHIMUA" – PANI

PANI is an association of political unity with legal recognition from the Ministry of the Interior and Justice through resolution 0184 of December 19, 2002, whose vision is focused on strengthening the autonomy and consolidation of the traditional Bora-Miraña territory, guaranteeing the survival of the people, based on the components of education, health, government and territory, Developing all the actions that are carried out in the internal sphere and the other agreements with the different governmental institutions, contributing to the strengthening of the Colombian State from its region(PANI, 2013)

2.5.2.4.1 Historical context of the PANI area

Taking into account that many ethnic groups migrated from their traditional territories to protect themselves, a situation that the Bora-Miraña people also went through, it is considered that 300 people of the Miraña ethnic group live in the lower Colombian Caquetá and 836 in Brazil, while the The population of the Bora ethnic group is 400 people distributed in the lower Caquetá, Igaraparaná river and Putumayo in Colombia and 600 people in Peru. The communities associated with PANI are established along the 200 kilometers of the Caquetá River in the lower Amazon: Manacaro , Maria manteca or Mariapolis , Puerto Remanso del Tigre, Solarte, Las Palmas, San Francisco and Quinché. (González, 2019)

In the second half of the 20th century, when the indigenous reservations began to be established in Colombia; Legal territorial limits were generated that did not necessarily coincide with the traditional territory of these ethnic groups, which is why the PANI (Miraña and Bora people) is related in the different resolutions of the reservations: In the Predio Putumayo reservation (1988) there are two settlements; in the Miritί Paraná reservation (1981) three; and a community that is in the Miritί Paraná and Curare Los Ingleses reservations (1995). This last community is Manacaro .

2.5.2.4.2 Characteristics of the reservations where the PANI is located

2.5.2.4.2.1 Resguardo Curare los Ingleses

The Curare Los Ingleses indigenous reserve was established in 1995 in favor of the Yukuna - Cubeo De Curare Los Ingleses community, with an area of 212,320 hectares, located to the west of the urban area of the corregimiento la pedrera (Resolution 019, 1995). In the reservation, the most representative ethnic groups present are Cubeo , Carijona , Yucuna and Tanimuca , equivalent to 30%, 18%, 16% and 15% respectively. The aquatic limits are the San Francisco creek, the Bernardo river and the Caquetá river. While the terrestrial limits are to the east the Camaritagua reserve and the Amazon Forest Reserve area; to the north the Miritί Paraná, Puerto Córdoba and Comeyáfu reservations ; and, to the west and south with the Río Puré National Natural Park (González, 2019), this reservation is part of the Association of Indigenous People of the Pedrera Amazonas (AIPEA).

2.5.2.4.2.2 Putumayo Premises Protection

It was established on April 5, 1988, by the Colombian Institute of Agrarian Reform - INCORA, today the Colombian Institute of Rural Development - INCODER, through Resolution No. 030 with an area of 5,818,702 hectares. The Putumayo Estate is the largest reservation in the Colombian Amazon, bordering to the North with the Caquetá River, the department of the same name and the Miritί Paraná-Amazon district, to the East with the districts of La Pedrera, Tarapacá and part of Puerto Arica- Amazonas, to the South with the Putumayo River and the Republic of Peru and to the West and Northwest with the Republic of Peru and the department of Putumayo. To the Northwest of the department of Amazonas is the district of La Chorrera, limited to the north by the department of Caquetá, to the east with the districts of Santander (Araracuara) and Puerto Arica, to the south with the districts of Puerto Arica and El Encanto and to the west with the districts of El Encanto and Puerto Alegría;

In the region, where the Predio Putumayo reserve is located, tropical forest biomes predominate, constituting an extensive territory, mostly jungle that covers 35% of the national territory and 61% of natural forests, representing 8% of the International Region of the Amazon. These figures demonstrate the importance of the Putumayo Estate for the main ecological structure of the Colombian Amazon and in general for the entire basin. This territory, preserved ancestrally by the Huitoto , Bora, Okaina and Muinane , constitutes one of the most important in terms of biological and cultural diversity, because important traditional knowledge is still preserved that guarantees the sustainable use of natural resources (Resolution 1947 29 of September 2006). The Predio Putumayo indigenous reservation, due to its large territorial extension, is divided into six (6) zones, La Chorrera, El Encanto, Puerto Arica, Puerto Alegría, Puerto Santander, and PANI. (Resolution 0105 of March 29, 2007).

2.5.2.4.2.3 Miriti Parana

The Miritί-Paraná Indigenous Reservation was established by means of Resolution 104 of December 15, 1981 issued by the Colombian Institute of Agrarian Reform - INCORA (today, Colombian Institute of Rural Development - INCONDER) and later expanded by Agreement # 204 of the year 2009, issued by INCODER. It extends along the Miritί-Paraná and Caquetá rivers and is located in the jurisdiction of the

corregimientos of Miritií and La Pedrera, department of Amazonas, with an area of approximately one million six hundred and three thousand two hundred and four hectares (1,603,294 ha).). The population that inhabits it corresponds mostly to the Yukuna , Tanimuka , Matapí , Makuna , Caviyarí , Miraña, Letuama and Maku ethnic groups ; and to a lesser extent, residents of the Cubeo , Yauna , Uitoto and Carijona ethnic groups . (Resolution 1112 June 23, 2008)

The economy of the Reservation Miritií - Paraná is intimately linked to the cultural tradition and, therefore, to the subsistence and sustenance of the family. Production in chagra, fishing and hunting, searching or collecting fruits and insects and the production of utensils, construction of canoes and houses with materials from the region are still the most common activities, but today these are framed in a context more closely related to the market economy (ACIMA, 2000).

2.5.2.4.2.4 Blue Villa Nunuya

The Nunuya de Villazul Indigenous Reservation , constituted by resolution 034 of April 6, 1988; It is located on the two banks of the Caquetá River, about 100 kilometers downstream from the sites called Aracuara and Puerto Santander, with an approximate extension of 59,840 hectares. For the benefit of 119 people divided into 20 families, the majority of whom belong to the Nunuya , Muinane , Andoque, Witoto , Letuama and Yukuna ethnic groups . (Resolution number 1190 July 4, 2008).

Territorial planning has always existed, it is the backbone of the indigenous peoples who make up a great territorial unit within the diversity of cultures characterized by the use of Coca and Ambil, four stalls of the maloca and four colors: green-blue, red, black and white; four dance rituals with their respective derivatives and currently four principles: Unity, Territory, Culture and Autonomy, People of the Center and therefore its name CRIMA, Regional Indigenous Council of the Middle Amazon.

2.5.2.4.2.5 Agreements with other AATIs

The PANI association, because it is immersed in several reservations, has signed agreements with other AATIs for the recognition of its ancestral territory, with the aim of being able to make use of it. These agreements have been achieved mainly under two projects carried out between 2007 and 2014: Conservation Mosaics and Conservation Incentives, both carried out by the Natural Heritage Fund with cooperation resources and articulated with the work carried out by National Natural Parks in the PNN Cahuinarí and PNN Río Puré. In 2007 and 2008, with the support of the mosaics for conservation project, intercultural meetings and conferences were held that yielded the following results (Table 24):

Table 24. *Actions carried out to consolidate the ancestral territory of PANI 2007 and 2008*

Exercise	Date	Participants	Product
AATIs Caquetá River Congress	25 to 28 April 2007	CRIMA, PANI, AIPEA, ACIMA - ACIYA - GAIA Foundation, PNN Cahuinarí	Work agreement to consolidate the territory and management of natural resources
PANI - ACIMA meeting	July 29 and 30, 2007	PANI, ACIMA, PNN Cahuinarí	Agreement on the use and control of natural resources in the area between Bocas de Miritií and Manacaro .

Exercise	Date	Participants	Product
PANI-CRIMA meeting	September 21-23, 2007	PANI, CRIMA, PNN Cahuinarí	Agreement 001 for the use and control of natural resources is signed between: aduche indigenous reservation , Nonuya de Villa Azúl and the Quinché Metá community , affiliated with the PANI association.
PANI - AIPEA meeting	September 21-23, 2007	PANI, AIPEA, PNN Cahuinarí, PNN Río Puré	Sign agreement 001 for the use and control of natural resources in the area between the Quebradón Manacaro and the mouth of the Bernardo River
Agreement follow-up meetings	Year 2008	PANI - ACIMA, PANI - CRIMA, PANI - AIPEA	Evaluate compliance with the agreements for the use and control of natural resources

Source: Prepared by Biotrade SAS (2022). Information provided by PANI.

With the Pedrera Amazonas Indigenous Association (AIPEA), of which the Curare los Ingleses reservation is a part , agreements have been reached related to the sector where the Manacaro community is located . Agreements for the use and management of natural resources were established within a specific area belonging to the traditional territory of the Bora-Miraña people, a shared co -management area called the Agreement Strip. The dialogue process between both social groups began between 2005 and 2007 when the Curare Los Ingleses reservation recognized that within its legal territory there is an area belonging to the traditional territory of the Miraña-Bora people. When these territories overlapped, in 2008, the first approaches to the territorial area of the Agreement Strip began, when the reservation carried out its first management plan and first zoning of the territory. In 2009 with the establishment of an alliance between PANI and Intangible Cultural Heritage, direction within the Ministry of Culture of Colombia. One of the activities within the alliance was to logistically support the internal meetings between the AATIs PANI and AIPEA [42]with the purpose of establishing agreements regarding the use, management and protection of natural resources jointly in the shared territory. The agreements were formalized in 2009 between both social groups and in 2010 between the corresponding (González, 2019)AATIs .

The agreements were built by the community of Manacaro , due to the knowledge acquired in the protection project for the charapa turtle (*Podocnemis expansa*) of the Cahuinarí National Natural Park (PNNCH). Within the formulation and construction of the agreements, Darío Silva Cubeo and other leaders were accompanied. The agreements seek to regulate the extraction of natural resources within the Strip by establishing caps on the resources, arts or tools allowed. to carry out the activity and its objective, community or commercial (González, 2019).

2.5.2.4.2.6 Ancestral territory of PANI

The traditional territory of the Bora is the sector between the Achiote and Sangre ravines (Fruit and Chontaduro clans) on the Cahuinarí River; from the Castaño creek, a tributary of the Cahuinarí, to the Pupuña creek on the Putumayo river; and between the Cahuinarí River and the Igaraparaná River . The Bora population was 3,000 people at the beginning of the 20th century, but currently there are 400 in

[42]Association of Indigenous Authorities of Pedrera Amazonas, Resguardo Curare Los Ingleses.

Colombia settled in the community of Las Palmas on the lower Caquetá, in Providencia on the Igaraparaná River and in Arica on the Putumayo River; meanwhile, in Peru the current population is 400 people who inhabit the Ampiyacu River . The ancestral territory of the Bora is outside the Cahuinarí Park but they have had a direct relationship with the Cahuinarí river basin, so much so that today the Bora de Las Palmas settlement is located in the park area. (PNNC, 2010)

For their part, the Miraña have an ancestral territory that includes the Cahuinarí river up to the Morelia salt flat (Salado Marimá), the Caquetá river on its right bank from Quinché to the Yupatí hill, and on the left bank between Meta and the Irarahé ravine below the Sol ravine (Figure 20). A population of 15,000 Mirañas and Boras was calculated in 1905 - 1908. Currently, there are approximately 300 people living in the lower Colombian Caquetá in a territory smaller than what was once their ancestral territory. In Brazil, the Mirañas live in communities in the indigenous areas of Miratú , Uarini , Cuiu wow . (PNNC, 2010).

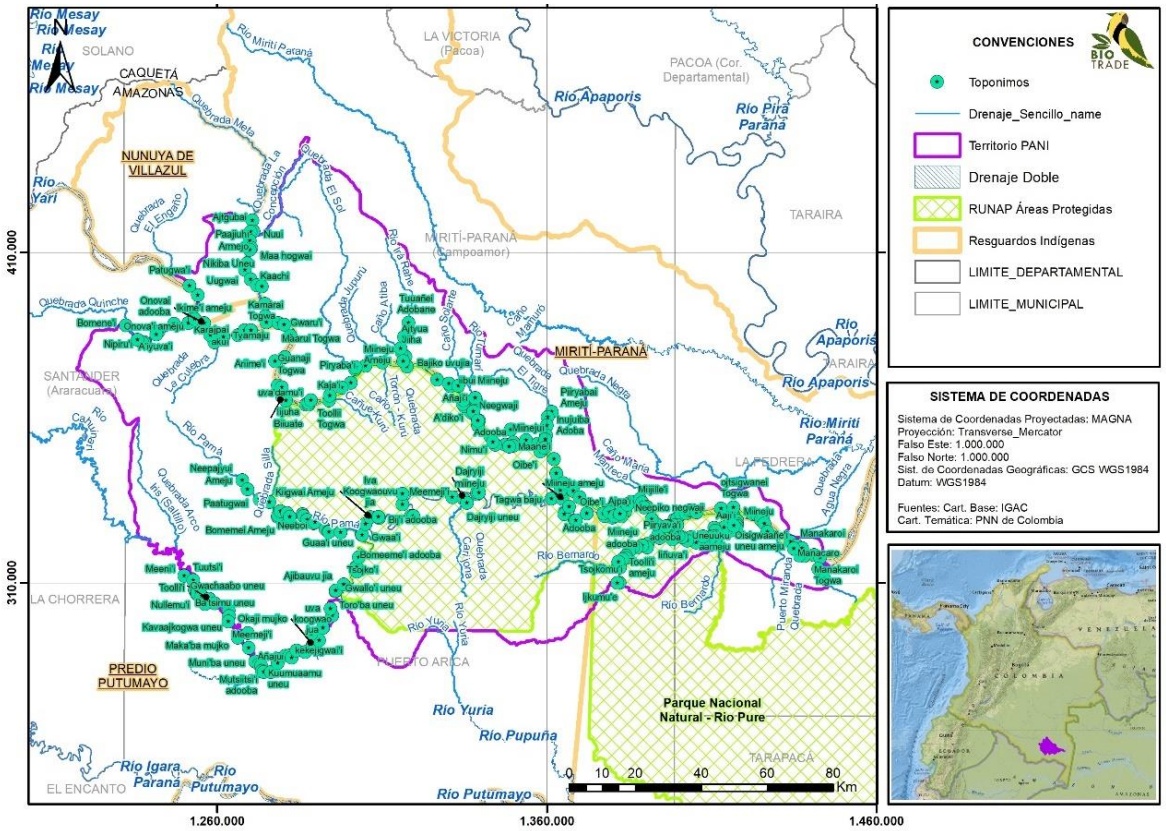


Figure 20. Toponymy map of the PANI territory. Source: Conservation Mosaic Projects – DTAM PNN. Prepared by Biotrade SAS (2022).

The Pamá , Caimo and part of the Cahuinarí rivers were the places most inhabited by these two groups, where their place of origin is located. The general territory is broader, and includes a set of sacred and mythical places in which the ancestors and mythological heroes left "thought". This extends along the Caquetá River at least from the Yupatí hill to the Quinché stream and throughout the Cahuinarí River up to its headwaters and can be shared with other tribes at its ends: the western end is shared with the Andokes who inhabit part from the headwaters of Pamá and Caimo , and the extreme south-west with the Muinane

de Sabana. The mythological territory in turn extends to the mouth of the Caquetá River in the Amazon (PNNC, 2010)(Figure 21).

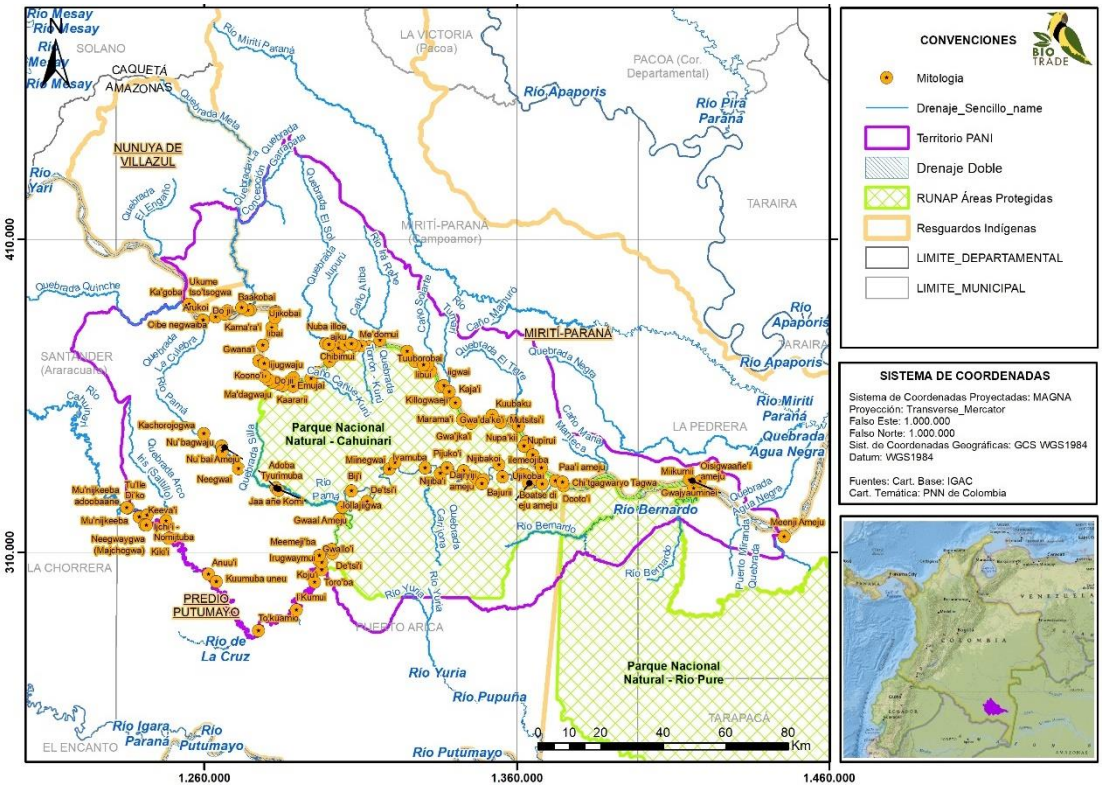


Figure 21. Mythology map of the PANI territory. Source: Mosaic Projects for Conservation – DTAM PNN. Prepared by Biotrade SAS (2022).

In the indigenous worldview, the ancestral territory is related to its "place of origin", this, according to the mythology or history of creation for the "people of ambil" (people who lick tobacco), is the site that was given by the creator to each group or ethnic group for its management in accordance with ancestral norms that, in particular, the Bora and Miraña call the "Law of Origin". This establishes the origin of each site of the ancestral territory and determines both physical and spiritual rules of use. (PNNC, 2010)

The sites considered sacred, have a spiritual owner and only the wise men, shamans, tobacco tigers and maloqueros, have the knowledge to interact with them and travel the territory in thought, managing to cure diseases, perform rituals and sacred dances, which are directly related to land management. Through intercultural work between the PNN Cahuinarí and the Miraña community, information has been collected that has been systematized in works such as the ancestral map known as "The Land of the Ancients", worldview concepts, current zoning map and ecological calendar, which are an integral part of the inputs in the relationship between the National Natural Parks of Colombia and the Bora and Miraña peoples for the land management (PNNC, 2010)(Figure 22).

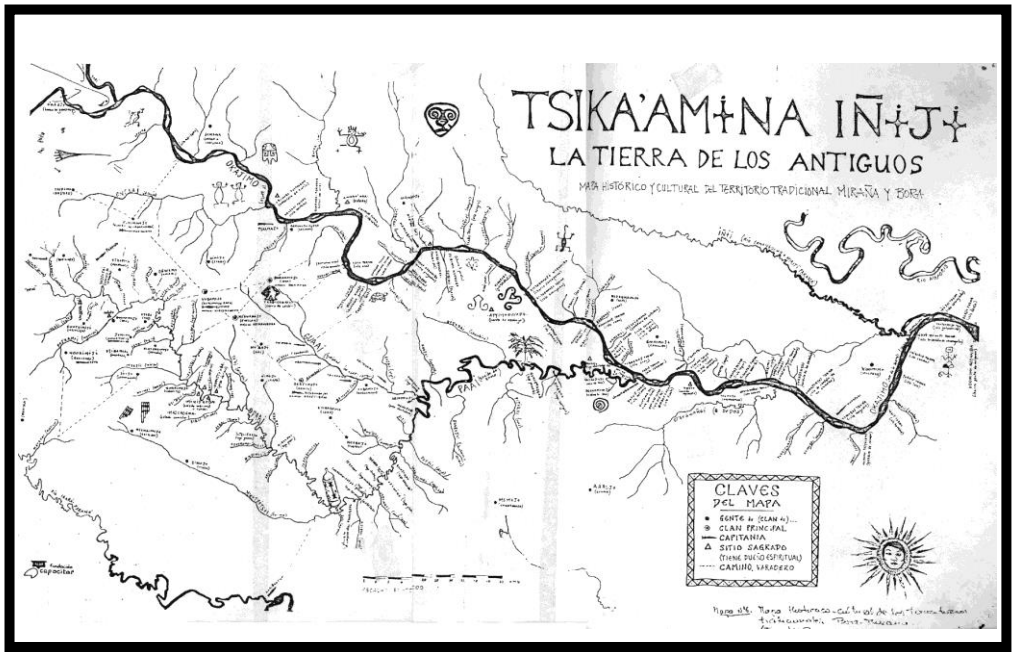


Figure 22. Ancient land map. Source: Conservation Mosaic Projects – DTAM PNN.

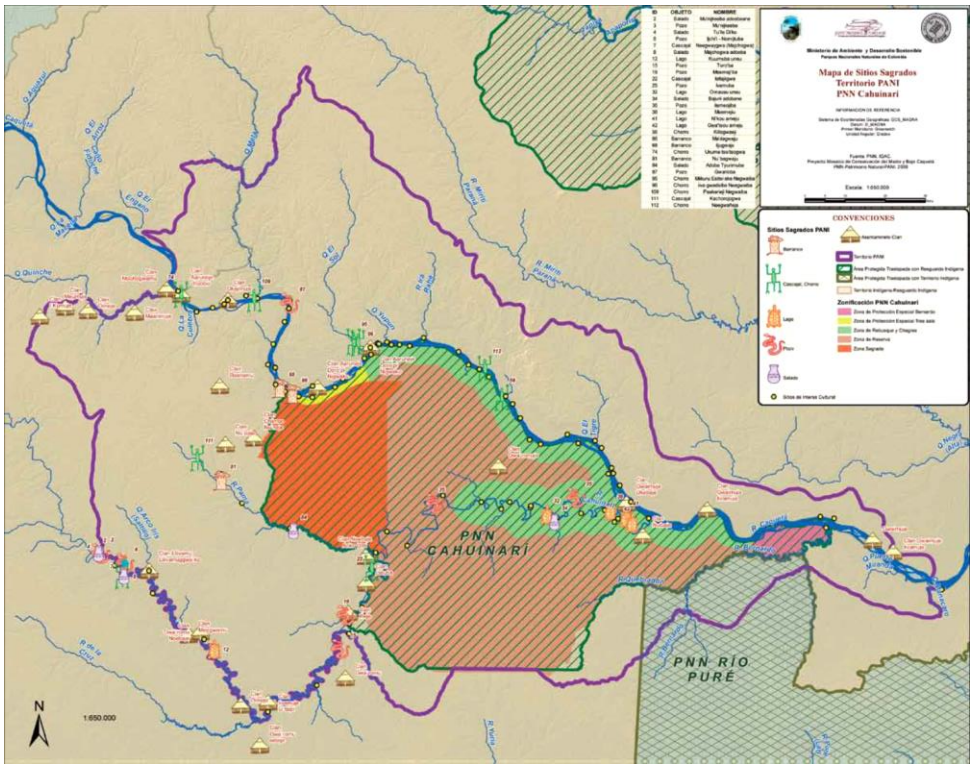


Figure 23. Ancient land map. Source: Taken from the safeguard of the intangible cultural heritage of the northwestern Amazon binational initiative between Colombia and Brazil, PNN of Colombia.

2.5.2.4.2.7 Law of origin and life plan of the PANI

Law of Origin

For the PANI: " *The law of origin are the mandates of the creator God, his son and the receiving gods of the bank of creation and as owner and creator of all things in this world. This is based on the Me Piive creation elements Bathe Me Piive Majchotae . The different standards that support this law are based on the maloca, the myths, the legends, the formations of the different sites and sacred places, the formation of the praise dances and the same words of formation that imply the fulfillment of the mandates of the father and avoid consequence for disobedience. The very words of the creator to his grandchildren are advice, the advice is based on listening, respecting and obeying, they are the essence that leads us to knowledge, as the foundation of true education. In other words, they are the laws that govern the indigenous world and that are given by the Creator and transmitted by those who know* " (PNNC, 2010).

The social, economic and cultural transformation of these communities settled on the banks of the Caquetá, is not an impediment to maintain today a strong roots in their culture and therefore a great respect for the nature that sustains them; Some regulatory norms are still unshakable, for example, access to some places that are considered sacred, appropriate behavior in the different parts of the territory and the levels of subtraction of permitted resources that tend towards a sustainable use of natural resources. . (PNNC, 2010). Currently and based on their ecosophy , the indigenous people who make up the PANI consider the area's raison d'être as: "Consolidate the Territory, understood as the control of the ancestral territory based on its own and autonomous management (PNNC, 2010). "

Life plan

The Life Plan is the guide for the life of the PANI Association. It is the course that has been proposed to fulfill, contains the dreams of each of its inhabitants and becomes the route to follow. The Life Plan was conceived from a single axis: the territory, from which PANI's thinking revolves and whose purpose is to consolidate territorial ordering for autonomous management. It describes five components that are environment, government, culture, health and education. Its objective is to strengthen the cultural, social, economic and political identity for the recognition and appreciation of their way of life through the development of plans and programs defined in the components of health, education, government, environment and ITEGWA that guarantee the governability and sustainability of the territory (PANI, 2013).

Environment:

Guarantee the conservation of biological and cultural diversity for social welfare based on traditional knowledge, recognition of ancestral territory and compliance with regulations (PANI, 2013). Which within its lines of action has:

a) Reliable, efficient, transparent and equitable resource management system.

b) Definition and implementation of rules that allow regulating the different problems based on their own principles, taking into account fundamental rights.

c) Consolidation and implementation of the major regulation, which contains the rules and procedures for the proper management of the territory.

d) Intercultural education and training to strengthen self-government.

e) Generation of interethnic integration spaces.

f) Application of cultural activities related to the ecological calendar.

g) Generation of mechanisms that strengthen the cultural value of traditional medicine.

h) Infrastructure and community equipment, communications and transportation.

ITEGWA

Support and strengthen the process of the PANI association in the specific aspects that women perform, considering the ethnic, cultural and social integrity and the search for productive economic alternatives (PANI, 2013).

self government

Consolidate an autonomous system for political, cultural, economic, environmental and social management that guarantees the participation and representation of communities in decision-making and the management of proposals within and outside the territory, which seek to improve living conditions. of the PANI (PANI, 2013).

Education

Train people to strengthen the social, cultural, economic, environmental and political components of PANI based on their own and Western knowledge (PANI, 2013).

Health

It improves the quality of life in the PANI by articulating the knowledge and practices of traditional and Western medicine with quality, efficiency and opportunity, through the consolidation of its own model that contributes to the construction of relevant public policies for indigenous peoples (PANI, 2013).

2.5.2.4.2.8 Coordination of the administration of the PNN Cahuinarí: REM PANI-PNN

Based on the recognition of the overlap of the Cahuinarí National Park area with the ancestral territory of PANI, a process of agreement was initiated for the management of the protected area. After the creation of the PNN Cahuinarí in 1986, the disappeared INDERENA initiated actions for the administration with the application of current regulations (Natural Resources Code), which created differences with respect to the indigenous communities that were present within it. Based on these differences, it was possible in 1993 to establish the first use and exploitation agreements with INDERENA

After a long relationship, PANI and National Natural Parks signed an inter-administrative agreement for the coordination of the public function of conservation. This exercise allowed the PANI association to have legal recognition as owners of their ancestral territory. From a PNN policy related to Special Management Regimes (REM), used as planning and management instruments in overlapping areas with indigenous reservations; and Agreements for the Use and Management of Natural Resources with indigenous authorities, materializes the principles and strategic guidelines of the Social Participation Policy in Conservation with the indigenous peoples of Colombia. The main axes that structure these instruments are culture, territory and governance, in a favorable framework for the conservation of biodiversity and the cultural survival of ethnic communities related to protected areas. This is how, in the exercise of participation in conservation, progress is made towards a process of environmental planning of the territory, a joint regulation of the use and management of natural resources, and the effective exercise of the coordination of the public function of conservation between the two authorities [43].

The REM is the legal and technical instrument for the management and coordination of the public function of the conservation of the overlapping area through norms and procedures that articulated among themselves, allow the planning, formulation, implementation, monitoring and evaluation of some actions for the development of the PANI life plan and the fulfillment of the mission objectives of the Cahuinarí National Natural Park. Its common objective is the conservation of biodiversity and the ethnic and cultural preservation of the Bora Miraña People, through knowledge from two different but complementary cultural spheres, for a more effective management of the area. Within its specific objectives this consolidation of the territory to guarantee the biophysical and cultural conservation of the protected areas; build governance models that guarantee the strengthening of indigenous self-government and compliance with the institutional mission and the functions and powers of the environmental authority and contribute to the recovery and cultural strengthening of indigenous communities.

The establishment of a Special Management Regime allows the economic use of natural resources, within limits that are given by compatible technologies and the objectives of the System (according to the Code of Renewable Natural Resources and Decree 622 of 1977); for the social and ecological function of the property (according to the Political Constitution), thus the customary use of biological resources must be

[43] Information taken from: www.parquesnacionales.gov.co

protected and advanced in accordance with traditional cultural practices that are compatible with the demands of conservation or sustainable use, in Consequently, the exploitation will be carried out with adequate techniques and in a controlled manner so that negative impacts are not generated in the conservation of the area (PNNC, 2010).

2.5.3 Free, Prior and Informed Consent (G5.2)

Whereas the initiative of the REDD++ PANI project is of the Association as reflected in sections 2.1.1 and 2.3.7, Appendix 1 of this document. And that the execution of the project will be accompanied by the company BIOTRADE S.A.S, under the rules that govern the PANI. The project will never encroach on private property, community property or government property.

Interested parties have been consulted and duly informed about the structuring, implementation of the project and are aware of the rights of use that can be authorized through the CVS (see Sections 2.3.3 and 2.3.7). As mentioned above, the days of the information dissemination meetings in each community were open. Where the community expressed its interest in continuing to participate in the project and other payment initiatives for environmental services associated with it.

2.5.4 Property Rights Protection (G5.3)

Project activities at no time lead to the involuntary removal or relocation of land ownership rights and do not oblige communities associated with the project area to relocate activities important to their culture or livelihood.

For more information on recognition of property rights and recognition of rights of use see Sections 2.5.1 and 2.5.2.

2.5.5 Illegal Activity Identification (G5.4)

There are four main illegal activities that have been identified in the project area that can potentially affect associated benefits ; however, none of them have been promoted by project activities. The activities illegal is it so related with the threats against the conservation Y protection from the forests of the NIBP and the others means natural of the territory (see section 5.1.1.3). The illegal activities identified were: illegal logging, mainly selective logging of fine wood and, to a lesser extent, clear cutting for crops for illicit use and mining , the overexploitation of fishing and hunting resources, and the problems associated with crops for illicit use and mining (Murcia et al., 2007; PANI & PNN- Cahuinari , 2010; Salazar Cardona, et al., 2019; Guio Rodríguez & Rojas Suárez, 2019; PANI & PNN- Cahuinari , 2022).

2.5.5.1 illegal logging

Forest deforestation, mainly related to unplanned occupation phenomena, through the increase of new settlements and changes in land use (Prieto-C & Arias-G, 2007)and (Miraña & Guiro, 2013). The main use of the extracted wood is for the construction and repair of houses. Activities related to illegal deforestation are related to the extraction of fine wood for external markets.

2.5.5.2 Indiscriminate fishing and hunting (overexploitation of resources)

Although this activity is not practiced massively, it occurs illegally and is directed, on the one hand, to local subsistence needs and, on the other, to the capture of species of commercial interest. Of the species that have been detected sensitive due to the intensification of fishing activity, are the large scale fish, and catfish due to the demand for their commercialization. (PANI & PNN-Cahuinari, 2022).

Of the species extracted for consumption and commercialization, they were considerably reduced or regulated, but they left serious consequences on the fauna populations, and therefore, affected the vulnerability of the species and their recovery capacity, such as the Charapa tortoise (*P. expansa*) . that due to the commercialization of adult females, neonates and eggs, specifically for the purpose of smuggling with Brazil (PANI & PNN-Cahuinari, 2022). After the populations of the species were considerably decimated, sustainable use agreements were implemented in the territory; however, this threat is still present today due to the lack of compliance with these agreements (PANI & PNN-Cahuinari, 2022). In addition to hunting for the fur trade, there was wildlife trafficking (especially primates) that generated the vulnerability of some populations of species and even the local extinction of some.

2.5.5.3 Mining

Illegal extractive activities, such as alluvial mining (mainly for gold extraction and to a lesser extent black sand and coltan). From 2012 to the present, situations of mining pressure have been recorded within the territory with the presence of illegal gold extraction rafts on the Caquetá River, which affect bodies of water due to mercury contamination (FIP & ADELPHI, 2021).

2.5.5.4 Crops for illicit use

The expansion of crops for illicit purposes; and mining have been the ones most affected by the PANI (PNNC, 2018).

2.5.6 Ongoing Disputes (G5.5)

The Project supports the indigenous authorities in their efforts related to the application of their governance, through the implementation of the related activity. However, it does not intervene or influence the processes to resolve conflicts of this type, nor does it generate any of them. In the execution of the Project and its Activities, the self-determination of indigenous peoples to manage their affairs is respected; No action necessary to comply with the Project Objective influences or coerces the efforts of the authorities to exercise their own form of government and the procedures to demand the rights over their lands, for which they themselves determine the necessary measures. During the approaches with the indigenous associations that border the PANI such as AIPE, ACITMA, AIZA, no conflict has been evidenced, with CRIMA it is necessary to meet for the ratification of limits.

2.5.7 National and Local Laws (G5.6)

2.5.7.1 Nationals

The activities of the PANI REDD++ project comply with the national legal framework for the implementation of REDD actions in Colombia, which is detailed below in Table 25:

Table 25. Legal framework under which the PANI REDD++ project is defined and implemented.

Element	Legal framework
	Article 8: Establishes the obligation of the State to protect the cultural and natural wealth of the Nation.

Element	Legal framework
Political Constitution of Colombia of 1991	Article 79: declares the right of all people to enjoy a healthy environment and guarantees that communities participate in all decisions that affect them. It also dictates that the State has the duty to protect the biological diversity and integrity of the environment and conserve biologically important areas.
	Article 80: decrees that the State must plan the management and use of natural resources with the aim of conserving, restoring or replacing them with the aim of achieving sustainable development.
	Article 95: within the duties of the citizen are included the protection of the natural resources of the country and ensure a healthy environment
	Article 339: the State must present a national development plan, which must include environmental policies.
Law 99 of 1993	Article 4: establishes the National Environmental System (SINA), made up of the Ministry of the Environment, the Regional Autonomous Corporations, departments, districts, municipalities, research institutes and civil society. Article 5: determines the functions that correspond to the Ministry of the Environment.
Law 164 of 1994, Law 629 of 2000 and Law 1844 of 2017	They adopt the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement respectively
Law 1450 of 2011	Article 17: Formulation of the National Plan for Adaptation to Climate Change – PNACC
Law 1753 of 2015	The National Registry for the Reduction of Greenhouse Gas Emissions is created.
Law 1819 of 2016	It adopts the tax reform and, among other aspects, creates the National Carbon Tax and the possibility for active subjects to seek carbon neutrality.
Decree 280 of 2015	Creates a commission for the effective implementation of the Post 2015 Development Agenda and the Sustainable Development Goals, including the goals described in Section 2.1.12.
Decree 298 of 2016	Establishes the organization and operation of the National Climate Change System, the National Climate Change Council, the National Information System on Climate Change and the National GHG Inventories.
Decree 926 of 2017	Regulates the procedure to make effective the non-causation of the national carbon tax.

Element	Legal framework
	Article 2.2.11.1: determines that the verification bodies for GHG emission reductions and removals from mitigation initiatives must be independent third parties
	Article 2.2.11.1: states that for verification under international accreditation schemes, it must be demonstrated that the reductions or removals of Greenhouse Gases (GHG) were generated in accordance with the ISO 14064-2:2006 standard.
Decree 446 of 2020	Regulates GHG verifiers. The National Government established rules applicable to GHG reduction verification bodies.
Resolution 1447 of 2018	Regulates the Monitoring, Reporting and Verification System for mitigation actions at the national level. Table Table 26details the content of this resolution.
Resolution 0831 of 2020	Modifies Resolution 1447 of 2018 regarding the components of the Monitoring, Reporting and Verification System (MRV) of mitigation actions at the national level.

Source: Prepared by Biotrade SAS (2022).

Resolution 1447 of 2018 (together with Resolution 0831 of 2020) establishes the specific guidelines on the development of REDD projects in Colombia, therefore, below we present the requirements that the PANI REDD++ project meets with respect to said resolution in the Table 26:

Table 26. Compliance with the requirements of Resolution 1447 of 2018 in the PANI REDD++ Project.

Resolution Sections	Compliance by the PANI REDD++ Project
Title I: Article 2, 10 and 13	• The PANI REDD++ Project is registered as a GHG mitigation initiative to demonstrate its mitigation results within the framework of compliance with the national Climate Change goals established under the UNFCCC. For this, the provisions of Resolution 1447 of 2018 are taken into account for the formulation, registration, validation and verification of the project. • The project proponent registers this initiative in the National Registry of GHG Emissions Reduction (RENARE).
Title II. Chapter 2. Section 2. REDD+ Projects: Article 39, 42, 43, 44, 45	• The PANI REDD++ Project uses a methodology that complies with the UNFCCC guidelines related to REDD+: " REDD+ Methodology Framework v1.6. – Approved VCS Methodology VM0007 " (see Sections 3.1.1 and 3.1.2), and a mechanism is established to quantify the risk of leakage of GHG emissions reduction (see Section 3.2.3), manage the risk of non-permanence of GHG emission reductions (see Sections 2.1.18, 2.1.19, 3.2.4.) and a mechanism for managing uncertainty in the quantification of the baseline and mitigation results.

Resolution Sections	Compliance by the PANI REDD++ Project
	The mitigation goals of the PANI REDD++ Project They are articulated with the goals of the Comprehensive Strategy for the Control of Deforestation and Forest Management, and the other national goals on Climate Change presented by the country before the UNFCCC, with respect to: • Zero gross deforestation (XXX ha of forest loss reduced in the project area, measured relative to the no-project scenario). • Increased quality of life for the local population (positive community benefits due to economic empowerment of community groups and increased job opportunities – See Section 4.2). • Strengthening the territorial governance of ethnic groups, peasant and rural communities that live in and depend on forests (positive community benefits from strengthening local governance and management of marine-coastal protected areas at the regional level – See Section 4.2). • Net reduction of 106,600.905 tCO_2e in emissions in the project area (measured relative to the scenario without the project) (see Section 3.2.4). • Sustainable Development Goals (see Section 2.1.12.)
	The PANI REDD++ Project complies with the additionality criterion (see Section 2.2.2.) MISSING
	In order to comply with the validation and verification criteria for REDD+ projects, the project proponent will take the necessary steps to contract the Validation and Verification Body (OVV) and that it takes into account the guidelines established by Art. 44 of the Resolution 1447 of 2018, Decree 446 of 2020 and Resolution 0831 of 2020.
	Regarding compliance with the Environmental and Social Safeguards of REDD+, Table 7(see Section 2.1.11.5.) presents the identification of the main instruments that the Project has to enforce each one of the safeguards, associated with the processes participatory and capacity-building activities that have been developed to date by participating entities and community groups.

Source: Prepared by Biotrade SAS (2022) based on Resolution 1447 of 2018 of the MADS.

2.5.7.2 Regional

See section 2.5.2.1

2.5.8 Approvals (G5.7)

The REDD++ PANI project has been approved by the appropriate authorities, both formal and traditional, required by the communities. For the particular case of approval by the institutions that make up the project's steering committee, see Section 2.5.9.

The evidence of the approval of the PANI REDD++ project by the community authorities is the contract signed between the proponent company (Biotrade SAS) and the PANI Association[44].

With regard to community authorities, they will be included in all stages of project design, including decision-making on the activities and training to be carried out, on the distribution of benefits, and on governance and implementation structures. as described in Section 2.3.

2.5.9 Project Ownership (G5.8)

For the specific case of this project, the documentary evidence that demonstrates ownership of the project consists of an alliance contract dated February 01, 2022 between the PANI Association and the BIOTRADE SAS Company, specifically to what the following THIRD CLAUSE refers : OBJECT OF THE ALLIANCE. its purpose is the participation of the proponents of the project in the percentages defined here in order to Formulate, Validate, Certify and Execute a REDD project within the geographic area of the indigenous organization PANI, based on the guidelines of the Life Plan for the environmental conservation of the territory and its culture, hereinafter called the "PROJECT", whose purpose is to improve the quality of life of the communities, protect, conserve and recover ecosystems and their biodiversity, through sustainable management of natural forests and other renewable natural resources. The activities that are carried out to fulfill the objective will be called REDD+ actions and will be executed within the PANI TERRITORY, through the verification of these actions and the content of mitigated carbon, it is expected to obtain the Verified Carbon Units (VCUs), through the Monitoring, Reporting and Verification process, which will be carried out every three years for thirty (30) years, described in the Project Design Document (PD). The commercialization of the VCUs will be carried out within the framework of the Voluntary Market and the national carbon tax. The parties are constituted as PROPONENTS of the project, and both will provide inputs for the design of the project and subsequent Validation, Verification and Certification of the same as PROPONENTS of the project [45].

2.5.10 Management of Double Counting Risk (G5.9)

The REDD++ PANI project does not seek to generate or has received any type of environmental or social credit. Nor have certificates related to the reduction of GHG emissions or renewable energy been applied or managed. The implementations and positive impacts achieved through this project will not be used to meet the emission reduction objectives of any other REDD program or mechanism. In this way, it is guaranteed that the PANI REDD++ project is totally independent from any other carbon project scheme in Colombia. For information on strategies to eliminate double counting in the crediting period of the project, see Section 2.5.15.

2.5.11 Emissions Trading Programs and Other Binding Limits

It does not apply to the REDD++ PANI project. It is not required to report evidence since the REDD++ PANI project is not related to or part of GHG emission trading programs or concessions (or any other similar mechanism).

[44]Supports are available in the " *Supporting " folder documents / Approvals / Associations agreements "*

[45]documents are available in the *Supporting folder documents / Approvals*

2.5.12 Other Forms of Environmental Credit

The REDD++ PANI project has not applied for or received any other form of environmental credit related to GHG, including renewable energy certificates.

2.5.13 Participation under Other GHG Programs

The PANI REDD++ project has not registered and is not seeking to register in any other GHG program.

2.5.14 Projects Rejected by Other GHG Programs

The REDD++ PANI project has not been rejected by any GHG program.

2.5.15 Double Counting (G5.9)

The registration of the REDD++ PANI Project in the National Registry of GHG Emissions Reduction (RENARE) avoids the generation of overlaps that are not compatible with future programs or projects that intend to be developed in the same project area, and thus the possibility of double generation will be eliminated. accounting at the national level for part of the project's mitigation results. This process is carried out under the guidelines of Art. 54 of Resolution 1447 of 2018 (See Table 26of section 2.5.7.1).

The PANI REDD++ Project has not been registered on any other platform besides Verra Registry , which guarantees that credits to be sold as offsets in the voluntary/compliance markets cannot be re-offered, thus avoiding double counting. In the same way, the Project does not seek to be eligible to participate in other programs or create another form of environmental or social credit different from the one presented in this PD.

3 CLIMATE

3.1 Application of Methodology

REDD+ Methodology Framework v1.6. – Approved VCS Methodology VM0007.

3.1.1 Title and Reference of Methodology

The project activities have been designed as part of the REDD+ project with the intention of reducing CO2 emissions from unplanned deforestation and degradation compared to baseline levels (Table 3). As required by VM0007, the land in the project area consists of contiguous and discrete project areas covered by forests meeting the definition of forest as defined by the government of Colombia. These areas were forests for a minimum of 10 years before the project start date.

Table 3. Modules applied

Title	Version
VM0007 REDD+ Methodology Framework (REDD-MF)	1.6

VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools (CP-AB)	1.1
VMD0004 Estimation of stocks in the soil organic carbon pool (CP-S)	1.0
VMD0007 Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation (BL-UP)	3.3
VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation (LK-ASU)	1.2
VMD0013 Estimation of greenhouse gas emissions from biomass and peat burning (E–BPB)	1.2
VMD0015 Methods for monitoring of greenhouse gas emissions and removals (M-MON)	2.2
VCS AFOLU Non-Permanence Risk Tool (T-BAR)	4.0

3.1.2 Applicability of Methodology

Applicability conditions of methodology VM0007 and its associated modules are detailed in Table 4 below.

Table 4. Applicability conditions

No.	Module	Applicability condition	Observation
1	VM0007 - REDD-MF – Section 4.3.1	Land in the project area has qualified as forest (following the definition used by VCS) at least 10 years before the project start date.	Condition satisfied. The project proponent has obtained satellite imagery from ten years before the project start date to demonstrate that the land in the project area qualified as forest in accordance with the national definition of forest: “land spanning more than 1 ha with trees higher than 5 meters and canopy cover of more than 30%, or trees able to reach these thresholds in situ” (IDEAM).
2	VM0007 - REDD-MF – Section 4.3.1	If land within the project area is peatland and emissions from the soil carbon pool are deemed significant, the relevant WRC modules (see Table 3) must be applied alongside other relevant modules.	Condition satisfied. Project area is not peatland; thus WRC must not be applied in this case. The project area includes natural forest considered to be important carbon sinks and the soil organic carbon which also in considered to be high.
3	VM0007 - REDD-MF – Section 4.3.1	Baseline deforestation and forest degradation in the project area fall within one or more of the following categories: • Unplanned deforestation (VCS category AUDD); • Planned deforestation/degradation (VCS category APD); • Degradation through extraction of wood for fuel (fuelwood and charcoal production) (VCS category AUDD)	Condition satisfied. Baseline deforestation and forest degradation fall in the categories of unplanned deforestation, also for extraction of wood for fuel.

No.	Module	Applicability condition	Observation
4	VM0007 - REDD-MF – Section 4.3.1	Leakage avoidance activities must not include: • Agricultural lands that are flooded to increase production (eg., paddy rice); • Intensifying livestock production through use of feed-lots and/or manure lagoons.	Condition satisfied. The project does not include agriculture on flooded lands or intensification of livestock production.
5	VM0007 - REDD-MF – Section 4.3.2	Baseline agents of deforestation must: (i) clear the land for settlements, crop production (agriculturalist) or ranching, where such clearing for crop production or ranching does not amount to large scale industrial agriculture activities; (ii) have no documented and uncontested legal right to deforest the land for these purposes; and (iii) be either residents in the Reference Region for Deforestation or immigrants. Under any other condition this methodology must not be used.	Condition satisfied. Agents of deforestation meet all the conditions required. See section 2 and 3
6	VM0007 - REDD-MF – Section 4.3.2	If, in the baseline scenario of avoiding unplanned deforestation project activities, post-deforestation land use constitutes reforestation, this methodology may not be used.	Condition satisfied. The project does not promote reforestation activities as post deforestation land use in the baseline.
7	VM0007 - REDD-MF – Section 4.3.3	Avoiding planned deforestation/degradation activities are applicable under the following condition: • Where conversion of forest lands to a deforested condition must be legally permitted.	Condition satisfied. The project area is not legally permitted deforestation due to current environmental legislation.
8	VM0007 - REDD-MF – Section 4.3.2	Avoiding forest degradation activities are applicable under the following conditions: • Fuelwood collection and charcoal production must be non-renewable in the baseline period. • If degradation is caused by either illegal or legal tree extraction for timber, this methodology cannot be used.	Condition satisfied. The project does not contemplate the use of wood for these activities
9	VMD001 – CP-AB	This module is applicable to all forest types and age classes. Inclusion of the aboveground tree biomass pool as part of the project boundary is mandatory as per the framework module REDD-MF.	Condition satisfied. Aboveground biomass is included in project emissions estimations.
10	VMD001 – CP-AB	Non-tree aboveground biomass must be included as part of the project boundary if the following applicability criteria are met (per framework module REDD-MF):	NTAGB not included in project area, as stocks changes are not significant.

No.	Module	Applicability condition	Observation
		Stocks of non-tree aboveground biomass are greater in the baseline than in the project scenario, and Non-tree aboveground biomass is determined to be significant (using the T-SIG module).	
11	VMD001 – CP-AB	Belowground (tree and non-tree) biomass are not required for inclusion in the project boundary because omission is conservative.	Below ground biomass (trees) is included, as allowed by the methodology.
12	VMD002 – CP-D	Dead wood shall be included if stocks are greater in the baseline than in the project scenario (in conformance with REDD-MF)	Dead wood not included in the project area, as carbon stocks changes are not significant.
13	VMD002 – CP-D	Dead wood shall be included if determined to be significant	Dead wood not included in the project area, as carbon stocks changes are not significant.
14	VMD0007 – BL-UP	The module shall be applied to all project activities where the baseline agents of deforestation: (i) clear the land for settlements, crop production (agriculturalist) or ranching, where such clearing for crop production or ranching does not amount to large scale industrial agriculture activities; (ii) have no documented and uncontested legal right to deforest the land for these purposes; and (iii) are either resident in the region (reference region—cf. section 1 below) or immigrants.	Condition satisfied. Module is applied to all project activities where the baseline agents of deforestation meet the characteristics mentioned
15	VMD0010 – LK-ASU	Activities subject to potential displacement are conversion of forest land to grazing lands, crop lands, and other land uses.	Condition satisfied. Project activities are conversion of forest lands to pastures, crops and settlements. See Section 2.1.11
16	VMD0010 – LK-ASU	The module is mandatory if module BL-UP has been used to define the baseline and the applicability conditions in module BL-UP must be complied with in full.	Condition satisfied. Module BL-UP is used, so this leakage module is applied.
17	VMD0012 – LK-DFW	Where fuelwood is collected or charcoal is produced for sale in regional or national market the market effects leakage must be considered using Module LK-ME.	Condition not applicable: fuelwood sale in regional or national markets is not considered in the project.
18	VMD0013 – E-BPB	This module is applicable to avoiding unplanned deforestation or degradation (AUDD), avoiding planned deforestation	Condition satisfied. Project aims at avoiding unplanned deforestation and

No.	Module	Applicability condition	Observation
		(APD) and avoiding degradation project activities, whether or not situated on peatland.	degradation activities, not situated on peatlands. See condition 2 and 3 above.
19	VMD0015 – M-REDD	Strata as defined in the relevant baseline modules are fixed and may not be changed without baseline revision.	Condition satisfied.
20	VMD0015 – M-REDD	The module is always mandatory. Without application of this module the methodology shall not be used.	Condition is satisfied: the module is applied.
21	VMD0015 – M-REDD	Where selective logging is taking place in the project case: • Emissions from logging may be omitted if it can be demonstrated the emissions are *de minimis* using T-SIG. • If emissions from logging are not omitted as *de minimis*, logging may only take place within forest management areas that possess and maintain a Forest Stewardship Council (FSC) certificate for the years when the selective logging occurs. • Logging operations may only conduct selective logging that maintains a land cover that meets the definition of forest within the project boundary. • All trees cut for timber extraction during logging operations must have a DBH greater than 30 cm. • During logging operations, only the bole/log of the felled tree may be removed. The top/crown of the tree must remain within the forested area. • The logging practices cannot include the piling and/or burning of logging slash • Volume of timber harvested must be measured and monitored.	Condition not applicable. The project does not involve selective logging.
22	VMD0016 – X-STR	In case of REDD, above-ground biomass stratification is only used for pre-deforestation forest classes, and strata are the same in the baseline and the project scenario. Post-deforestation land uses are not stratified. Instead, average post-deforestation stock values (eg, simple or historical area-weighted approaches are used, as per module BL-UP).	Condition satisfied. See application of this module in section 3.1.1.
23	VMD0016 – X-STR	For peatland rewetting and conservation project activities this module must be used to delineate non-peat versus peat	Condition not applicable. See condition 2 above.

No.	Module	Applicability condition	Observation
		and to stratify the peat according to peat depth and soil emission characteristics, unless it can be demonstrated that the expected emissions from the soil organic carbon pool or change in the soil organic carbon pool in the project scenario is *de minimis*.	
24	VMD0016 – X-STR	In the case of peatland rewetting and conservation project activities, the project boundary must be designed such that the negative effect of drainage activities that occur outside the project area on the project GHG benefits are minimized.	Condition not applicable. See condition 2 above.
25	VMD0017 – X-UNC	This module is mandatory when using methodology REDD-MF.	Condition satisfied. This module has been used throughout the project design to estimate uncertainties.
26	T-ADD	AFOLU activities the same or similar to the proposed project activity2 on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced;	Condition satisfied. Project activities do not violate any applicable laws. They all aligned with government guidelines.
27	Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" T-ADD	Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.	Condition satisfied. REDD activities do not violate any Colombian applicable law.
28	Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" T-ADD	This tool is not applicable to small - scale afforestation and reforestation project activities.	Condition satisfied. REDD activities are not classified as small scale.

3.1.3 Project Boundary

In addition to the table, provide a diagram or map of the project boundary, showing clearly the physical locations of the various installations or management activities taking place as part of the project activity based on the description provided in Section 2.1.11 (Project Activities and Theory of Change) above.

Include in the diagram or map the locations of where the various measures are taking place, any reference areas and leakage belts.

Carbon pool	Included?	Justification
Aboveground tree biomass	Yes	Major carbon pool affected by project activities.
Aboveground non-tree biomass	Yes	Expected to increase from project activities. Must be included when the land cover under the baseline scenario is perennial tree crop.
Belowground biomass	Yes	Major carbon pool affected by project activities.
Dead wood	No	Conservatively excluded as it is expected to decrease under the baseline scenario.
Litter	No	Excluded as per VCS AFOLU Requirements.
Soil organic carbon	No	Conservatively excluded as it is expected to decrease under the baseline scenario.
Wood products	No	Conservatively excluded

Source		Gas	Included?	Justification/Explanation
Baseline	Deforestation	CO_2	Yes	Aboveground and belowground biomass losses resulting from deforestation are included
		CH_4	No	Not required for REDD projects per the VCS AFOLU requirements.
		N_2O	No	Not required for REDD projects per the VCS AFOLU requirements.
		Other	No	
	Biomass burning	CO_2	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
		CH_4	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
		N_2O	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
		Other	No	Aboveground biomass losses as a result of fire are conservatively assumed zero

Source		Gas	Included?	Justification/Explanation
	Combustion of fossil fuels	CO_2	No	Conservatively omitted
		CH_4	No	Conservatively omitted
		N_2O	No	Conservatively omitted
		Other	No	Conservatively omitted
	Use of fertilizers	CO_2	No	Conservatively omitted
		CH_4	No	Aboveground and belowground biomass losses resulting from deforestation are included
		N_2O	No	Not required for REDD projects per the VCS AFOLU requirements.
		Other	No	Not required for REDD projects per the VCS AFOLU requirements.
Project	Deforestation	CO_2	Yes	Aboveground and belowground biomass losses resulting from deforestation are included
		CH_4	No	Not required for REDD projects per the VCS AFOLU requirements.
		N_2O	No	Not required for REDD projects per the VCS AFOLU requirements.
		Other	No	
	Biomass burning	CO_2	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
		CH_4	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
		N_2O	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
		Other	No	Aboveground biomass losses as a result of fire are conservatively assumed zero
	Combustion of fossil fuels	CO_2	No	Conservatively omitted
		CH_4	No	Conservatively omitted
		N_2O	No	Conservatively omitted
		Other	No	Conservatively omitted
		CO_2	No	Conservatively omitted

Source		Gas	Included?	Justification/Explanation
	Use of fertilizers	CH_4	No	Aboveground and belowground biomass losses resulting from deforestation are included
		N_2O	No	Not required for REDD projects per the VCS AFOLU requirements.
		Other	No	Not required for REDD projects per the VCS AFOLU requirements.

3.1.4 Baseline Scenario

Identify and justify the baseline scenario for the GHG reduction and/or removal activities, in accordance with the procedure set out in the applied methodology and any relevant tools. Where the procedure in the applied methodology involves several steps, describe how each step is applied and clearly document the outcome of each step.

Explain and justify key assumptions, rationale and methodological choices. Provide all relevant references.

Step 0. Preliminary Screening base on the starting date of the project activity

The project start date is January 01 of 2018. This is the date on which the community voluntary involved in the development of a REDD+ project.

Step 1. Identification of alternative land use scenarios to the proposed project activity

Step 1.a Identify credible alternative land use scenarios to the proposed project activities.

Scenario 1: Continuation of current land use

Scenario 2: REDD + project without certification of emission reduction:

Scenario 3: Current national programs

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

Step 2: Barrier Analysis

Step 2.a. Identification of the barriers that that would prevent the implementation of the type of proposed project activity

Investment Barriers:

Social barriers

Step 2.b Barrier analysis regarding the implementation of at least one of the alternatives identified except for the proposed project activity

Step 3: Common practice analysis

3.1.5 Additionality

Additionality: Application of VCS Tool

The project has used Tool VT0001 for Demonstration and Assessment of Addiionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) project activities.

Step 1: Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a (a): Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a. Continuation of land-use scenarios in the project area prior to project initiation:

i. Land use conversion due to subsistence agriculture.

As stated above, community members change the mainland forest use for the development of subsistence farming. On the other hand, crops for illegal use carried out and managed by external agents without control also constitute land uses that result in unplanned deforestation.

b. REDD + project without certification of emission reduction

ii. It is possible, though highly unlikely, that the Community Council and Regional Environmental Authority could cease the change of land use and the illegal use activities that result in deforestation of the project area without registering the activity as a REDD+ project through increased patrolling and enforcement.

iii. It is possible, though highly unlikely, that national or international development or non-governmental organizations could implement similar alternative livelihood, governance, and capacity building activities to reduce deforestation and forest degradation.

c. Activities similar to the proposed project activities on at least part of the land within the project boundary resulting from legal requirements or observed similar activities.

iv. Not applicable, none of the project activities are required by law, and there are no similar activities occurring in the region that are not REDD+ projects.

Sub-step 1a (b): Credibility of identified land use scenarios

Scenario 1 was present in the project area prior to project initiation and is thus credible. Analysis, and characterizations confirm that these land uses were present in the project area prior to the project start dates and are likely to continue in absence of the project.

Scenario 2 is considered credible since some of the baseline activities are not under the national law. The Regional Environmental Authority would thus have legal precedent to cease illegal mining and crops in the area.

Scenario 3 is considered credible because aid and non-governmental organizations have implemented sustainable development projects in the region before, though markedly different in scale.

Sub-step 1a (c): List of credible alternative land use scenarios

1. Continuation of land use conversion, see number i above.
2. Cessation of illegal land use conversion by the Regional Environmental Authority, see number ii above
3. Implementation of alternative livelihood, governance, and capacity building activities to reduce deforestation and forest degradation by an international or national non-profit, see number iii above.

Sub-step 1b (a): Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

1. Land use scenario 1 is the result of historical practices carried on in the area. Although communities have the right to derive income and livelihood from resources in their territories, there are some activities that are carried out not under law. Due to this, these scenarios are not in compliance with all mandatory applicable legal and regulatory requirements.

   Land use scenario 2 is based on the legal rights of the Regional Environmental Authority, as described above, and is thus in compliance with all regulatory requirements.

   Land use scenario 3 involves the action of local or international NGOs and it is assumed that their activities would be in compliance with regulatory requirements.

2. For land use scenario i, land use conversion are systematically un-enforced. Community members and external actors either do not obtain a permit or legal permits are illegally re-used beyond their intended scope.
3. Based on above, no land use scenarios have been removed.

Sub-step 1b (b): Outcome of Sub-step 1b

1. Continuation of land use conversion, see number i above.
2. Cessation of land use changes activity by the Regional Environmental Authority, see number ii above.
3. Implementation of alternative livelihood, governance, and capacity building activities to reduce deforestation and forest degradation by an international or national non-profit, see number iii above.

Sub-step 1c: Selection of baseline scenario

Due to the lack of adequate governance and resources to limit land conversion to agriculture within the project area, the most plausible reference scenario is the continuation of the previous and current land use scenario (previous number i). The expansion of agricultural and pasture frontiers is given by internal agents that open areas of primary forest to install crops and livestock. Illicit crop activities are carried out by external actors. This scenario has been present in the project area and the reference area for the last decade and is unlikely to cease without effective intervention.

The project activities described in this document require substantial financial resources and long-term presence in the project area to manage the activities. Without significant financial returns to ensure project longevity, aid and non-governmental projects cannot operate at the scale described above. Because of these limitations on potential regional, national, and NGO activities, scenarios ii and iii were not selected.

Step 2: Investment Analysis

The VCS Additionality Tool requires that either step 2 (investment analysis) or step 3 (barrier analysis) be undertaken (or both). The barrier analysis was selected and the analysis is completed below.

Step 3: Barrier analysis

Step 3a: Identify barriers that would prevent the implementation of the type of proposed project activity

Investment barriers.

Access to credit is practically non-existent in community lands. Similar activities of alternative livelihood productive activities have only taken place with grants from international cooperation or the national government. Debt funding is not available for these type of project activities, unless under a REDD+ project. Community lands cannot be used as guarantee for loans, due to legal requirements, and the communities do not have other relevant assets to establish liens on. The REDD+ project enables the carbon streams to be used as guarantee.

Social barriers

Social: Resistance to change due to unsustainable production model is common within the community, however, there is a percentage of the population that really wants change and a REDD project without registration, although it may have resistance, can overcome the social barriers with the successful experience of other projects.

Step 3b: Show that the identified barriers would not prevent the implementation of at least one the alternative land use scenarios (except the proposed project activity):

All barriers identified above will not prevent the land use scenarios identified in Step 1.

Step 4: Common practice analysis

Due to the lack of government and community resources, there are no similar development assistance projects or initiatives to reduce deforestation and forest degradation on this scale in the region with the exception of Vision Amazonia which is a REDD+ program but which It has a great shortcoming and that is

that being a program with such a large scale, the distribution of benefits is not the most appropriate, in addition to failing to comply with other safeguards.

The conclusion of the step by step approach, is the following: The region is predominately comprised of lands titled to Communities Councils and Indigenous Territories, who do not have the financial capacity to implement activities like those presented in this project. Therefore, efforts to reduce deforestation and forest degradation through sustainable production systems, improving livelihoods conditions, supporting local governance capacity and land-use planning and monitoring the biodiversity on a community-based scheme are not common a practice in the region. As a result of this analysis, the project activities are determined to be additional.

Community and biodiversity additionality is stated in section 2.2.3 above.

3.1.6 Methodology Deviations

The project does not involve deviations from the methodology.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

The quantification of baseline emissions followed the VM0007 methodology modules BL-UP, X-STR, C-AB, E-BB. Following the module BL-UP the baseline deforestation rate was calculated from the Reference Region for Deforestation (RRD). Projected areas of deforestation are based on the simple historic approach and on the average deforestation rate observed in the reference region during the reference period, thus, the population driver approach was not used.

Reference Region for Deforestation (RRD):

A combination of different geospatial data was used to delineate the reference region. The main defining criterion of the reference region is that it includes the watershed of the Caquetá River with the sub-watershed that comprise it. Within these limits, the reference region was analyzed to ensure that biophysical conditions such as slope, elevation, land use, precipitation, and temperature are similar to project area conditions. All areas that have restricted access, that is, protected areas such as national natural parks, were excluded from the reference region.

The calculation of the baseline was based on the use of information sources with academic and research recognition, such as the high-resolution global maps of forest cover change by Hansen et al. (2013), which precisely guarantee the phenomena of deforestation and land cover change, in order to measure an adequate forest area reduction rate, which is used for the projection of the future dynamics of change in use of the soil due to deforestation and/or forest degradation.

For the calculation of the emission factor, the most updated national reference level (NREF) is used, with this the studies carried out by the government institutes with respect to the carbon stock of the forests are ensured.

3.2.2 Project Emissions

Emissions that result from fuel or biomass combustion or nitrogen application are not part of the project greenhouse gases sources as state in project boundaries section.

3.2.3 Leakage

Ex-ante leakage estimation was done with tool *VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation (LK-ASU)*, which states that a conservative estimate must be produced to reflect potential GHG emissions in the leakage belt as a result of displaced deforestation agents.

In the case of the project, where no location of deforestation analysis has been conducted, the annual deforestation area in the leakage belt is given directly by *ABSL,LB,unplanned,t*. So, to estimate the projected unplanned baseline deforestation in the leakage belt, the equation #6 of the BL-UP was used:

$$ABSL,LB,unplanned,t = ABSL,RRD,unplanned,t * P_{LK}$$

The results are that 640 ha/year can be loss in the leakage belt during the accreditation of the project. This number is assumed to maintain stable during the implementation years.

After this equation, the sum of the deforested areas was estimated using the equation #8 of the same tool:

$$A_{BSL,LB,unplanned} = \sum_{t=1}^{t*} A_{BSL,LB,unplanned,t}$$

Leakage mitigation strategies for the project include the implementation of productive activities which improve socio-economic status, the strengthening of governance, and the establishment of forest patrols. The strengthening of local governance improves the ability of the community councils to manage local participation in project activities that generate income (not from illegal activities), and to effectively distribute those economic benefits. Finally, the presence of forest patrols may discourage illegal activities in the leakage area that directly borders the project area boundaries. The predicted outcome of implementing these types of activities throughout the project zone is the successful mitigation of leakage by providing legal alternatives and incentives.

3.2.4 Net GHG Emission Reductions and Removals

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
2018	3,861,095	46,059	37,248	3,777,789
2019	3,844,844	46,056	37,091	3,761,696
2020	3,828,661	46,054	36,935	3,745,672
2021	3,812,546	46,052	36,780	3,729,715
2022	3,796,499	46,049	36,625	3,713,825
2023	3,780,520	46,047	36,471	3,698,002
2024	3,764,608	46,045	36,317	3,682,245
2025	3,748,762	46,043	36,165	3,666,555
2026	3,732,984	46,040	36,012	3,650,931
2027	3,717,272	46,038	35,861	3,635,373

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
2028	3,701,626	46,036	35,710	3,619,880
2029	3,686,046	46,033	35,559	3,604,453
2030	3,670,531	46,031	35,410	3,589,090
2031	3,655,082	46,029	35,261	3,573,792
2032	3,639,698	46,026	35,112	3,558,559
2033	3,624,378	46,024	34,965	3,543,389
2034	3,609,123	46,022	34,817	3,528,284
2035	3,593,932	46,020	34,671	3,513,242
2036	3,578,805	46,017	34,525	3,498,263
2037	3,563,742	46,015	34,380	3,483,348
2038	3,548,742	46,013	34,235	3,468,495
2039	3,533,806	46,010	34,091	3,453,705
2040	3,518,932	46,008	33,947	3,438,977
2041	3,504,121	46,006	33,804	3,424,311
2042	3,489,372	46,003	33,662	3,409,706
2043	3,474,685	46,001	33,520	3,395,164
2044	3,460,060	45,999	33,379	3,380,682
2045	3,445,497	45,997	33,239	3,366,261
2046	3,430,995	45,994	33,099	3,351,901
2047	3,416,554	45,992	32,960	3,337,602
Total	109,033,518	1,380,760	1,051,852	106,600,905

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation

Data / Parameter	$\Delta C_{BSL,unplanned}$
Data unit	t CO2e
Description	Net greenhouse gas emissions in the baseline from unplanned deforestation
Source of data	Module BL-UP
Value applied	109,033,518
Justification of choice of data or description of	See section 3.2 developed under Module BL-UP guide.

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	Regional Forest Cover / Non-Forest Cover Benchmark Map
Data unit	ha
Description	Map that shows the location of forest and non-forest areas in the Reference Region RRD at the beginning of the reference period).
Source of data	Satellite imagery used is adequate in terms of spatial resolution (less than 30 meters) and an appropriate scale (Landsat)
Value applied	4,346,895.77
Justification of choice of data or description of measurement methods and procedures applied	Satellite imagery used is adequate in terms of spatial resolution (less than 30 meters) and an appropriate scale.
Purpose of Data	The images were used for all the purposed listed below: • Determination of baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage baseline scenario • Calculation of leakage emissions
Comments	
Used in Equations	3

Data / Parameter	Project Forest Cover Benchmark Map
Data unit	ha
Description	Map showing the stratification and location of forest within the project area at the beginning of each monitoring period. The benchmark map will show the deforested areas at each monitoring event (Map of spatial limits)
Source of data	Satellite imagery used is adequate in terms of spatial resolution (less than 30 meters) and an appropriate scale (Landsat and Planet Scope)
Value applied	1,654,722.58

Justification of choice of data or description of measurement methods and procedures applied	Satellite imagery used is adequate in terms of spatial resolution (less than 30 meters) and an appropriate scale.
Purpose of Data	The project area forest benchmark map for year 2018 is used to: • Determine baseline scenario • Calculate baseline emissions • Calculate project emissions
Comments	
Used in Equations	3, 5, 7

Data / Parameter	Leakage Belt Forest Cover Benchmark Map
Data unit	ha
Description	Map showing the location of forest within the leakage belt at the beginning of each monitoring period. The benchmark map will show the deforested areas at each monitoring event
Source of data	Satellite imagery used is adequate in terms of spatial resolution (less than 30 meters) and an appropriate scale (Landsat and Planet Scope)
Value applied	115,986
Justification of choice of data or description of measurement methods and procedures applied	Satellite imagery used is adequate in terms of spatial resolution (less than 30 meters) and an appropriate scale.
Purpose of Data	The leakage belt forest cover bench mark map is used to • Calculate project emissions • Calculate leakage
Comments	Non-applicable
Used in Equations	3, 6, 8

Data / Parameter	CFj
Data unit	t C t-1 d.m
Description	Carbon fraction of biomass for tree species j
Source of data	Species- or family-specific values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3) shall be used if available, otherwise default value of 0.47 t C t-1 d.m. can be used.
Value applied	0.47 t C t-1 d.m

Justification of choice of data or description of measurement methods and procedures applied	Default value 0.47 t C t-1 d.m. can be used, or species specific values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3)
Purpose of Data	The Carbon fraction for dry wood was used to: • Calculate baseline emissions • Calculate project emissions • Calculate leakage
Comments	Where new species are encountered in the course of monitoring, new carbon fraction values must be sourced from the literature or otherwise use the default value.
Used in Equations	1 – Module CP-AB

Data / Parameter	Dj
Data unit	t d.m. m^{-3}
Description	Basic wood density in t d.m. m^{-3} for species *j*
Source of data	National Reference Level (NREF)
Justification of choice of data or description of measurement methods and procedures applied	According to good practice procedures, project should prioritize the use of local information when available, otherwise national or regional studies may be used.
Purpose of Data	*The basic wood density was used for:* • Calculate baseline emissions • Calculate project emissions • Calculate leakage emissions
Comments	Non-applicable
Used in Equations	1 – Module CP-AB

3.3.2 Data and Parameters Monitored

Data and parameters determined or available at validation are included in Section 3.3.1 (Data and Parameters Available at Validation) above.

Data / Parameter	Project Forest Cover Monitoring Map
Data unit	ha
Description	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data	Satellite images

Description of measurement methods and procedures to be applied	By using satellite images and remote sensing to map forest and non-forest covering the Project Area it would be determined if there are any variations in the forest in the project area.
Frequency of monitoring/recording	Every 2 years (or less) with images. Verification of deforested areas will be continually monitored in field by the project participants.
Value applied	N/A
Monitoring equipment	SIG software
QA/QC procedures to be applied	
Purpose of Data	*Calculation of project emissions*
Calculation method	N/A
Comments	

Data / Parameter	Leakage Belt Forest Cover Monitoring Map
Data unit	ha
Description	Map showing the location of forest land within the leakage belt at the beginning of each monitoring period.
Source of data	
Description of measurement methods and procedures to be applied	By using satellite images and remote sensing to map forest and non-forest covering the Project Area it would be determined if there are any variations in the forest in the project area.
Frequency of monitoring/recording	Every 2 years (or less) with images. Verification of deforested areas will be continually monitored in field by the project participants.
Value applied	N/A
Monitoring equipment	
QA/QC procedures to be applied	
Purpose of Data	*Calculation of leakage*
Calculation method	N/A
Comments	

Data / Parameter	ADistPA,t
Data unit	ha
Description	Area impacted by natural disturbance in the project area at time t; ha
Source of data	Satellite images
Description of measurement methods	Analysis of natural disturbance in project area like fires or permanent flooding.

and procedures to be applied	
Frequency of monitoring/recording	This will be monitored at least every two years.
Value applied	N/A
Monitoring equipment	Computer and software
QA/QC procedures to be applied	N/A
Purpose of Data	*Calculation of the non-permanence risks*
Calculation method	Interpretation of satellite images.
Comments	

3.3.3 Monitoring Plan

The initial monitoring follows the requirements for a REDD project including those stated in CCB Standard v3.0, VCS Standard, AFOLU requirements, and VM0007 v1.6. Data and parameters available at validation are included in Section 3. Details regarding all the process involved in the monitoring scheme are describe in the appendix “Procedimiento PANI_v1.pdf”.

3.3.4 Dissemination of Monitoring Plan and Results (CL4.2)

Monitoring and Implementation Reports will be posted in the public domain on the CCBA and VCS websites in accordance with each program’s procedures. Summaries of monitoring results will be disseminated to stakeholders and communities members within the project zone prior to verification and accordingly to the communities means of communication and access to documents.

3.4 Optional Criterion: Climate Change Adaptation Benefits

The project does not seek to be validated to the Gold Level for climate change adaptation benefits.

3.4.1 Regional Climate Change Scenarios (GL1.1)

Identify likely regional or sub-national climate change and climate variability scenarios and impacts and identify potential changes in the local land use scenario due to these climate change scenarios in the absence of the project.

3.4.2 Climate Change Impacts (GL1.2)

Describe how current or anticipated climate changes are having or are likely to have an impact on the following in the project zone and surrounding regions:

- *Community well-being.*
- *Biodiversity conservation status.*

3.4.3 Measures Needed and Designed for Adaptation (GL1.3)

Based on the causal model described in response to G1.8, describe measures needed and designed to assist communities and biodiversity to adapt to the probable impacts of climate change.

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CM1.1)

4.1.1.1 Welfare

The degree of conservation in which the territory is currently found is the result of the traditional form of management of the Bora-Miraña people, of the activities developed in it, in a respectful and sustainable manner, allowing its stability over the years. However, this relationship of correspondence with the environment that has been exposed to all kinds of interventions by Western man, putting at risk its condition as a functional system. Over time, the Colombian Amazon has been affected by large extractive waves, and has also become a place of operations for actors interested in controlling the territory and the business of illicit activities (illicit crops, mining, wildlife trafficking, and flora, among others), with serious consequences in the environmental, social, economic and political spheres. The expansion of crops for illicit purposes; and mining have been the ones most affected by the PANI (PNNC, 2018).

Mining has been responsible for leaving drastic consequences on the ecosystems of the PANI territory, the most notable related to environmental toxicology associated with gold mining, generating an impact on fish, and man who ultimately consumes those hydrobiological resources present. in the Caquetá river, in the Colombian Amazon, which has been contaminated with mercury. Even when the quality of the resource was negatively affected, the inhabitants of PANI continue to make use of it, putting their health at risk and that of anyone who comes into contact with their products, since it has traditionally had a subsistence economy, tied to completely to the use and exploitation of the natural resources of their territory, they do not have other economic alternatives that allow them to pluralize their livelihoods; In conclusion, the quality and way of life of the Bora-Miraña people is subject to any change or transformation that their territory suffers, and so far they do not have the means to boost their economy.

Regarding education, the association has a school system that allows basic primary education in three of the five communities. Likewise, it has dropout rates of over 13% per year, largely due to the long journeys made by students to attend school. It has an educational infrastructure that is equipped for approximately 85 students, which is in fair condition, as well as the provision of chairs, boards and other elements necessary for the provision of the service (Figure 24).

Figure 24. School branch of the community of Las Palmas. Source: Biotrade SAS (2022).

Although more than 97% of the population has health coverage in the subsidized and contributory regimens, being able to access these services requires having the necessary resources to reach the La Pedrera tertiary care hospital. In other words, a boat that provides some comfort and an engine that allows you to get there in a short time is required; PANI does not currently have this provision, so the sick and emergencies are attended to from the availability of a boat, motor and gasoline that a member of the community has. Agreements have been made with the PNN Cahuinarí to attend to emergencies, however, in most cases it does not have resources with which to support. The health brigades on the part of the government are sporadic and respond more to the management of resources carried out by the PANI, which in itself is a program of the

The infrastructure for health is scarce, in the community of Mariapolis there is a health center built with brick and cement. Although the facilities are optimal, it does not have staff for its operation and much less qualified personnel for attention. In the other five communities there are no facilities or health centers, in which people can receive health care and much less emergencies. There is an increase in malaria, polyparasitism and flu diseases in the last five years, which the health secretary argues is due to the low application of preventive vaccination schemes, due to the low quality of water for human consumption and the Ignorance of knowing the changes of western and own diseases.

By 2013, Miraña and Guiro found that about 19% of PANI family units did not have their own home. Likewise, those who had 63% consider that they have the necessary space for them, while the other 37% consider that they lack space in their homes; showing a lack of housing in the first case and a lack of living space in the dwelling in the second case. In general, the state of the houses of the PANI families is not ideal for them, since they state that in the future they would like to have wooden walls and floors, since wood lasts and protects more, it is more comfortable and because the zancona is getting scarce (Miraña & Guiro, 2013).

Electrical connectivity is low, since only the backwater community has electricity supply between 6:00 PM and 10:00 PM every day, although there are houses that are outside the power lines . In general, PANI families are supplied with electricity through gasoline generators, and in some cases, with solar energy systems installed for the development of ecotourism in PANI.

There are no drinking water supply systems, water for consumption is obtained in most of the territory by collecting rainwater, being used without any type of treatment. Some families obtain water from streams or rivers near their home. The only sanitary batteries with septic tanks for wastewater treatment are those installed for ecotourism, one for each community.

According to an analysis of income carried out by PANI in 2012, medium-sized families received an average of 2.1 current legal minimum wages, while large families received 1.8 and small families received 0.8. The most important source of income for PANI families comes from goods obtained from the territory, which ranges from 57% for medium-sized families to 81% for large families. It was observed that small and medium-sized families tend to seek income alternatives by selling primary and processed products, as well as providing services to institutions present in the territory, while large families support their income in obtaining goods from the territory. Table Table 27the income of each type of PANI family:

Table 27. source of the Income by type of family in the PANI.

Family Unit Type	Income (SMLV)	Sales of primary and transformed goods	Gifts	Provision of Services	Goods obtained from the territory
Small	0.8	12.5%	11.8%	13.3%	62.3%
Median	2.1	8.3%	5.9%	28.5%	57.3%
Big	1.9	7.0%	6.3%	5.1%	81.7%

Source: Information taken from (Miraña & Guiro, 2013). Prepared by Biotrade SAS (2022)

On the other hand, 67.9% of the income of PANI families comes from goods taken from the territory such as fish and wild meat, fruits, tubers and others, which indicates that there is a great dependence on the territory for their survival, especially medium and large families (Table 28):

Table 28. source of the Family income in the PANI

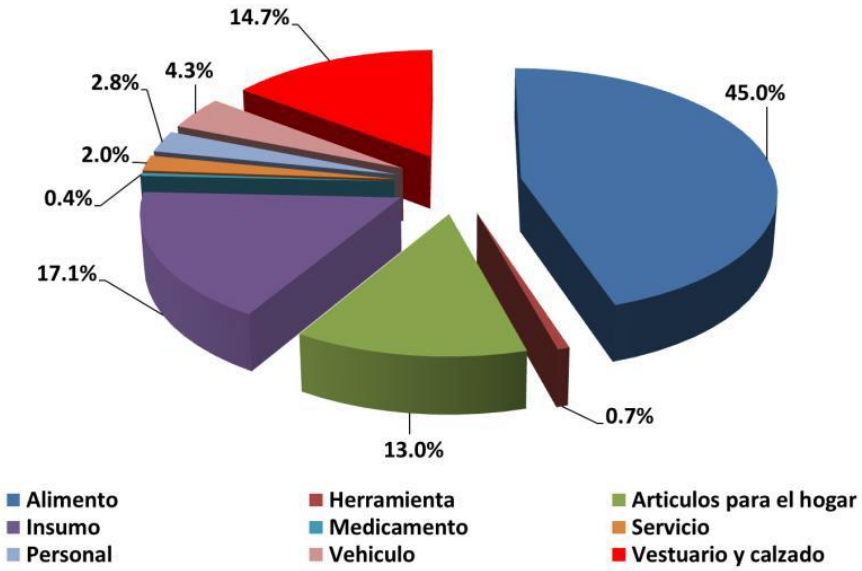
source of income	Type of family unit			Total
	Small	Median	Big	
Sales of primary and transformed goods	2.1%	3.6%	2.8%	8.5%
Gifts	2.0%	2.6%	2.5%	7.0%

Provision of Services	2.2%	12.4%	2.0%	16.7%
Goods obtained from the territory	10.3%	24.9%	32.6%	67.9%

Source: Information taken from (Miraña & Guiro, 2013). Prepared by Biotrade SAS (2022)

Of the products that are obtained from the territory and that generate income for PANI families are fish meat (24.1%), fariña (11.2%), pork (9.6%), Charapa (8 .2%), Tapir (6.9%) and Wood (3.5%), among others. The main market for the sale of these products is the district of La Pedrera, followed by Puerto Santander (Miraña & Guiro, 2013).

Regarding the expenses made by PANI families, these are mainly oriented to obtain products from the region [46]with 60.6%, while the remaining 39.4% are goods and services of origin outside the territory. Of the latter, 45% of expenses are on food products (Figure 25).



[46]The PANI assigned a commercial value to the goods obtained from its territory

Figure 25. Destination of purchases of products from outside the territory by PANI families. Source: Taken from Miraña & Guiro (2013).

These activities have been allowed by the PANI for a generation of income greater than what families have regularly from their activities, these spaces are generated due to the weakness of their economy. The monthly income of PANI families was between 0.5 and 0.8 SMMLV [47], while a miner receives between 1.5 and 3 SMMLV (Miraña & Guiro, 2013).

4.1.1.2 Characteristics and diversity of the community

4.1.1.2.1 Ethnic groups that make up the PANI

The traditional territory of the PANI has had a very strong bond with the presence of extractive activities, the activity of rubber extraction being very important. Casa Arana was located in part of the territory, causing a great impact on the populations, territory and social and political organization, leaving them practically exterminated. Already in the middle of the 20th century, they were located in a point of their ancestral territory called Puerto Remanso and it is where the PANI began to form. Currently, the PANI has 13 indigenous ethnic groups and two crosses (Mestizo and Zambo). (Miraña & Guiro, 2013). The ethnic group with the greatest presence in the PANI is the Miraña with 46.6% of its inhabitants, followed by the Bora (12.1%) and Carijona (11.5%). The other ethnic groups, Huitoto (8.3%), Matapí (4.6%), Macuna (4.4%), Yucuna (4.2%), Cabiyari (1.9%), Tanimuca (1.5%)), Muinane (1.2%), Cubeo (0.2%), Andoque (0.2%), Ticuna (0.2%), are a minority, however, they represent 29.8% of the population (PANI, 2022)(Figure 26).

[47]SLMMV: Current Minimum Legal Monthly Wage.

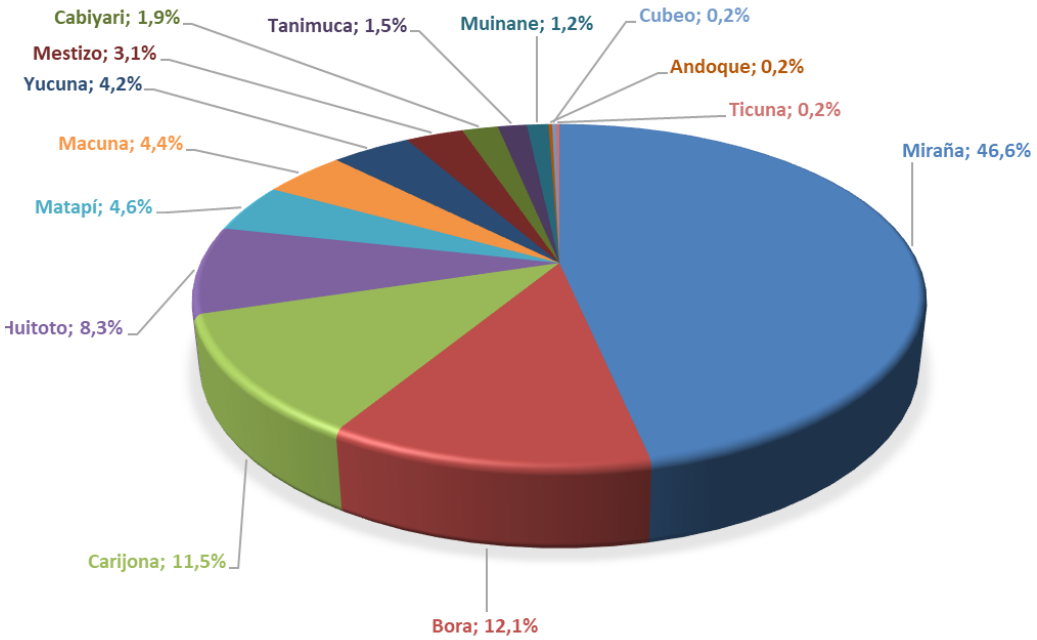


Figure 26. Organizational structure of the PANI . Source: Data obtained PANI (2022). Prepared by Biotrade SAS (2022).

4.1.2 Interactions between Communities and Community Groups (CM1.1)

Currently, the PANI government system each community elects a representative (Authority) who is part of the decisions of the association through the general assemblies of indigenous authorities, the highest body of the PANI association. Each of the communities has autonomy for its decisions regarding the coexistence manual, however, the policies and strategies to be developed in all its components [48]are directed by the general assembly. Thus, each component is a secretary of the PANI organization chart, each of them having a technical team made up of a representative from each community for each topic.

For the construction of policies, initiatives, projects and POA's, among other things, it is carried out in a participatory manner in a general assembly of authorities, generally three (3) assemblies are held in the year: 1) Planning; 2) Tracking; and 3) Evaluation. These assemblies are held starting in February when the traditional council opens the activities for the PANI. Occasionally and when required, extraordinary assemblies are held to deal with specific issues that require prompt decision-making. In this sense, measures will be taken to guarantee that these spaces for participation and decision-making of the PANI. Likewise, the actions that will be developed within the project will not have negative repercussions on these interactions, since the project's governance structure is based on and strengthens these relationships between communities and associations.

[48]There are five (5) components: secretaries of health, education, government, environment and territory, ITEWA.

4.1.2.1 Welfare Historic adjoining agreements

4.1.3 High Conservation Values (CM1.2)

For the classification of the High Conservation Values, the *HCV Resource Network Guide was taken into account,* which through a participatory work of the PANI identified and prioritized as High Conservation Value, the Forests and salt marshes, Jaguar, Tapir, Pintadillo and the tiger. . This is due to the fact that they were characterized by having serious negative impacts on the well-being, health and/or survival of the PANI families that depend on them and the health of the territory, as well as the fact that there are no ways to provide the services that they lend if they are not present within the PANI territory. These ecosystem services that meet at least one of these factors and were divided according to the categories included in the Millennium Ecosystem Assessment.

4.1.3.1 HCV1 Diversity of species.

Concentrations of biological diversity that contain endemic species or rare, threatened or endangered (RAP) species, and that are of significant importance on a global, regional or national scale a single species alone may be considered important enough to be considered a HCV 1.

High Conservation Values	**Jaguar or tiger (*Panthera onca*)**
Qualifying Attribute	➢ For Colombia, the species is considered "Vulnerable" (VU) (Resolution 1912 of 2017 of the Ministry of Environment and Sustainable Development - MADS) and within the Red List of the International Union for Conservation of Nature (IUCN) in the category of “Near Threatened”. ➢ Considered a flagship species because it requires large areas, and as a super predator in the Neotropics. (Jędrzejewski, et al., 2018) ➢ Ecosystem service: helps keep the ecosystem healthy Characteristic: o It acts as an umbrella species, which contributes to the restoration of ecosystems. o It usually walks along the banks of rivers, which disperses herbivores and allows the regeneration of natural vegetation that stabilizes soils and prevents erosion and high sediment loads in swamps. o It regulates the population of approximately 85 species on which it feeds, maintaining the functionality of ecosystems by preventing the overpopulation of species [49].
focal area	PANI REDD++ project area

[49] Information taken from **the regional system of protected areas of the Colombian Caribbean:** https://www.sirapcaribe.org/jaguar#:~:text=Como%20elemento%20estrat%C3%A9gico%20de%20conservati%C3%B3n,%C3%A1rea%20de%20approximately%2090%20km2 .

High Conservation Values	**Charapa turtle (*Podocnemis expansa*) and the fundamental ecosystems for its survival**
Qualifying Attribute	➢ It is under the threat category "Endangered" (EN) in Colombia (Resolution 1912 of 2017 of the Ministry of Environment and Sustainable Development - MADS), and in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) . ➢ Defined in the REM as Integral Conservation Priorities (PIC). ➢ Ecosystem service: Maintain the balance of aquatic ecosystems. Characteristic: o It helps transport fruits and seeds along rivers. o It is part of the food chain of other animals, it serves as food for birds, catfish, foxes, jaguars, alligators and water dogs. o Recirculation of nutrients by removing the bottom of the rivers to be buried.
focal area	PANI REDD++ project area

High Conservation Values	**Tapir (*Tapirus terrestris*)**
Qualifying Attribute	➢ Listed globally (IUCN), and nationally (MADS Colombia) as a Vulnerable species (VU) (it is considered to be facing a high risk of extinction in the wild). ➢ Defined in the REM as Integral Conservation Priorities (PIC). ➢ Large spatial requirements, and preferences for certain types of habitat in good condition (do not tolerate habitat degradation easily) (Cruz, et al., 2014). ➢ Ecosystem service: Maintain the balance of aquatic ecosystems. Characteristic: o Seed disperser, the seed fertilized by its excrement germinates and this allows trees and plants to grow in different places. o Open clearings in the forest. o Eliminates one of the main obstacles to germination in the forest, (consumes vegetation below the canopy made up of bushes and shrubs). o It facilitates the growth of seedlings in wooded areas.
focal area	PANI REDD++ project area

High Conservation Values	**Tiger paintbrush (*Pseudoplatystoma tigrinum*)**
Qualifying Attribute	➢ It is under the national category (MADS Colombia) as a Vulnerable species (VU). ➢ Ecosystem service: Maintain the balance of aquatic ecosystems Characteristic: ○ Its diet also includes insects and fruits that fall from the trees to the ecological regulator river, as it is a predator that controls other species that can become pests. ○ It helps transport fruits and seeds along rivers.
focal area	PANI REDD++ project area

4.1.3.2 HCV 2 Ecosystems and mosaics at landscape scale.

Ecosystems and mosaics of ecosystems that are large at landscape scale and important at global, regional, or national scales, and that contain viable populations of the vast majority of naturally occurring species under natural patterns of distribution and abundance.

High Conservation Values	**Amazonian and salty tropical humid forest (PANI territory)**
Qualifying Attribute	➢ It is an important reservoir of biodiversity at the Amazon and national levels due to the biogeographic characteristics, variety of ecosystems and species, physiography, and climate of the (Prieto-C & Arias-G, 2007, PANI & PNN-Cahuinarí, 2010). ➢ In the middle of the Cahuinarí river basin there is a high density and diversity of vegetation. Additionally, this area reports the presence of 674 bird species (Salaman, et al., 2007), 158 amphibians (mostly endemic species) (Galeano , et al., 2006), 195 reptiles, 2122 mammals and 753 fish species. ➢ The salt flats are the habitat of several threatened species (PANI & PNN-Cahuinari, 2022).
focal area	PANI REDD++ project area

4.1.3.3 HCV 5 Community Needs

Sites and resources critical to meeting the basic needs of local communities or indigenous peoples (eg livelihoods, health, nutrition, water, etc.), identified through dialogue with such communities or indigenous peoples.

High Conservation	**Amazonian and salty tropical humid forest (PANI territory)**

Values	
	➢ Ecosystem service: Supply of natural resources. ➢ Benefits for the community: o Food o Energy sources (Wood energy source for heating water or cooking) o Construction materials, elaboration of utensils (Fiber, wood, clay). o Medicines. o natural pesticides
focal area	PANI REDD++ project area

High Conservation Values	**Charapa turtle (*Podocnemis expansa*) and the fundamental ecosystems for its survival**
Qualifying Attribute	➢ Ecosystem service: They provide the following supply resources o It is a source of protein for 112 PANI families. o Fat or lard for medicinal and culinary uses. ➢ It plays an important role within the PANI culture. o From the PANI indigenous worldview, the charapa tortoise is directly related to the origin myth of the Miraña ethnic group: " *One of the gods, an ancestral being, gave flesh and blood to the charapa, materializing it and giving it to all the grandchildren so that they they will feed on it* ." The myth is expressed through rites associated with the species such as the charapa dance, which allows the social regulation of its use" (PANI & PNN-Cahuinari, 2010).
focal area	PANI REDD++ project area

High Conservation Values	**Tapir (*Tapirus terrestris*)**
Qualifying Attribute	➢ Ecosystem service: They provide the following supply resources o It is a source of protein for 112 PANI families. o Fat or lard for medicinal and culinary uses.
focal area	PANI REDD++ project area

High Conservation Values	**Tiger paintbrush (*Pseudoplatystoma tigrinum*)**

Qualifying Attribute	➢ Ecosystem service: They provide the following supply resources o It is a source of protein for 112 PANI families. o Use for self-consumption and commerce. (Agudelo, 2015). o It is one of the 12 species of greatest economic importance in the Leticia sector of the Brazil-Colombia-Peru border. The pintadillos are the most commercialized group and together they account for 21% of the catch. The fishing of the striped pintadillo catfish (*Pseudoplatystoma tigrinum*) (Linnaeus, 1766): Aspects of local knowledge, fishing biology and population parameters in the upper Amazon River (Leticia sector – Colombia). Amazon Research Institute (IMANI).
focal area	PANI REDD++ project area

4.1.4 Without-Project Scenario: Community (CM1.3)

For a description of the characteristics of the communities in the scenario without the project, see Sections 2.1.6 and 4.1.1.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

The REDD++ PANI Project conceives the generation of community impacts from the development of the strategic lines and its activities with the association, taking into account that they will be carried out based on short-term actions, which have been considered from the analysis of theory of change for each. Therefore, we present the expected impacts in Table 29and Table 30:

Table 29. Description of community impacts expected from the REDD++ PANI project: *Increased capacity to autonomously manage the territory*

Impacts	**Increased capacity to autonomously manage the territory**
Type of benefit, cost or risk	Direct benefit projected on the PANI association as planned from the strengthening of the technical and administrative capacities of the leaders. For the autonomous management of its territory, building development guidelines in it, with space management at the departmental and national levels for the coordination and implementation of activities that preserve and strengthen its territory.
change in well-being	Positive impact that will contribute with: ➢ Reducing pressure on forests and avoiding conversion to other land uses through actions that increase the capacity to manage and control the territory. ➢ Improvement of the management capacity of the leaders for the exercise of governability and governance in the environmental management of the territory. ➢ Improvement of regulations on the use and exploitation of goods and services in the territory.

Table 30. Description of expected community impacts of the PANI REDD++ project: PANI *territory developed in a sustainable way*

Impacts	**The PANI territory developed in a sustainable way.**
Type of benefit, cost or risk	Direct benefit projected on the people and the territory they inhabit, which is expected to be obtained through actions to improve social infrastructure, boost the economy, leverage sustainable productive initiatives for entrepreneurs, and strengthen higher education and research
change in well-being	Positive impact that will contribute with: ➢ Promote the development of productive activities and/or sustainable use of the forest as a measure to prevent the change of land use from forest to non-forest. ➢ Improvement of social services for PANI families. ➢ Improvement of the income of PANI families by making use and exploitation of the goods and services derived from the territory and the forest. ➢ Incorporation D2:E3 of conservation elements to carry out activities for the use and exploitation of the forest and the territory. ➢ Incorporation of actions for the management of species based on traditional knowledge, which considers animals, plants, water, saltwater, ravines and others as an integral part of the territory. ➢ Generation of qualified local human talent with traditional knowledge about the territory and the forests, as a fundamental value for the protection of the forest and its ecosystem services. ➢ Creation of new knowledge that translates into behaviors based on traditional practices on decision-making on the use and exploitation of goods and services derived from the territory and the forest. ➢ Reduction of non-sustainable and/or illegal activities settling within the territory and endangering biodiversity and associated ecosystem services.

4.2.2 Negative Community Impact Mitigation (CM2.2)

The negative impacts of the project were determined through assembly scenarios, which made it possible to generate a mitigation strategy for them, linked to the activities to be developed and based on the nature of the project (Table 31).

Table 31. Mitigation strategies for negative community impacts of the REDD++ PANI project.

negative impacts	Mitigation Strategy
Problems and/or internal conflicts of the organization and/or its communities	<u>Administration and transparency mechanism.</u> An Executive and a technical committee were established, with oversight by the general assembly. Developing a robust implementation scheme that has the participation of representatives of all the communities of the association, in turn with all the secretaries.
Problems and/or internal conflicts of the organization with Organizations that work in the area and/or neighbors.	<u>Mechanism for PQRSD care</u> A system of Petitions, Complaints, Claims, Reports and Suggestions (PQRSD) will be designed and implemented, which will allow disappointing all requests associated with the organization and its communities.
Planning problems, forms and execution times.	<u>POAS, strategic lines and implementation of activities with schedules</u> The project will have POAS with clear implementation schedules, approved by its Executive Committee, as well as by the general assembly, if required, its coordinator who will be in charge of promoting the activities. Through the PQRSD system, requests regarding the strategic lines and their schedules will also be received. The technical committee will be in charge of preparing the implementation proposals, as well as the schedules, taking into account all the variables that arise due to access to the territory and others, so that the schedules are very close to reality.
Deficient or biased participation and/or linkage of the communities or secretaries	<u>Establishment of committees with the effective participation of the community, and prior consultations with the administrative body</u> The project will not have preferences for any community and/or implementation sector. For this, the development of the activities of the POA approved in an assembly with the participation of representatives of all the communities and sectors of the association will be carried out in the planned places, by the people who meet the skills and/or capacities defined according to the type of activity, its objective and the budget. The strategic plan developed includes the project activities that consolidated the different initiatives that have been worked on and/or implemented in the territory, seeking to represent all sectors and/or communities. The realization of each activity of the project will begin with a call to those interested in joining and / or participating in it.

negative impacts	Mitigation Strategy
Ineffective socialization processes and communication channels	The socialization to guarantee knowledge of the project, as well as its impacts, and record the observations and perceptions of the participants, has been carried out, and will continue to be carried out, through Assemblies, and/or visits to communities, being a direct and effective relationship. . Specific communication channels have been established in the project for each public, adapted to the dynamics of the area, the communities and the needs presented in the initial phase. Communication in the project is carried out through contact in the field, and call from the area that has an internet connection (PNN Cahuinarí).
Problems in the allocation of project benefits.	Benefit Distribution System (SDB) Resource allocation problems will be avoided by a benefit distribution system, which specifies the types of benefits (ecosystem, social, cultural and economic), actions to be developed, resources for each strategic line, and responsibilities, all under the principles of trust, transparency, respect, coordination and compliance. With this mechanism, the communities will have clarity about the resources received by the project and the way in which they will be executed in the territory.

Source: Prepared by Biotrade SAS (2022).

4.2.3 Net Positive Community Well-Being (CM2.3, GL1.4)

As has been described throughout this document, the PANI has weaknesses in the self-management of its territory, which is why there are failures in the implementation of actions and instruments that allow them to manage it strategically. Most of these weaknesses arise due to educational and economic barriers. The association has been developing activities for the conservation and sustainable management of its territory, however, these activities continue to be limited by access to environmental education, knowledge of environmental problems, the importance of species in the ecosystem, management and ways of solving conflicts between humans and species, and a lack of a stable economy that allows the inhabitants of PANI to have basic living conditions solved, without depending solely on their territory, putting at latent risk the initiatives and strategies implemented by the association in the articulation of conservation and the way of life of the inhabitants of PANI.

Since the creation of the PANI Association, it has ensured the conservation of its territory, joining forces with the organizations present in the Colombian Amazon, demanding their interest in caring for the natural resources and the people who inhabit the territory, since that he is not alone, he has settled communities in which they are directly affected if something happens to him. This is how the PANI association sought the implementation of a mitigation project that allows it to self-manage its territory, reducing deforestation and/or degradation in the area, continuing with the conservation activities that it has developed together with the organizations, including the REM activities, while developing and executing social, economic and territorial planning policies for the association, allowing it to improve the quality of life for its inhabitants.

In this way, the long-term impacts on the well-being of the members of the association are expected to be positive, compared to the conditions exposed in the scenario without the project, in which the conservation activities to the PICs, the sustainable management of the forest, the hunting and fishing agreements, the generation of income and sustainable productive activities, are constantly at risk since the association does not have the management capacity and sufficient resources to maintain them. In the absence of the project, the advances that have been made so far in the autonomous management of its territory would be in danger, it would not be possible to have an efficient monitoring and control of the activities or situations that could affect the territory.

The PANI REDD++ project will meet the "Gold Level" standard for biodiversity and community benefits through the programs and activities defined in the strategic lines of the project (see Section 2.1.11, Table 9). Within these strategic lines , programs will be carried out that will have a positive impact on the conservation of biodiversity and communities. The programs of these strategic lines that will generate net positive well-being for the community are described below (**¡Error! No se encuentra el origen de la referencia.**):

Table 32. Strategic lines and programs of the PANI REDD++ Project that will contribute to achieving the "Gold" standard in biodiversity and community .

Strategic line of the project	Programs that will generate net positive impacts on biodiversity and the community
Consolidation of self-government	The objective of the programs that are part of these strategic lines is to strengthen the PANI communities, and thus increase autonomy and governance over their territory. The governance of the communities is essential for the protection of their cultural values, the sustainable management of natural resources, and the conservation of the biodiversity of the PANI territory.
Strengthening traditional knowledge	
Actions for the sustainable development of the PANI territory	This strategic line has programs such as: *i) Improvement of the social, cultural and productive infrastructure for the sustainable development of PANI,* and *Education, Research and technological development,* which will allow the social development of the PANI community, and ii) *Production and sustainable commercialization of goods and services of the territory* , where direct actions will be implemented to improve the economic income of the people of the PANI community, through environmentally and financially sustainable productive activities.
monitoring and control	The programs of this line that have a direct influence on the governance of the territory are: i) *Control, vigilance and monitoring of the actions of the PANI* , since in this program actions will be developed for the follow-up and control of what happens within the territory, and *ii) Monitoring of social and environmental safeguards,* which will guarantee the protection of the rights of the indigenous communities of the PANI, at the same time that actions are carried out to improve the quality of life and of the ecosystems present in the PANI territory.

Source: Prepared by Biotrade SAS (2022).

4.2.4 High Conservation Values Protected (CM2.4)

None of the HCVs related to community well-being (Section 4.1.3) will be negatively affected by the PANI REDD++ project. The project activities, described in Section 2.1.11, are aimed at their conservation.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (CM3.1)

Each of the expected impacts of the PANI REDD++ project on other stakeholders are presented below:

community group	PNN Cahuinari
Impacts	Self-management of the PIC conservation activities agreed in the REM and Generation of actions that help resolve socio-environmental conflicts and promote the protection of PICs.
Type of benefit, cost or risk	Direct benefit projected on the project area and the overlap with the PNN Cahuinarí that is expected to be obtained through the implementation of the monitoring actions of the PICs agreed in the REM, as well as the design and implementation of monitoring programs of the PIC agreed in the REM.
change in well-being	Positive impact that will contribute with: • Diagnosis of the current state of the forest in the PANI territory and generates actions that strengthen its protection, conservation and management. • Generation of capacities so that the association and the PANI families have information for making their decisions on the conservation, use and exploitation of the territory. • Surveillance and reporting of changes in the population dynamics of flora and fauna species considered to be of high conservation value.

community group	All identified stakeholders (Section 2.1.8)
Impacts	Transparent management of information and administrative and financial processes within the PANI and with third parties.
Type of benefit, cost or risk	Direct benefit to all interested parties that is expected to be obtained from the start-up of the PANI Indigenous Council with the capacity to administer its territory and the recognition of the PANI association as an Indigenous Territorial Entity, generating a transmission of information, communication and formal planning, between the ETI, neighbors, local authorities, NGOs, and other stakeholders (section 2.1.8)
change in well-being	Positive impact that will contribute with:

	• Reduces pressure on forests and prevents conversion to other land uses through actions that increase the capacity to manage and control the territory. • Improves the management capacity of the leaders for the exercise of governability and governance in the environmental management of the territory. • Improves the rules on the use and exploitation of goods and services in the territory.

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

The negative impacts on other stakeholders of the project were determined through assembly scenarios, which allowed generating a mitigation strategy for them, linked to the activities to be developed and based on the nature of the project (Table 33).

Table 33. Negative impacts on other stakeholders and mitigation strategies.

Negative impacts	Mitigation Strategy
Internal problems and/or conflicts of the organization with organizations that work in the area and/or neighbors	Administration and transparency mechanism The project has established and will continue to develop briefings prior to the implementation of activities, seeking that all interested parties are informed of the project process and can contribute their recommendations, guaranteeing transparency throughout the process. Mechanism for dealing with PQRSDSA system of Petitions, Complaints, Claims, Reports and Suggestions (PQRSD) will be designed and implemented, which will receive all requests related to problems and/or conflicts with institutions, community associations, in addition to requests regarding planning and coordination of activities in the territory.
Poor or biased engagement of local and regional authorities, NGOs and other stakeholders	Methodological plan for the identification of interested parties and activities that have supported and/or developed in the territory, with the active participation of the community. The project has identified the interested parties that have directly worked with the PANI, in order to give them participation in the coordination of activities in common with the association in favor of the

Negative impacts	Mitigation Strategy
	conservation of their territory. The actors that were identified as important for the association and therefore for the project, have been informed and consulted. At the same time, the strategic plan developed includes the activities of the project that consolidated the different initiatives that have been worked on and/or implemented in the territory, seeking not to leave any out and have the results of those previous activities in less time, or continue each process.

Source: prepared by Biotrade SAS (2022).

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

The project hopes that the impacts on other stakeholders will be positive, taking into account the conditions that have been described in the scenario without the project, all of which have encountered logistical, management, political, and economic limitations, and the disarticulation of actors, which that has generated isolated processes of technical and scientific studies and productive initiatives, with little continuity, without contributing to the objectives of the PANI life plan. With the implementation of the project, it is expected to overcome all these limitations and achieve the projected positive impacts for the interested parties.

4.4 Community Impact Monitoring

4.4.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The monitoring plan is based on the activities by strategic line of the project (guided by the Theory of Change methodology section 2.1.11) considering the impacts, allowing to assess its effectiveness in maintaining and/or improving the high conservation values related with the welfare of the community. It identifies the stakeholders that are considered to be monitored, the variables, measures, methods, and frequency. The pillars of the monitoring plan are community work and its coordination with the technical team, considering three types of indicators: Product indicators, Result indicators, Impact indicators. In this sense, the following tables detail the monitoring activities and their indicators. for each strategic line.

- **Consolidation of the Own Government**

Indicator/check source	Type	Method	Is there data?	Who measures?[50]	When do you measure?[51]	Who is measured?
Proposed impact indicator: in 2026 have the registration of the PANI association as ETI						
Have the limits adjusted in accordance with IGAC and the ANT.	Product	adjusted map	Yes	IGAC AND ANT	First 2 years.	With the PANI management and technical committee
Updated socioeconomic information	Outcome	Socioeconomic Diagnosis Document	Yes	Project Technical Committee	every 10 years	PANI people and territory.
Proposed impact indicator: in 2026, the capacities in administrative, economic, accounting, financial and public policy areas have been improved for the effective development of self-government of 60% of the members of the PANI steering and technical committee.						
Number of meetings and trainings attended by the members of the PANI committees	Product	Minutes and attendance lists	Do not	Project Technical Committee	Annually	Leaders and team members of the different components of the PANI association.
Impact indicator: in 2026, at least 40% of PANI's technical teams are made up of young people and women participating in management and decision-making.						
Number of events held to strengthen management and leadership capacities aimed at young people and women.	Product	Minutes and attendance list, photos	Yes	Project Technical Committee	Annually	Youth and women of the PANI.

[50]The entity in charge of measuring the indicator must monitor it and report to whoever is in charge of evaluating the indicators.

[51]Regardless of how often the monitoring is done, the entity in charge of the measurement must continuously monitor its evaluation.

- **Strengthening traditional knowledge**

Indicator/check source	Type	Method	Is there data?	Who measures?[52]	When do you measure?[53]	Who is measured?
Proposed impact indicator: in 2026 have the Design of the internal communications strategy and for third parties						
Number of communication mechanisms from the traditional designed	Product	Documents communication mechanisms, minutes, attendance lists	Yes	Project Technical Committee	Annually	PANI communications equipment.
Proposed impact indicator: By 2026 Have an annual program for the preparation and dissemination of visual, audio and/or written material on traditional and cultural practices of the PANI						
Number of videos, audios, writings on traditional and cultural practices of the PANI.	Product	Videos, audios, writings.	Yes	Project Technical Committee	Annually	Communications equipment PANI and ITEWA.
Impact indicator: in 2026 have their own literary, academic and didactic material for teaching and learning of the inhabitants of PANI						
Number of primers, books, teaching material.	Product	Primers, books, teaching material	Yes	Project Technical Committee	Annually	Communications equipment PANI and ITEWA.

[52]The entity in charge of measuring the indicator must monitor it and report to whoever is in charge of evaluating the indicators.

[53]Regardless of how often the monitoring is done, the entity in charge of the measurement must continuously monitor its evaluation.

- **Actions for the sustainable development of the PANI territory.**

Indicator/check source	Type	Method	Is there data?	Who measures?[54]	When do you measure?[55]	Who is measured?
Proposed impact indicator: by 2026 PANI families have at least 60% of basic sanitation facilities in their homes						
Number of actions in water, sanitation and hygiene (WASH) in PANI homes	Product	Number of beneficiary families. Reports, photos, delivery certificates.	Yes	technical committee	Annually	PANI families
Number of homes with electricity service	Product	Number of households benefiting from the connection. Photos, service receipts	Yes	technical committee	Annually	PANI families
Proposed impact indicator: in 2026 construction and improvement of at least 40% of PANI housing						
Number of improved houses	Product	Photos, delivery certificates.	Yes	technical committee	Annually	PANI families
Number of houses built	Product	Photos, plans, delivery certificates.	Yes	technical committee	Annually	PANI families
Proposed impact indicator: in 2026 at least 40% of the people in the PANI with the intention of studying high school, technical and professional with support scholarships.						

[54]The entity in charge of measuring the indicator must monitor it and report to whoever is in charge of evaluating the indicators.

[55]Regardless of how often the monitoring is done, the entity in charge of the measurement must continuously monitor its evaluation.

Indicator/check source	Type	Method	Is there data?	Who measures?[54]	When do you measure?[55]	Who is measured?
Number of high school students receiving scholarships	Product	Minutes, enrollment records, attendance list.	Yes	technical committee	Annually	Students
Number of technical level students awarded scholarships	Product	Minutes, enrollment records, attendance list.	Yes	technical committee	Every 6 months	Students
Number of university-level students receiving scholarships.	Product	Minutes, enrollment records, attendance list.	Yes	technical committee	Every 6 months	Students
Proposed impact indicator: in 2026 at least 40% of families participate in sustainable production initiatives.						
Two productive initiatives marketing inside and outside the PANI territory.	Outcome	Contracts, invoices, delivery certificates, photos.	Yes	technical committee	Every year	PANI entrepreneurs.
Proposed impact indicator: in 2026 have 60% of the PANI entrepreneurship unit						
Number of trainings carried out to strengthen entrepreneurial skills.	Outcome	Minutes, attendance lists, photos.	Yes	technical committee	Every year	PANI entrepreneurs.
Number of people trained with empowered skills in entrepreneurship	Product	Certificates, attendance lists, photos.	Do not	technical committee	Every year	PANI entrepreneurs.
Proposed impact indicator: by 2026, at least 40% of the inhabitants of the PANI have the skills to manage PIC species.						

Indicator/check source	Type	Method	Is there data?	Who measures?[54]	When do you measure?[55]	Who is measured?
Number of trainings carried out to strengthen the capacities of PANI in management plans.	Outcome	Minutes and attendance list	Yes	technical committee	Every year	Leaders Sustainable management PANI
Number of people trained with skills in preparing and implementing management plans	Product	Management plan for PIC, assistance lists.	Yes	technical committee	Every year	Leaders Sustainable management PANI

- **monitoring and control**

Indicator/check source	Type	Method	Is there data?	Who measures?[56]	When do you measure?[57]	Who is measured?
Proposed impact indicator: in 2026, 80% of people participate in control, surveillance and monitoring activities within the PANI territory.						
Number of PICs monitored	Product	Records, reports, photos.	Yes	technical committee	Annually	PANI families
Number of trainings for the implementation of surveillance, monitoring and control of the PANI territory.	Outcome	Attendance lists, photos.	Yes	technical committee	Annually	Secretary of the environment work teams
Number of aquatic and/or land routes carried out by each PIC in the territory.	Product	Records, reports, photos.	Yes	technical committee	Annually	PANI families
Proposed impact indicator: in 2026, 100% of the PQRSD received have been transferred to the corresponding areas						
Number of PQRSD processed	Product	Posts, messages, videos, letters, photos.	NOT	Technical Committee	Every 6 months	With the general assembly of traditional authorities of the PANI

[56]The entity in charge of measuring the indicator must monitor it and report to whoever is in charge of evaluating the indicators.

[57]Regardless of how often the monitoring is done, the entity in charge of the measurement must continuously monitor its evaluation.

4.4.2 Monitoring Plan Dissemination (CM4.3)

The disclosure of the monitoring plan for community benefits will take into account what is described in Sections 2.3.2 and 3.3.4 on dissemination of project summary documents and disclosure of the climate monitoring plan.

4.5 Optional Criterion: Exceptional Community Benefits

4.5.1 Exceptional Community Criteria (GL2.1)

The PANI REDD+ project is an initiative that arose from the heart of the PANI association, in which, based on its life plan and the agreement signed with National Natural Parks, it developed a series of actions that direct the benefits to the vulnerable population. In this sense, the constitutional court of Colombia, through order 004 of 2009, protects the fundamental rights of individuals and indigenous peoples displaced by the armed conflict or at risk of forced displacement, considering that their individual and collective rights are affected by:

- Forced recruitment of minors and young people,
- Sexual and gender-based violence,
- forced prostitution,
- armed confrontations,
- Installation of antipersonnel mines;
- Selective assassinations of authorities, traditional, teachers and health promoters; and Confinement.

On the other hand, by 2020, 42.1% of the inhabitants of the department of Amazonas were within the multidimensional poverty line, which involves 15 indicators in the dimensions: educational conditions of the home; conditions of childhood and youth; Health; work and housing conditions; and access to residential public services.

4.5.2 Short-term and Long-term Community Benefits (GL2.2)

Taking into account the weakness of the PANI in the self-management of the territory and that the project contemplates the generation of community impacts associated with the strategic lines, programs and/or activities of the project, the positive impacts detailed in section 4.2 are estimated as exceptional community benefits. 1 in relation to the increase in the capacity to autonomously manage the territory, and its development in a sustainable way. The community benefits that are expected in the short and long term are detailed in section 4.2.3

4.5.3 Community Participation Risks (GL2.3)

The risks of community participation in the development of project strategies and/or activities were determined through assembly scenarios, which made it possible to generate a mitigation strategy for them, linked to the activities to be developed and based on the nature of the project. Project as follows:

- Internal problems and/or conflicts of the organization and/or its communities: Through the administration and transparency mechanism, an executive committee and a technical committee were established, with oversight by the general assembly. Developing a robust implementation scheme that has the participation of representatives of all the association's communities, as well as all the secretaries.

- Planning problems, forms and execution times: The project will have POAs with clear implementation schedules, approved by its Executive Committee, as well as by the general assembly if required. its coordinator who will be in charge of dynamizing the activities, and the technical committee will be in charge of preparing the implementation proposals, as well as the schedules taking into account all the variables that arise due to access to the territory and others, this in order that schedules are very close to reality.
- Deficient or biased participation and/or linkage of the communities or secretaries: The establishment of committees with the effective participation of the community, and prior consultations with the administrative body will guarantee that the project will not have preferences for any community and/or implementation sector. For this, the development of the activities of the POA approved in an assembly with the participation of representatives of all the communities and sectors of the association will be carried out in the planned places, by the people who meet the skills and/or capacities defined in accordance with the type of activity, its objective and the budget.
- Problems in the allocation of project benefits: Problems in resource allocation will be avoided through the implementation of a benefit distribution system, which specifies the types of benefits (ecosystem, social, cultural and economic) actions to be developed , resources for each strategic line, and responsibilities, all under the principles of trust, transparency, respect, coordination and compliance. With this mechanism, the communities will have clarity about the resources received by the project and the way in which they will be executed in the territory.
- Likewise, the project has safeguarded to the maximum, the effective participation of the PANI in the entire construction process as well as in each of the activities that will be developed in the project (see Section 2.3.10) and all the advances in the consultation, participation and/or socialization are carried out publicly, always seeking to guarantee transparency.

4.5.4 Marginalized and/or Vulnerable Community Groups (GL2.4)

Community Group 1	Members of the communities of Manacaro, Mariapolis, Puerto Remanso, Las Palmas, San Francisco, of the PANI association.
Net positive impacts	According to the constructed ToC, it seeks to improve the autonomous management of its territory, as well as Health, Education, basic sanitation, and livelihoods. What will translate into a good life for the communities in a sustainable way.
Benefit access	The activities of the POA approved in an assembly with the participation of representatives of all the communities and sectors of the association will be carried out in the planned places, by people who meet the skills and/or capacities defined according to the type of activity, their objective and budget, seeking to provide benefits to the largest possible number of people in the association.
Negative impacts	Negative impacts are not expected.

4.5.5 Net Impacts on Women (GL2.5)

The project will generate net positive impacts on the well-being of women, both with their participation in the development of project activities, as well as by ensuring that women participate in decision-making.

Women traditionally already participate in the transmission of the traditional language and in the chagra [58]; The implementation of the REDD++ PANI project will promote the empowerment of women, strengthening their capacities in the sustainable development of their territory. Likewise, it is expected that all community impacts associated with the strategic lines and project activities will also have an impact on women.

4.5.6 Benefit Sharing Mechanisms (GL2.6)

The Benefit Distribution System (SDB) proposed for the REDD+ + PANI project was built in a participatory manner in a general assembly of authorities (February 28 to 21), socialized in the five communities and later approved again in a general assembly of authorities. It proposes a distribution system that is built from the experience of the association, anchoring itself to its own governance and resource management structures. Likewise, it starts from the legal and social recognition of its territory in which its protection is essential to guarantee the multiple benefits: Environmental, social, cultural, economic and political (OPIAC, 2018).

The REDD+ PANI project is presented as a compendium of projects associated with programs that are immersed in the lines of investment or strategies defined to invest in benefits. These intend to have an impact on the cultural, environmental, economic, political and social dimensions of the Miraña and Bora people.

The PANI conceives its forest not as an isolated element, but as an integral part of a territory, of its territory, which they define as *"… Our mother earth is the essence of the procreation of life, therefore it is sacred. Our territory is a territory of praise, of honor; from our mother's breast emanates all creation. It is from herself that the fruits are harvested to feed the creative spirit. The territory is not conceived by all geographical limitations, but also by all worldview or spiritual lines. The territory is also considered as a reproduction of life that is centered and expands and enters into relation with other centers* (PNNC, 2010)*."*

In the different construction spaces of the project, the important aspects to invest were defined. These are based on the development of actions that allow the PANI association to go from an AATI to an Indigenous Territorial Entity (ETI) [59], seeking benefit for the exercise of government (PANI territory) and the environmental governance of the territory and the region in which it is located. immersed Likewise, they propose that cultural practices and traditional knowledge be strengthened, favoring its transmission to new generations and developing materials and spaces for internal and intercultural exchange.

Additionally, a benefit is sought for families by proposing actions for their sustainable development either through investments in social, cultural and economic infrastructure or by promoting paid activities in the areas of conservation, education, research and entrepreneurship. Finally, actions are proposed that benefit decision-making on governance and environmental governance based on strengthening and/or creating mechanisms for the control, surveillance and monitoring of their actions, including those of the REDD+ + PANI project.

[58] Space arranged for agricultural activities, food production for the home.

[59] Application of decree 632 of 2018

4.5.7 Benefits, Costs, and Risks Communication (GL2.7)

As described in section 2.3.4, the information on the expected and real benefits, costs and risks has been communicated to the association, through a general assembly, as well as to each community in an appropriate manner, using colloquial language and didactic tools. To expand in detail the communication with the PANI association, see Sections 2.3.3 and 2.3.4.

4.5.8 Governance and Implementation Structures (GL2.8)

The PANI REDD+ project will be developed within the ancestral territory of the Miraña and Bora indigenous peoples, whose inhabitants are affiliated with five communities that make up the PANI Association of Traditional Indigenous Authorities (Piñe Aaweju Nimue Lachimua) Below is a brief description of the PANI association and its general characteristics.

4.5.8.1 "Piine Ayveju Niimu´e Iaachimu´a" – PANI

Registered as the association of traditional indigenous authorities Bora-Miraña "PIÑE AAWEJU NIMUE LACHIMUA" PANI, in the registry of associations of councils and/or traditional indigenous authorities before the general directorate of indigenous affairs, today the directorate of indigenous, Rom and Minority affairs, as a special public law entity. Through resolution No. 184 of December 19, 2002, with NIT 838000358-1.

4.5.8.1.1 Internal structure

The PANI association has a hierarchical structure that considers the general assembly of authorities as the highest authority, who makes the decisions and leaves the execution to the secretariats of government, territory and environment, ITEWA, Health and Education. The legal representation of the organization is exercised by the government secretary. The general assembly is advised by the traditional council (they advise and give advice from experience and traditional knowledge), likewise, it is advised by an administrative board (See Figure 27).

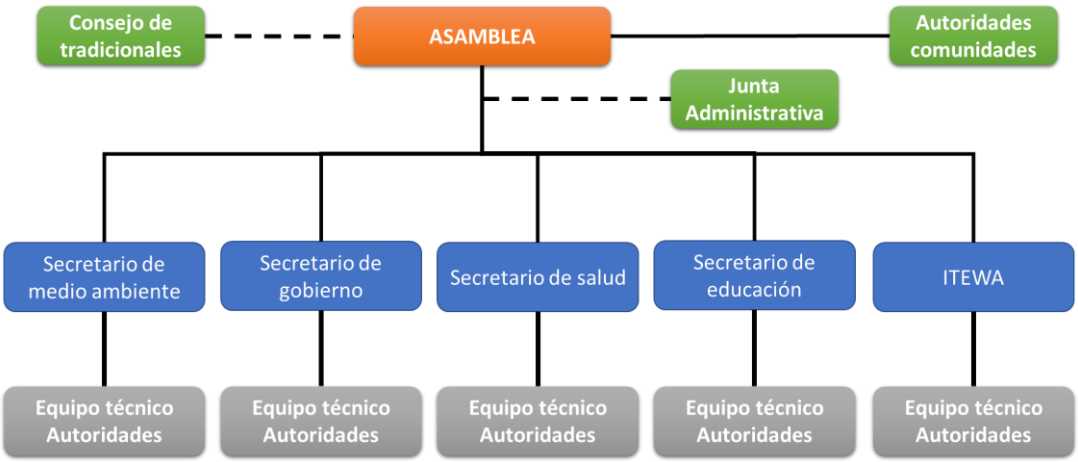


Figure 27. Organization chart association of traditional indigenous authorities PANI . Source: Own elaboration BIOTRADE SAS

4.5.8.1.2 Oversight bodies and mechanism

It consists of two bodies and an oversight mechanism, the first body is the steering committee that is made up of the traditional authorities of each community, the traditional council and the coordinator of the PANI REDD+ Project who will have a voice and a vote, while they may be part professionals or advisers who will only have a voice. The functions of this committee are:

- Be responsible for the actions developed within the project, guiding the achievement of its objectives, goals and ensuring its long-term continuity,
- Submit and propose three-year investment plans and annual operating plans,
- Evaluate the performance of the execution of the project and the fulfillment of its objectives,
- Make decisions regarding project deviations and regain control of the project,
- Evaluate investment proposals for actions within the project,
- Direct strategies and align them with the actions of the project, adjusted to the lines of investment,
- Make proposals about new work methodologies,
- Lead the human talent that is part of the project,
- Convene extraordinary general assemblies for the resolution of conflicts.
- The others that you consider necessary and that are the product of your own spring,
- Prepare and modify its internal regulations and work guidelines to submit them for its own approval, and
- The other functions that are incumbent on him for the exercise of administration, execution and monitoring of the actions of the project.

The second body is the technical committee, which is subordinate to the steering committee, is made up of the leaders of each component (secretaries) and their work teams who will have a voice and a vote within it, plus professionals and advisors who will have a voice but not vote (See **¡Error! No se encuentra el origen de la referencia.**). The functions of this committee will be:

- Establish guidelines and administrative, technical and financial proposals to present to the steering committee on the actions to be carried out within the project, based on the needs of the communities and PANI problems,
- Execute and render an administrative, technical and financial report on the actions carried out during the project,
- Prepare and modify its internal regulations and work guidelines to submit them for the approval of the project's Board of Directors, and
- All those related to the purposes of the project.

The PANI general assembly was established as the oversight body, before which the management and technical committee will report once a year. The assembly also has the purpose of being the mechanism for conflict resolution, since it is the highest authority of the association; this may be convened in an extraordinary manner by the steering committee.

4.5.9 Smallholders/Community Members Capacity Development (GL2.9)

Seeking the effective participation of the PANI inhabitants in each and every one of the activities, the ToC exercise included programs that increase capacities and provide tools, (1.2. Strengthening of capacities for the autonomous management of the territory; 3.2. Education, Research and technological development), thereby seeking to contribute to the objectives of the project. This capacity building will be one of the pillars for the association to be independent, and to maintain its management over time.

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

To describe the existing conditions of the project area, we reviewed primary and secondary sources of the Cahuinarí National Natural Park (PNN by its acronyms in Spanish) region and surrounding areas of the PANI territory area. The threat criteria defined by the International Union for Conservation of Nature (IUCN), red lists and books of threatened species in Colombia, Colombia threatened species list established by Resolution 1912 of 2017 of the Ministry of the Environment and Sustainable Development – MADS (by its acronyms in Spanish)[60], and the Colombian Biodiversity System (SiB) data set.

5.1.1.1 Strategic ecosystems

The project area is in the Amazonia-Orinoquia humid tropical zonobiome (ZBHT-AO), within the transition zone between the Amazon plain and the forests of the upper Río Negro (Murcia, et al., 2007; IDEAM, et al. ., 2017). The predominant ecosystem (85.6%) of this region is the Tropical Humid Forest (Bh-T), characterized by areas with trees higher than 5 meters and crown density higher than 70% (Murcia, et al., 2007). The transitional zone between the low Amazonian plain, the forests of the Alto Río Negro, and the *'salt licks*' (known as '*salados*', in Spanish) comprehends ecosystems with alluvial plains with frequent or sporadic flooding, such as floodplains of the Amazonian rivers with black and clear waters and low and high terraces (Castellanos & Ramírez, 2007) (Table 5) (Figure 9). This dynamics of soil flooding defines the types of floodplain forests of this region, which are: very low overflow (RMB, by its acronyms in Spanish[61]), low overflow (RB), medium overflow (RM), and high overflow (RA) (Walschburger, et al., 1990; Muñoz, et al., 2009).

Table 5. List of general ecosystems present in the REDD++ PANI project area.

General ecosystems	Area (ha)	Percentage (%)
Basal moist forest	1,447,166	85.6
Basal floodplain forest	170,954	10.11
White-Water River	48,308	2.86
Basal Moist grassland	10,470	0.62
Basal floodplain grassland	3,899	0.23
Basal Moist shrubland	2,807	0.17

[60] Available at: http://www.minambiente.gov.co/images/normativa/app/resoluciones/75-res%201912%20de%202017.pdf

[61] "Rebalse My Bajo" (RMB), "Rebalse bajo" (RB), "Rebalso Medio" (RM), and "Rebalse Alto" (RA).

General ecosystems	Area (ha)	Percentage (%)
Secondary vegetation	2,000	0.12
Rocky mountain complexes	1,863	0.11
Transformed transitional	1,331	0.08
Alluvial Lagoon	634	0.04
Mosaic agroecosystem of crops, pastures, and natural spaces	512	0.03
Fragmented forest with secondary vegetation	407	0.02
Basal floodplain shrubland	164	0.01
Crop and Pasture Mosaic Agroecosystem	111	0.01
Fragmented forest with pastures and crops	78	0.01
Total	1,690,704	100

Source: IAVH, IDEAM & IGAC. Map of continental and marine ecosystems of Colombia. Scale 1: 100,000. 2015. IGAC, DANE. Basic information. 2015. Prepared by Biotrade SA S (2022).

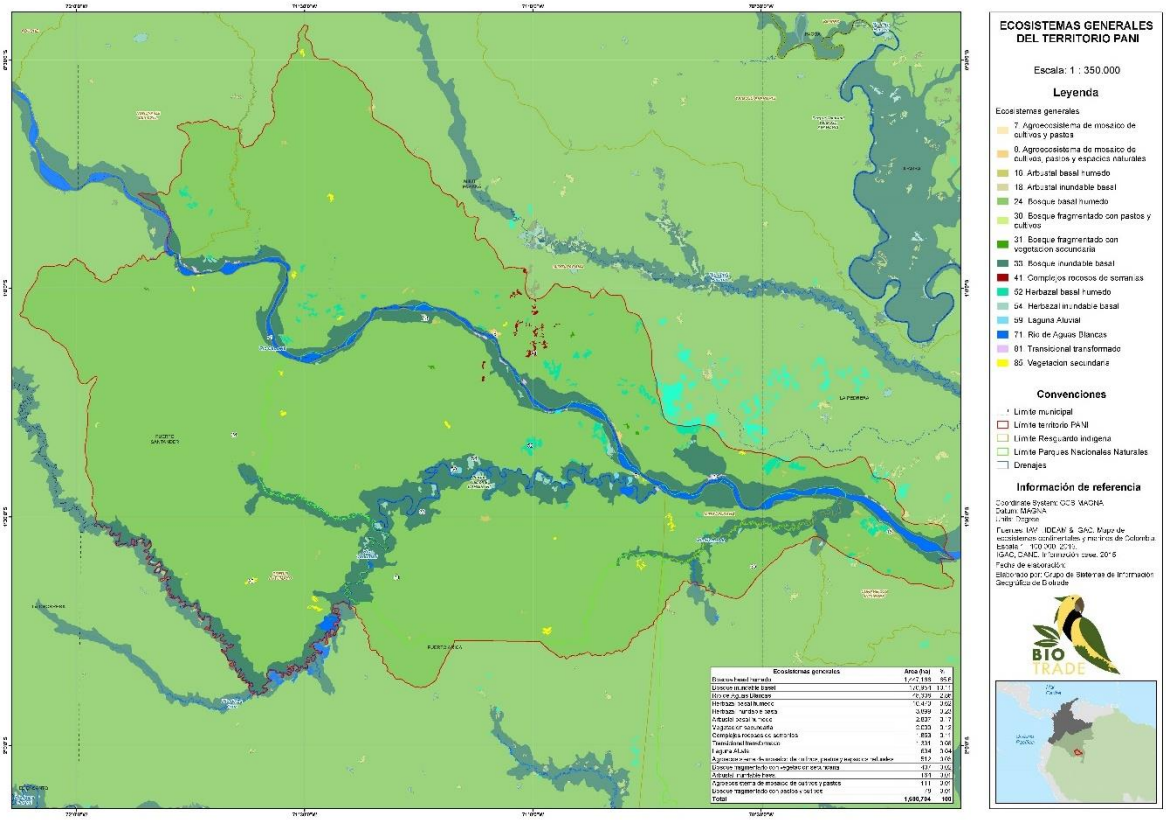


Figure 9. General ecosystems present in the REDD++ PANI project area. Source: IAVH, IDEAM & IGAC. Map of continental and marine ecosystems of Colombia. Scale 1: 100,000. 2015. IGAC, DANE. Basic information. 2015. Prepared by Biotrade SA S (2022).

This region is an important reservoir of biodiversity at the Amazon and national levels, thanks to the biogeographical characteristics, the dynamics of its ecosystems, and the physiographic and climatic conditions (Prieto-C & Arias-G, 2007, PANI & PNN-Cahuinarí, 2010). The Amazon flooded forests are the main source of nutrients for the aquatic ecosystems of the region, which positively influences the fish fauna of this area (Walschburger, et al., 1990; IDEAM, et al., 2017). The Cahuinarí river basin forms a large

floodplain with variable characteristics from its spatial and temporal dimensions, depending on the dynamics of the flood (Walschburger, et al., 1990). In this type of forest cover, there are other strategic ecosystems such as *salt licks*[62]and *cananguchales*[63](Figure 10), which are semi-aquatic and feeding habitats for different species, and favor important ecological dynamics and are regulators of the water resource (Bermúdez-Romero, 2019). In addition, since most Amazonian soils are poor in soluble nutrients, salty soils are key elements for herbivores' habitats in oligotrophic ecosystems (Emmons & Stark, 1979).

99.59% of the covers present in the REDD++ PANI project area are natural, and only 0.4% corresponds to semi-natural and transformed covers, such as secondary or transitional vegetation, fragmented forest with secondary vegetation or with pastures and crops, and transformed, as a mosaic of pastures or crops with natural spaces (Table 6).

Figure 10. Cananguchа palm (Mauritia flexuosa) and its aggregation in cananguchales. Source: Biotrade SAS (2022).

Table 6. Type of covers and their current condition in the REDD++ PANI project area.

Condition	Type of coverage	Area (ha)	Percentage (%)
natural	Dense tall terra firme forest	1,451,369	85.84
natural	Heterogeneous high dense flooded forest	147,370	8.72
natural	Rivers (50m)	38,190	two
natural	Low dense flooded forest	16,460	0.97

[62]Ecosystem units that present characteristics such as soils with high concentrations of salts (such as sodium, calcium, magnesium, and potassium), and are of special importance for herbivorous species, such as the Tapir (Montenegro, 1998).

[63]Forest characterized by aggregation of the palm (*Mauritia flexuosa*), known as "Canagucho" or "cananguchа" in the Colombian Amazon.

Condition	Type of coverage	Area (ha)	Percentage (%)
natural	palm groves	11,454	0.68
natural	Dense terra firma grassland with shrubs	10,510	0.62
semi-natural	Secondary or transition vegetation	4,926	0.29
natural	Dense lowland forest on terra firme	3,116	0.18
natural	Dense grassland flooded with trees	2,482	0.15
natural	Dense bushland	1,542	0
semi-natural	Fragmented forest with secondary vegetation	1,253	0.07
natural	Non-wooded dense floodplain grassland	665	0.04
natural	Natural sandy areas	415	0.02
Turned	Mosaic of crops, pastures and natural spaces	279	0.02
semi-natural	Fragmented forest with pastures and crops	233	0.01
natural	Dense non-wooded terra firma grassland	230	0.01
Turned	Mosaic of pastures with natural spaces	180	0.01
natural	Lagoons, lakes and natural swamps	30	0.01
Total		1,690,704	100

Source: IAVH, IDEAM & IGAC. Map of continental and marine ecosystems of Colombia. Scale 1: 100,000. 2015. IGAC, DANE. Basic information. 2015. Prepared by Biotrade SA S (2022).

5.1.1.2 Flora and fauna

Listed below are some species of flora and fauna found in the project area, which are of exceptional importance to the indigenous communities of the PANI territory, either because of the associated economic or cultural values (PANI & PNN-Cahuinarí, 2010; Miraña & Guiro, 2013). Furthermore, according to the IUCN red list[64], many of these species are listed in threat categories[65] at the global (IUCN) or national level (Resolution 1912 of 2017 of the Ministry of Environment and Sustainable Development - MADS), and therefore their conservation is a priority.

The Amazon region flora is characterized mainly by jungle vegetation on the mainland, permanently or periodically flooded (by black or white-water bodies), defined according to the soil and the water retention capacity (Figure 11). On the other hand, the Amazonian savannahs have sparse non-graminoid vegetation predominance, and in natural or seasonal savannahs Gramineae (graminoid) and complexes predominate in rocky outcrops (Prieto-C & Arias-G, 2007). Additionally, the vegetation of the floodplain forests of the Middle Rebalse (overflow) of the Cahuinarí River presents a high structural complexity, with values well above other tropical forests at the density of individuals, the basal area, canopy cover, and plant diversity (Walschburger, et al., 1990).

[64]Available at: https://www.iucnredlist.org

[65]IUCN Threat Categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Conservation Dependent (CD), Near Threatened (NT), Vulnerable (VU), Endangered (EN), En Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX).

Figure 11. Forest coverage of the REDD++ PANI project area. Source: Biotrade SAS

In the Colombian Amazon, there are almost 7,000 plants species estimated (López & Cardenas, 2002), with high diversity in many groups, such as woody plants. Some of the most representative species of the PANI territory are the Acapú or Cuyubí (*Minquartia guianensis*) (NT) (Figure 12) and the Itatuba (*Mezilaurus itauba*) (VU), among others (Table 7). As for the floodplain forests, in the middle overflow of the Cahuinarí, the high density and diversity of vegetation stand out, with nearly 1,100 species of plants identified in a total area of 5,600 m². Consequently, this region can be considered one of the utmost areas of plant diversity in the Colombian Amazon (Walschburger, et al., 1990).

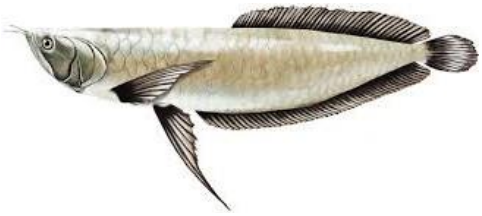
Figure 12. The Acapú or Cuyubí (Minquartia guianensis) is one of the flora species listed as threatened according to the IUCN, in the "Near Threatened" (NT) category. Taken from: UNDP 2021.

Table 7. Some species of flora identified in the PANI territory area

Name scientific	Name common	threat level _	
		Global (IUCN, 2021)	National (MADS, 2017)
Ocotea costulata	Comino real	-	-
Ocotea javitensis	Laurel comino	LC	-
Lepidocaryum tenue	Puy o caraná	-	-
Minquartia guianensis	Acapú	NT	-
Mezilaurus itauba	Itatuba	VU	-
Licania longistyla	Palo cemento	LC	-
Anaueria brasiliensis	Aguacatillo	-	-
Heteropsis flexuosa	Bejuco Yaré	-	-
Heteropsis spruceana	Bejuco Yaré	-	-
Couma utilis	Juansoco de rebalse	-	-
Cedrelinga catenaeformis	Achapo	-	-
Ischnosiphon arouma	Guaruma	-	-
Socratea exorrhiza	Palma Zancona	LC	-
Anthurium flexuosum	Bejuco burro	-	-
Aspidosperma sp.	Costillo	-	-
Mauritia flexuosa	Canangucho	-	-
Manilkara bidentata	Quinilla	-	-
Carapa guianensis	Andiroba	LC	-
Osteophloeum platyspermum	Caracolí	LC	-

Source: MADS Resolution 1912 of 2017 and IUCN Red List (2021).

The REDD++ PANI project area is considered an essential wildlife refuge for the PANI territory. For instance, many species are consumption resources for indigenous communities, such as fish, with more than one hundred species recorded, like the Silver Arawana (*Osteoglossum bicirrhosum*), the Dorado or Gilded Catfish (*Brachyplatystoma rousseauxii*), and the Pintadillo Tigre or Tiger sorubim (*Pseudoplatystoma tigrinum*), with the latter in “Vulnerable” (VU) MADS category (Figure 13**¡Error! No se encuentra el origen de la referencia.**). Equally, other important threatened species stand out, such as the Lowland Tapir (*Tapirus terrestris*) (Figure 14), the otters (*Pteronura brasiliensis* and *Lontra longicaudis*), the Black Caiman (*Melanosuchus niger*), the Wattled Curassow (*Crax globulosa*), the Jaguar (*Panthera onca*) (Figure 15), and the Charapa Turtle or South American River Turtle (*Podcnemis expansa*), among others (Table 8) (Castellanos & Ramírez, 2007). Apropos the Charapa turtle (*P. expansa*) (Figure 16), which is a threatened species (EN), is also a significant object of cultural conservation for the indigenous peoples of PANI. Traditionally, *P. expansa* is related to the Myth of Origin of the Miraña ethnic group (PANI & PNN-Cahuinari, 2010).



Arawana *(Osteoglossum bicirrhosum)*.
Source: PNN

Pintadillo tigre *(Pseudoplatystoma tigrinum)*.
Source: Brooks M. Burr (1994)

Dorado *(Brachyplatystoma rousseauxii)*.
Source: WWF

Figure 13. Threatened Fish species ("Vulnerable" VU, MADS) from the PANI territory. Source: various.

Figure 14. Record of Lowland Tapir (Tapirus terrestris) at Río Puré National Natural Park. Taken from: PNN (2019).

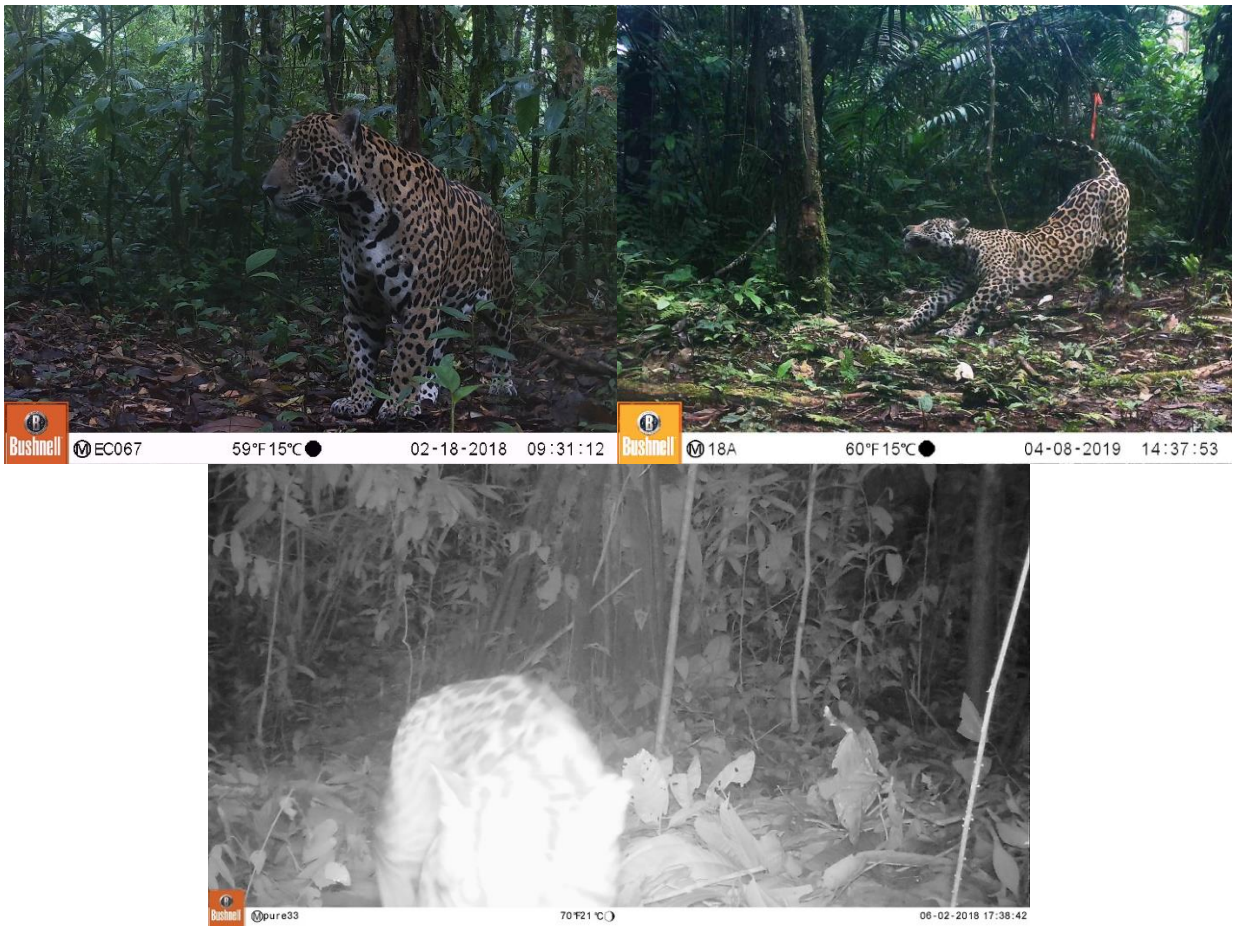


Figure 15. Jaguar (Panthera onca) record in the Amazon. Above: in the framework of the tri-national monitoring of the jaguar and its prey in the Napo-Putumayo corridor. Source: WWF-Ecuador (2020). Below: camera trapping at Río Puré National Natural Park. Source: PNN (2019).

Figure 16. Charapa turtle (P. expansa) on the beaches of the PANI territory. Source: PNN (2020).

Table 8. Some species of fauna identified in the PANI territory area.

Group taxonomic	Name scientific	Name common	Threat category	
			Global	National
Mammals[66]	*Tapirus terrestris*	Danta or Lowland Tapir	VU	VU
	Agouti paca	Agouti or Borugo	LC	-
	Pteronura brasiliensis	Lobo de río (Gigant otter)	VU	VU
	Lontra longicaudis	Lobo de agua (Neotropical otter)	NT	-
	Panthera onca	Jaguar or tigre mariposo	NT	VU
	Leopardus pardalis	Ocelot or tigrillo	LC	-
	Leopardus tigrinus	Leopardo or Northern Tiger Cat	VU	-
	Leopardus wiedii	Tigrillo arborícola or Margay	NT	-
	Leopardus yagouaroundi	Yaguarondi or Jaguarundi	NE	-
	Puma concolor	Tigre Colorado or Puma	LC	-
	Eira barbara	Ulama or Tayra	LC	-
	Myrmecophaga tridactyla	Palmero (Giant Anteater)	VU	-
	Tamandua tetradactyla	Palmero or Southern Tamandua	LC	-
	Bradypus variegatus	Brown-throated Sloth	LC	-
	Dasypus novemcinctus	Nine-banded Armadillo or gurre	LC	-
	Priodontes maximus	Giant Armadillo or trueno	VU	EN
	Alouatta seniculus	Red Howler Monkey or Cotudo	LC	-
	Cebuella pygmea	Pygmy marmoset	VU	-
	Pithecia monachus	Monk Saki or Mico volador	LC	-
	Lagothrix lagothricha	Common Woolly Monkey	VU	-
	Potos flavus	Kinkajou or oso mielero	LC	-
	Tayassu pecari	Cerrillo or White-lipped Peccary	VU	-
	Pecari tajacu	Puerco or Collared Peccary	LC	-
	Mazama americana	Venado Colorado or Red Brocket	DD	-
	Dasyprocta fuliginosa	Guara or Black agouti	LC	-
	Myoprocta acouchy	Tintín or Red acouchis	LC	-
	Nasua nasua	South American Coati or Achuni	LC	-
Amphibians	*Osteocephalus taurinus*	Edible frog or Hylid frog	LC	-
Reptiles	*Podocnemis expansa*	South American River Turtle or Charapa	CD	EN
	Podocnemis unifilis	Yellow-spotted River Turtle or Tericaya	VU	EN
	Melanosuchus niger	Black Caiman	NE	VU
	Chelonoidis denticulata	Yellow-footed Tortoise	VU	-
	Chelonoidis carbonaria	Red-footed Tortoise	-	VU
	Paleosuchus trigonatus	Smooth-fronted Caiman or Babilla	LC	-
Birds	*Crax globulosa*	Wattled Curassow	EN	EN
	Tinamus major	Great Tinamou or Panguanas	LC	LC
	Crypturellus soui	Little Tinamou	LC	LC

[66]Available at: https://mammalogynotes.org/ojs/index.php/mn/article/view/109/93

Group taxonomic	Name scientific	Name common	Threat category	
			Global	National
	Crypturellus undulatus	Ondulated Tinamou	LC	-
	Penelope jacquacu	Spix's Guan	LC	-
	Aburria pipile	Pava cuyubí	CR	-
	Psophia crepitans	Grey-winged Trumpeter	LC	LC
	Nothocrax urumutum	Nocturnal Curassow	LC	LC
	Casmerodius albus	Great White Egret	LC	-
	Nycticorax nycticorax	Black-crowned Night-heron	LC	LC
	Tigrisoma lineatum	Rufescent Tiger-heron	LC	LC
	Mycteria americana	Wood Stork	LC	LC
	Ara ararauna	Blue-and-yellow Macaw	LC	LC
	Ara macao	Scarlet Macaw	LC	LC
	Orange-winged Amazon	Orange-winged Amazon	LC	LC
	Ramphastos tucanus	Red-billed Toucan	VU	LC
Fish	*Pseudoplatystoma tigrinum**	Pintadillo tigre or tiger sorubim	-	VU
	Brachyplatystoma filamentosum	Lechero (bagre) or piraíba	-	VU
	Brachyplatystoma rousseauxii	Dorado (bagre) or gilded catfish	-	VU
	Symphysodon discus	Red discus or Heckel discus	-	-
	Colossoma macropomum	Gamitana or Tambaqui	-	NT
	Osteoglossum bicirrhosum	Silver Arawana	-	VU
	*Sorubimichthys planiceps**	Pejeleño or cabo de hacha	-	NT
	Colomesus asellus	Tamborerito or Amazon puffer	-	-
	Leiarius marmoratus	Barbudo or Sailfin Pim/ Achara Catfish	-	-
	Platynematichthys notatus	Capaz or coroatá/ striped catfish	-	-
	*Phractocephalus hemioliopterus**	Guacamayo or Redtail catfish	-	-
	*Zungaro zungaro**	Amarillo or black manguruyu	LC	VU

Source: MADS Resolution 1912 of 2017 and IUCN Red List. * Migratory species.

5.1.1.3 Threats to biodiversity

Historically, at the beginning and middle of the 20th century in the PANI territory, there were threats or pressures on biodiversity derived from unsustainable productive activities or illegal activities, such as rubber extraction, indiscriminate hunting of animals (where the Charapa Turtle was severely affected), illicit crops and drug trafficking, logging, and illegal gold mining (PANI & PNN-Cahuinarí, 2010; Miraña & Guiro, 2013; PANI & PNN-Cahuinarí, 2022). Nonetheless, many of these threats continued over the years and generated adverse impacts on the ecological integrity of ecosystems and species over time. Thanks to the "Cahuinarí National Natural Park" protected area declaration (1986) (which covers most of the PANI territory), and the establishment of the Special Management Regime – REM[67] (by its acronyms in Spanish) Cahuinarí-PANI (2010), a large part of the Amazon forests have been conserved, mitigated biodiversity threats effects, and reduced landscape transformation to minimal over the last 30 years.

[67] REM: "Régimen Especial del Manejo"

Some of the remnant threats in the REDD++ PANI project area are:

i) Forest deforestation. Mainly related to unplanned occupation phenomena, through the increase of new settlements (Prieto-C & Arias-G, 2007), and changes in land use in response to the needs of the inhabitants (Miraña & Guiro, 2013).

ii) Forest degradation due to unsustainable practices implementation in the short, medium or long term, such as the extraction of fine wood for local consumption, palm leaves for house roofs, and the implementation of chagras in unsustainable ways.

iii) Natural resources overexploitation, through non-sustainable self-consumption productive practices (cultivation or chagra, hunting, fishing and gathering) (PANI & PNN-Cahuinari, 2022),

iv) Fishing activity intensification, which mainly puts large scaled fish species, and catfishes, at risk (PANI & PNN-Cahuinari, 2022).

v) Illegal extractive activities, such as alluvial mining[68] (mainly for gold extraction and to a lesser extent black sands and coltan), drug trafficking (PANI & PNN-Cahuinarí, 2010; Salazar Cardona, et al., 2019; Guio Rodríguez & Rojas Suárez , 2019; PANI & PNN-Cahuinarí, 2022), logging, and wildlife trafficking (Murcia, et al., 2007).

vi) Human-wildlife conflict is related to species such as the Jaguar (*P. onca*), the Giant otter (*P. brasiliensis*), and Collared Peccary or pig (*P. tajacu*). Those species listed before have a broad negative perception of the PANI community. The conflict is associated with a). Jaguar: they attack dogs (community pets), b). Giant otters: Consumption of Charapa turtles (PANI conservation object), or c). Peccaries: chagras damage (affectation to self-consumption resources).

It is important to mention that in the PANI territory area, the indigenous communities carry out subsistence activities[69], such as chagra, fishing, hunting, and collecting fruits or medicinal species, meaning, Non-Timber Products of the PMB Forest (PANI & PNN-Cahuinarí, 2010; Miraña & Guiro, 2013). These productive subsistence activities can cause negative impacts on ecosystems and species if they are not carried out within the framework of a management, follow-up and monitoring plan (to define places, times, and quantities of species used), which ensures sustainability of the use of resources. The indigenous communities of PANI have developed usage agreements for the use of resources, and they use the 'ecological calendar', which is an element that contemplates the cultural and productive norms that govern certain times of the year (PANI & PNN-Cahuinari, 2022). This traditional knowledge is part of the forests conservation culture of the PANI territory, but in the climate change context, the ecological calendar may not have the required information to adapt to current climatic conditions. Therefore, the PANI ecological calendar should be updated periodically so this way the monitoring and sustainable management of the forest is adaptive to the environmental conditions and the knowledge generated by the communities

The so-called '*chagras*' are traditional rotating crop production systems for indigenous communities' self-consumption and are regulated in the PANI Territory Life Plan (Miraña & Guiro, 2013). These production systems are areas of 0.2 to 1.5 hectares where natural ecosystems are transformed, through logging, slash-and-burn activities, to make productive use of the soil (PANI & PNN-Cahuinarí, 2010; Miraña & Guiro, 2013; Muñoz, et al., 2009). The Miraña and Bora ethnic groups have population dynamics characterized by

[68] From 2012 to the present, situations of mining pressure have been recorded within the territory with the presence of illegal gold extraction rafts on the Caquetá River, which affect bodies of water due to mercury contamination (FIP & ADELPHI, 2021).

[69]The subsistence activities of the indigenous communities of the territory are protected and regulated under the REM (PANI & PNN-Cahuinari, 2010)and the Life Plan of the communities of the PANI association (Miraña & Guiro, 2013)

provisional settlements, which vary according to the availability of resources (hunting and fishing) and the possibility of making good chagra (Miraña & Guiro, 2013). This way, the chagras high rotation can potentially be a pressure for soils and ecosystems which are not optimal for exploitation. As a result, the chagra impact can be irreparable in the short rotation time. Moreover, it is also possible that non-sustainable practices are implemented in the territory within these chagra areas, such as the use of chemical inputs for pest control or fertilizers. Those practices, although they are not part of the indigenous culture, can extend to the territory as an alternative to certain circumstances that may be present, such as pests.

Regarding the use of species in the area of the PANI REDD++ Project, between 1950 and 1980 Brazilian and Colombian hunters overexploited wildlife from the territory to obtain fur, skin, and bones (illegal wildlife trade) (PANI & PNN-Cahuinari, 2022). Poaching to obtain fur stood out for being very intense, which is why once the availability of one species was over, the pressure transferred to another species. This way, poaching was initially focused on Crocodilians, such as babillas and caiman black (*M. niger*), followed by otters, and finally, felines (the latter one known as 'Tigrilladas') (Payán & Trujillo, 2006; PANI & PNN-Cahuinarí, 2010; PANI & PNN-Cahuinarí, 2022). In addition, feline poaching required baits and used primates for this purpose (particularly affecting Churucos populations), along with tapirs, Cerrillos or peccaries, and other types of animals. Consequently, this also affect these species (PANI & PNN-Cahuinari, 2022). Finally, the fishing activity intensification has some practices that accelerate shores erosion, and the increase in fishing pressure on large scaled-fish and catfish, due to the increasing demand at commerce (PANI & PNN-Cahuinari, 2022). Although currently these unsustainable extractive activities have been considerably reduced or regulated, they left serious consequences on fauna populations, affecting their ability to recover.

On the other hand, overexploitation of the Charapa Turtle (*P. expansa*) occurred between 1970 and 1980 due to the commercialization of adult females, hatchlings, and eggs, specifically for the purpose of smuggling with Brazil (PANI & PNN-Cahuinari, 2022). After the populations of the species were considerably decimated, sustainable use agreements were implemented in the territory; however, this threat is still present today due to the lack of compliance with these agreements (PANI & PNN-Cahuinari, 2022). In addition to hunting for the fur trade, there was wildlife trafficking (especially primates) that generated the vulnerability of some species populations and even the local extinction of some (PANI & PNN-Cahuinari, 2022).

The Colombian Amazon is one of the regions with ethnic communities most vulnerable to climate change (IDEAM, et al., 2017). In this matter, subjects such as food security, infrastructure, and water resources are high-risk topics. Hence, the Colombian Amazon is considered highly sensitive to climate change and highly low in adaptive capacity, which constitutes a high and very high vulnerability to climate change effects (MADS, 2020). Unfortunately, due to some population dynamics, such as interregional migration, low birth rates, high mortality rates, income from illicit activities, among others, have influenced the loss of traditional knowledge and the reduction of practices associated with the conservation of the biodiversity of ethnic territories (MADS, 2020), which is why the National Development Plan 2018-2022 defines as a priority strengthening the governance of indigenous communities the protection and sustainable use of ecosystems (PND 2018-2022).

5.1.2 High Conservation Values (B1.2)

For the development of this exercise, the project considered the framework of the REM PANI-PNN Cahuinarí (PANI & PNN-Cahuinari, 2010), and the perception of biodiversity by indigenous communities in the context of this project. High Conservation Values for the REDD++ PANI project were analyzed through semi-structured interviews carried out with people from the community of the PANI territory

The assortment of these conservation objects is based on different motivations expressed by the community, from cultural, economic, environmental, positive values, to negative perceptions, due to situations that have arisen in recent years. The High Conservation Values related to biodiversity identified in the project area are:

High Conservation Value	**Amazonian tropical humid forest and salt licks**
Qualifying Attribute	The Amazon region represents about 67% of Colombia's forest cover and is home to 170 types of ecosystems, various vegetation covers, and several fauna and flora species (FIP & ADELPHI, 2021). The terrestrial ecosystems of the Colombian Amazon store 10% of carbon reserves and are essential for the global water cycle (FIP & ADELPHI, 2021). The Amazon rainforest is an important reservoir of biodiversity at the Amazon and national levels due to the biogeographical characteristics, variety of ecosystems and species, physiography, and climate (Prieto-C & Arias-G, 2007, PANI & PNN-Cahuinarí, 2010). In the floodplain forests of the middle overflow of the Cahuinarí river basin, there is a high density and diversity of vegetation, and for that reason, it can be considered one of the areas with the highest plant diversity in the Colombian Amazon (Walschburger, et al., 1990). Additionally, this area reports the presence of 674 bird species (Salaman, et al., 2007), 158 amphibians (mostly endemic species) (Galeano, et al., 2006), 195 reptiles, 2,122 mammals, and 753 fish species. This type of forest and the salt licks, are the habitat of several threatened species, and of economic and sociocultural importance for the PANI communities (PANI & PNN-Cahuinari, 2022). In particular, the salt licks have been affected by the external demand for hunting (trade), which represents a threat to biodiversity, especially for mammals such as the Lowland Tapir (*Tapirus terrestris*), the Boruga (*Agouti paca*), the Black agouti (*Dasyprocta* sp.), the Cerrillo (*Tayassu pecari* or *Pecari tajacu*), and the armadillos (*Priodontes maximus* or *Dasypus novemcinctus*). Therefore, the scarcity of subsistence resources causes food security risk for the community (WWF-Colombia & FPR, 2018). For the indigenous communities of PANI, the forests are their territory, and therefore all the actions they carry out revolve around biodiversity conservation. The salt licks are resources present in forests and have particular characteristics, and they play an essential role in the subsistence of the indigenous peoples of the Amazon basin (Lozano Barrero, 2006). They are part of the Comprehensive Conservation Priorities (PIC[70], by its acronyms in Spanish) established in the REM PANI-PNN Cahuinarí (PANI & PNN-Cahuinari, 2010), and also have a high cultural value in the cosmovision of the indigenous people of the PANI territory (Miraña & Guiro, 2013).
Focal Area	REDD++ PANI project area

[70] PIC: Prioridades Integrales de Conservación

High Conservation Value	**Charapa turtle (*Podcnemis expansa)* and the fundamental ecosystems for its survival**
Qualifying Attribute	*P. expansa* is one of the largest freshwater turtle species in South America and is under the threat category "Endangered" (EN) in Colombia (Resolution 1912 of 2017 of the Ministry of Environment and Sustainable Development - MADS) and in Appendix II[71]. The Charapa turtle commonly inhabits the main rivers of the Colombian Amazon basin, such as the Amazon, Putumayo and Caquetá (Castellanos & Ramírez, 2007), and together with the fundamental ecosystems for its survival, they are defined as Comprehensive Conservation Priorities (PIC, by its acronyms in Spanish) of the REM PANI-PNN Cahuinarí (PANI & PNN-Cahuinari, 2010). The ecosystems that are part of the habitat of the Charapa are the spawning beaches on the Caquetá river, and the Cahuinarí river lake system (PANI & PNN-Cahuinari, 2022). The Charapas population of the Caquetá River represents the largest population of nesting females in Colombia, since in the other basins their populations have been drastically decimated (PANI & PNN-Cahuinari, 2022). The strongest threat to *P. expansa* is indiscriminate hunting for meat, eggs, and oil (Prieto-C & Arias-G, 2007), especially between 1970 and 1980 (PANI & PNN-Cahuinari, 2022). Although under the guidelines of the PANI Life Plan and the REM PANI-PNN Cahuinarí, there are agreements are established for the exploitation and use of species (including Charapa bushmeat) and control and surveillance actions. It is necessary to evaluate the state of the Charapa populations recently. From the PANI indigenous cosmovision, the Charapa turtle is related to the Miraña ethnic group origin myth: "*One of the gods, an ancestral being, gave flesh and blood to the Charapa, materializing it and giving it to all the grandchildren so that they will feed on it. The myth is expressed through rites associated with the species, such as the Charapa dance, which allows the social regulation of its use"* (PANI & PNN-Cahuinari, 2010).
Focal Area	REDD++ PANI project area

[71] CITES Appendix II: Species not necessarily threatened with extinction, but may be unless trade is tightly controlled.

High Conservation Value	**Jaguar or Tiger (*Panthera onca)***
Qualifying Attribute	The jaguar (*P. onca*) is the largest feline in the Americas (70 kg) (Payán Garrido & Soto Vargas, 2012), and it is estimated that the species has lost half of its historical distribution, especially in the Mesoamerican region (de la Torre, et al., 2017) (Wultsch, et al., 2016). The jaguar or butterfly tiger has an IUCN threat category: "Near Threatened" (NT) and is in Appendix I[72]of CITES. However, in Colombia, the species is considered "Vulnerable" (VU) (Resolution 1912 of 2017 of the Ministry of the Environment and Sustainable Development - MADS). The Jaguar is considered a flagship species due to its requirement for large areas and as a top predator in the Neotropics (Jędrzejewski, et al., 2018). In South America, the Amazon is considered the most significant habitat for the long-term survival of *P. onca* and most large mammals that depend on tropical lowland forests, and this region is the largest continuous habitat for jaguars in existence (5,844,320 km^2) (Payán & Escudero-Páez, 2015). The Colombian Amazon is one of the areas of the country with the highest representation of protected areas with jaguars (6,847 km^2), and within these protected areas is the PNN Cahuinarí with 5,569 km ^{2} (Payán Garrido, et al., 2016). There are an estimated 9,882 jaguars[73]in the Amazonian UCJ (Jaguar Conservation Unit), thanks to the fact that the Colombian Amazon has low tropical humid forests, and throughout the landscape, there is homogeneity and connectivity (Payán Garrido, et al., 2016). The main threats in the Amazon region to the *P. onca* populations, and in general large mammals, are ecosystems transformation, logging, colonization, and illegal mining that come from the Andean region from Leticia and the border with Brazil (Etter, et al., 2006). Jaguars' habitat transformation highly constrains their presence (Jędrzejewski, et al., 2018), which generates displacement of populations to areas of high isolation and inaccessibility (Gónzalez Maya, et al., 2008). Protected areas have a fundamentally positive impact on the persistence of jaguar populations (Jędrzejewski, et al., 2018). PANI territory, which encompasses the entire Cahuinarí National Natural Park, has optimal conditions to maintain the *P. onca* populations because, in addition to being a protected area, the indigenous activities impact is low. However, in recent years conflict between jaguars and residents has increased due to attacks by jaguars on pets (dogs), and therefore jaguars are hunted as a retaliatory measure. Due to the conditions of the

[72] Appendix I: most endangered species on the CITES list, threatened with extinction. CITES prohibits international trade.

[73]Under a conservative density of three jaguars in 100 km ^{2} (Payán Garrido, et al., 2016)

	species, not only at the national level but globally, it is necessary to evaluate these situations of conflict with the jaguar and propose conservation alternatives and management.
Focal Area	REDD++ PANI project area

High Conservation Value	**Tapir (*Tapirus terrestris)***
Qualifying Attribute	The Danta or Lowland tapir (*Tapirus terrestris*) is the largest land mammal in the Amazon rainforest (Montenegro, 1999)and is listed globally (IUCN) and nationally (MADS Colombia) as a Vulnerable species (VU) and is in Appendix II of CITES. The Tapir is a great seed disperser (especially palm seeds) (MADS, 2005; Tobler, et al., 2009) as it has large spatial requirements and preferences for certain types of habitat in good condition (they do not tolerate degradation easily) of the habitat) (Cruz, et al., 2014). Thus, the main threats to *T. terrestris* are hunting and habitat alteration, fragmentation, and destruction (Brooks & Eisenberg, 1999; MADS, 2005). *T. terrestris* inhabit different ecosystems types, but they generally prefer secondary forests due to the wide availability of shoots (stimulated by the entry of light in this type of forest) for their consumption (Garcia, et al., 2012). In the Amazon Basin, tapir populations are highly related to the salt licks, which they regularly visit to drink water and consume edaphic materials (geophagy) (Lozano Barrero, 2006). The availability and abundance of fruits consumed by the tapir are determining characteristics of the use of the habitat of the species, and therefore places such as salt licks or *cananguchales* are of great importance for the populations of *T. terrestris* (Vélez, et al., 2017). Traditionally, the Bora Miraña indigenous peoples consume Tapir. Nonetheless, within the REM PANI-PNN Cahuinarí, it has been established agreements of species use, where is included not only the Tapir, but also the Charapa and Tericaya turtles, peccaries, and Boruga are included (PANI & PNN-Cahuinari, 2022). However, *T. terresitris* is one of the most hunted species, due to its commercial value which generates economic resources for the PANI communities. Like other species, the tapir suffered from overexploitation in the 1950s. The tapir was used indiscriminately for the meat trade, and used as bait to hunt felines, alongside primates, matchsticks, and other medium to large mammals (PANI & PNN-Cahuinari, 2022). This situation wreaked vast havoc on the tapir populations. So far the indigenous communities' perception of the REDD++ PANI project area is that the Tapir population has decreased and "is no longer easily found." The tapir is one of the five species defined as an Integral Conservation Priority (PIC) in the REM PANI-PNN Cahuinarí.

Focal Area	REDD++ PANI project area

High Conservation Value	**Pintadillo tigre (*Pseudoplatystoma tigrinum)***
Qualifying Attribute	The Pintadillo tigre (*Pseudoplatystoma tigrinum*) is a carnivorous species that feeds on small-sized fish and lives in the main channel of whitewater rivers. *P. tigrinum* has long-distance, longitudinal and cross-border migrations (Lasso & Sánchez-Duarte, 2015) associated with reproductive events (Agudelo, 2015). The Pintadillo tigre is cataloged at the national level (MADS Colombia) as a Vulnerable species (VU). The large catfish, known as striped catfish or Pintadillos, which are distributed in the Amazon basin (Apaporis, Caguán, Cahuinarí, Caquetá, Mesay, Miritíi-Parana, Orteguaza, Putumayo) are *Pseudoplatystoma punctifer* and *Pseudoplatystoma tigrinum* (Agudelo, et al., 2011). From the fishing point of view, the most significant catfish family is Pimelodidae (Lasso & Sánchez-Duarte, 2015), to which P. punctifer and P. tigrinum belong. Therefore, it is not surprising that these are some of the most exploited species in the PANI REDD++ project area (Bermúdez-Romero, 2019), either for local consumption (subsistence) or for trade (Agudelo, 2015). *P. tigrinum* is a threatened species in Colombia, and it has a high fishing pressure. However, the population dynamics and trends of this species are highly unknown. From 1950 to the present, fishing intensification, modification, and new fishing gear technologies, the entrance of collection centers, such as cold rooms or refrigerated storage, increased the fishing pressure on large-sized catfish for their commercialization. In 2015 (Agudelo) recorded a catch decrease in landings of large catfishes, including *P. tigrinum*. This type of fish has biological characteristics such as large size, long-distance migration, no parental care, slow growth rate, late maturity, thus more vulnerable to threats such as overexploitation (Agudelo, 2015). For the communities of the PANI territory, the development of fishing management that allows food sovereignty (subsistence fishing) and the sustainability of the commercialization of fishing resources is essential.
Focal Area	REDD++ PANI project area

5.1.3 Without-project Scenario: Biodiversity (B1.3)

Although the PANI territory area is mostly (~ 85%) within the system of protected areas of Colombia (PNN Cahuinarí), it is a priority to ensure that the actions carried out throughout the territory, including those outside the PNN Cahuinarí, are aligned with the conservation of biodiversity and ecosystem services in the region. Jointed management processes, such as those established by the Special Management Regime – REM Cahuinarí-PANI (2010) and the PANI Life Plan have achieved that most of the Amazonian forests in

the region are conserved. However, the territory extension is massive, and it is necessary to guarantee that regulations should be effective both spatially and temporally. Therefore, this will prevent pressures or threats from persisting, worsening, or appearing and avoid the environmental unsustainability of the area. Due to public order situations, PNN Cahuinarí officials have not been able to enter the territory for two years, time since local employees and communities have been the ones who have continued conservation actions and protected the integrity of the area.

The scenario of the PANI territory area without REDD++ PANI project implementation suggests that the threats to biodiversity (section 5.1.1.3.) will continue, and in many cases, they will increase, and threats previously considered only as "potential" may appear or reappear. Table 33 below details the environmental impacts of this scenario and how they will affect biodiversity:

Table 34. Scenario without the REDD++ PANI project and the impacts on biodiversity.

Threats	Impact environmental	Impact on biodiversity
Non-sustainable[74] transformations to ecosystems (vegetable cover and soils) for the production of food for self-consumption	Fragmentation and degradation of forest ecosystems and reduction of biological corridors	• Reduction and degradation of ecosystems, especially forests. • Reduction or disappearance of ecosystem services • Loss of structure and biotic composition of ecosystems • Habitat degradation or destruction increases the vulnerability of species. • Loss of ecological connectivity at the landscape level.
Use of resources and **unsustainable production practices**	Natural resources overexploitation (logging, hunting, and fishing)	• Food chains destabilization (associated with indiscriminate hunting) • Loss of the structure and biotic composition of ecosystems, and therefore decrease or loss of habitat quality
	Soil and water bodies contaminated by chemical inputs or residues	• Degradation of the natural composition of soils and bodies of water • Decreased water quality
Mining illegal	Heavy metal pollution and alteration and destruction of beaches	• Bioaccumulation of heavy metals in flora and fauna, especially for aquatic species. • Decreased water quality. • Habitat (beaches) loss for valued species such as the Charapa Turtle.

[74] It is essential to clarify that, within the framework of the REDD++PANI project it is not intended to disrupt the ancestral practices, cultural values, or traditions of indigenous peoples. The project objective will not seek to stop the "*chagras*" or their related actions. We define **unsustainable situations or practices** if some actions related to these practices that have or could have negative environmental impacts. In such a case, the project will work with the communities on mitigation measures that are culturally and environmentally appropriate.

Threats	Impact environmental	Impact on biodiversity
felling illegal	Fragmentation and reduction of biological corridors	• Loss of structure and biotic composition of ecosystems
Illicit coca crops and drug trafficking	Deforestation, fragmentation of forest cover, and contamination of water sources with chemical residues	• Habitat degradation or destruction increases the vulnerability of threatened species. • Decreased water quality.

Source: Prepared by Biotrade SAS (2022).

Although compared to other areas of the Colombian Amazon (such as the Piedemonte or the Alto-Putumayo zone), the ecosystems of the department of Amazonas do not present high levels of transformation (SINCHI, 2007). Given the socioeconomic context of the REDD++ PANI project area, it is necessary to promote and strengthen the local governance of indigenous communities from a capacity-building, community monitoring, and environmental management approach that helps conserve strategic ecosystems, ecosystem services, and adaptation to the effects of climate change. In this scenario, The REDD++ PANI project will design and execute conservation and sustainable management actions for the PANI territory. The project aims to prevent the occurrence of unsustainable activities that could affect the ecological integrity of the region, and also safeguard the fundamental rights of indigenous communities.

Thanks to the PANI Association's extraordinary capacity for management and community work in favor of conservation has worked with other institutions. Therefore, the PANI community has the potential to develop tools and abilities for the environmental and social organization of their territory. However, PANI has not had sufficient autonomy to lead its processes and has been working for third parties. On many occasions, the institutions, and particularly the Colombian Government[75], do not show the will to support the sustainable development processes that the PANI community requires, like capacity building, support for surveillance and control of the territory, new business development with the use of local species (such as, to develop productive projects), the rescue of indigenous handicrafts, among others. The lack of local governance and inaction of the Colombian Government contributes to the persistence of the threats to biodiversity described in this section and, for this reason, the PANI community must achieve autonomy and self-management of the territory to execute their Life Plan and then guarantee the survival of the Amazonian indigenous peoples.

[75]In 2016, the indigenous communities of the Miraña and Bora Peoples established a '*tutela*' (legal action) against the Colombian Government due to the establishment of illegal mining in the territory and the ineffectiveness to resolve this situation. Through this guardianship action, the Miraña and Bora requested the protection of the fundamental constitutional rights to life, cultural identity, food security, cultural and territorial integrity.

Available at: https://www.ramajudicial.gov.co/documents/10635/14766768/2017-1029++ACCI%C3%93N+POPULAR-+DDA+YANEXOS%281%29%20%20DR+DIMAT%C3 %89.pdf/ab575387-cb69-41ee-9507-015d254b255c

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

As a result of the actions of the PANI REDD++ Project, the following changes are expected:

Biodiversity Element	Flora
Estimated Change	Positive
Justification of Change	The actions of the REDD++ PANI project will contribute to reducing the fragmentation and degradation of forest ecosystems and recovering or preserving their structure and composition of vegetation, improving and guaranteeing the ecological integrity of the different habitats they encompass. The project impacts on flora will be verified through follow-up actions and participatory monitoring. Monitoring of ecosystems and flora, described in Section 5.4.1.

Biodiversity Element	Fauna
Estimated Change	Positive
Justification of Change	The fauna, principally represented by those considered to have High Conservation Values and those monitored, will benefit from the activities to be carried out within the framework of the PANI REDD++ Project, specifically through those aimed at regulating the sustainable use of natural resources (logging, hunting, and fishing), and avoid overexploitation of these. Also, the vegetal covers improvement will contribute to conserving the habitats of the fauna species of the PANI territory. The project impacts on fauna will be verified through follow-up actions and participatory monitoring. Monitoring of ecosystems and flora, described in Section 5.4.1.

5.2.2 Mitigation Measures (B2.3)

The REDD++ PANI project will not generate negative impacts on biodiversity. In the REM Cahuinarí-PANI, natural resources use is allowed within the limits of the territory with suitable techniques and in a controlled manner. Thus, the negative impacts are not generated at the conservation area (PANI & PNN-Cahuinarí, 2010; PANI & PNN-Cahuinarí, 2022).

5.2.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

Throughout the execution of the PANI REDD++ project, the threats to biodiversity (section 5.1.1.3.) and the environmental impact scenarios without the project (section 5.1.3.) are expected to be counteracted or mitigated. In this way, the project will have net positive impacts on biodiversity, such as (Table 9):

Table 9. Scenarios without and with the REDD++ PANI project and the expected net impacts on biodiversity.

Scenario without the project	scenario with the project	Net positive impacts on biodiversity
Fragmentation and degradation of forest ecosystems	Conservation of ecosystems and use of plant covers and soils in a sustainable manner	• Reduction in CO2 emissions due to forest degradation. • Maintenance of the ecological attributes of biodiversity at the landscape scale, such as connectivity, heterogeneity, and fragmentation. • Maintenance of the ecological integrity of soils and bodies of water. • Improvement of water quality. • Conservation of the functional relationships of ecosystems • Maintenance of ecosystem services.
Overexploitation of natural resources (logging, hunting, and fishing)	Sustainable use of natural resources	• Conservation of biodiversity and protection of threatened and key species
Pollution by heavy metals or chemical residues, related to illicit activities	Reduction of illicit activities in the project area	• Improvement in the ecological integrity of aquatic ecosystems • Restoration or improvement of the ecosystem services of water supply.

Source: Prepared by Biotrade SAS (2022).

The REDD++ PANI project will meet the “Gold Level” standard for the benefits of adaptation to climate change, through the programs and activities that will be developed along all the strategic lines of the project (section XXX). Through these lines, the project will seek to promote and strengthen local governance (self-government) of indigenous communities from a capacity-building, community monitoring and environmental management approach, for the conservation of strategic ecosystems, ecosystem services and adaptation to the effects of climate change, safeguarding the fundamental rights of indigenous communities.

Especially, from the strategic lines: " Actions for the sustainable development of the PANI territory", and "Monitoring and control", programs will be carried out that will have direct positive impacts on biodiversity, through adaptation to the potential impacts of climate change, as described below in Table 10:

Table 10. Strategic lines and programs of the REDD++ PANI project that will contribute to adaptation to climate change.

Line project strategy _	Programs that will generate net positive impacts on biodiversity
Actions for the sustainable development of the PANI territory	This strategic line has programs such as: *i) education, research and technological development,* within which studies will be formulated to evaluate and monitor possible climate change scenarios in the territory, and mitigation and adaptation measures in this context, and ii) *Conservation of biodiversity and ecosystem services* , where direct actions will be implemented for the conservation of species and ecosystems, with a special focus on those threatened species and with high cultural and economic values.
Monitoring and control	The programs of this line that have a direct influence on the scenarios of climate change in the territory are: i) Control, vigilance and monitoring of the actions of the PANI, since in this program the development of a monitoring and evaluation plan of adaptation to climate change at the local level, and its possible articulation with national[76] and international efforts. Also within this program, monitoring and control of threatened wild fauna and flora species will be carried out.

Source: Prepared by Biotrade SAS (2022).

5.2.4 High Conservation Values Protected (B2.4)

The REDD++ PANI project aims to prevent deforestation and degradation of ecosystems, in order to conserve biodiversity and ecosystem services. In this way, under the project activities, the High Conservation Values are not expected to be affected in any way.

5.2.5 Species Used (B2.5)

List all species used by the project.

5.2.6 Invasive Species (B2.5)

No known invasive species will be introduced into any REDD++ PANI project area. If any activity requires the use of species, these should not be in the "Global *Database of Invasive Species"*[77] nor listed as invasive for the Colombian Amazon (Cárdenas, et al., 2011).

5.2.7 Impacts of Non-native Species (B2.6)

In the REDD++ PANI project area, indigenous communities have used native species in the *chagras* for centuries, and they do not usually use non-native species. Although there are records of introduced species

[76] Like the National System for Monitoring and Evaluation (M&E) of adaptation in Colombia "sNAPshot".

[77] "*Global Invasive Species Database"*. Available at: http://www.iucngisd.org/gisd/

(Cárdenas, et al., 2011), likely, that these will not generate negative impacts since they have been used traditionally in the territory.

5.2.8 GMO Exclusion (B2.7)

The REDD++ PANI Project will not use GMOs.

5.2.9 Inputs Justification (B2.8)

The REDD++ PANI project will not use chemical inputs such as fertilizers or pesticides, biological control agents, or any other product of this type.

5.2.10 Waste Products (B2.9)

REDD++ PANI project activities will not generate waste.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

As a result of the REDD++ PANI project activities, there are no negative impacts estimated on biodiversity outside the project area, and therefore no mitigation measures are defined.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

REDD++ PANI project offsite biodiversity will have a positive impact due to the influence of the implementation and results in the project area. The actions of sustainable use and management are essential to maintain the characteristics and status of the ecosystems and species present there. The Colombian Amazon forests harbor great biological and cultural richness. Hence, the REDD++ PANI project actions will guarantee the autonomy and sustainability of environmental management by indigenous communities, and thus contribute to the maintenance of ecological connectivity with other Amazon ecosystems.

At the landscape level, the REDD++ PANI project estimates that maintaining the ecological integrity of ecosystems will protect the connectivity of the populations of many threatened species with wide-ranging distributions, mainly large mammals, such as the jaguar (*Panthera onca*) (NT) and medium-sized species such as the Lowland Tapir (*Tapirus terrestris*) (VU).

Another relevant aspect to highlight is the positive impacts on aquatic ecosystems and their biodiversity outside the REDD++ PANI project area. REDD++ PANI project objectives and actions are aligned to conserve and improve the conditions of water bodies, and also the species associated with these types of habitats, such as the Charapa Turtle (*Podocnemis expansa*) (EN). These actions will allow the preservation of the region's fish wealth while at the same time maintaining ecosystem services, such as water regulation.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

The monitoring plan for the biodiversity impact of the REDD++ PANI project will evaluate its actions through indicators that estimate the status and trends of the ecosystems and species in the region. The guidelines of this monitoring plan are based on the Reference Manual: Biodiversity Monitoring for REDD+ (Latham, et

al., 2014) and aligned with the objectives and methods of territorial planning and management tools, such as the Regional Program for Environmental Monitoring of the Colombian Amazon – PRMA-AC (López, 2007)[78] and the Regional Action Plan on Biodiversity of the South of the Colombian Amazon 2007-2027 (Ruiz, et al., 2007), developed within the regulatory framework of Law 99 of 1993 and Law 165 of 1994 (Agreement on Biological Diversity).

This monitoring plan is structured based on the state of knowledge of biodiversity in the region, thanks to the information collected through different investigations carried out over 30 years in the Colombian Amazon. These investigations were consolidated within the framework of projects, agreements, and strategic alliances between different local, regional, national, and international entities, non-profit organizations, among others. Therefore, monitoring results will contribute to the knowledge of the state of biodiversity in the region. Other national management and monitoring programs and plans were also consulted, such as:

- Cahuinarí National Natural Park Monitoring Program (Bermúdez-Romero, 2019)
- Charapa Plan of the REM PANI – PNN Cahuinarí (FZS)
- Strategic Conservation Plan for Colombian continental turtles 2012 (Morales-Betancourt, et al., 2015)
- National Program for the Conservation of Turtles in Colombia 2002 of the Ministry of Environment and Sustainable Development (MADS)
- Community conservation program for river turtles by Colombian-Peruvian indigenous communities of the Amazon River (Fundación Biodiversa).
- Jaguar Strategy 2020-2030 (WWF, 2020)
- National program for the conservation of felines in Colombia (Payán Garrido & Soto Vargas, 2012)
- National Program for the Conservation of the *Tapirus Genus* in Colombia (MADS, 2005)

The areas for monitoring the impact on the biodiversity of the REDD++ PANI project have characteristics such as i) preserving historical sampling sites, this to be able to generate constant data in time and space that can be used in taking decisions, ii) expanding the monitoring areas, and obtain more information and knowledge of the biodiversity in the region, and iii) according to the dynamics of the ecosystems and the ecology of the species. The indicators and methodologies proposed in this plan are adaptations of protocols already designed and implemented, locally, regionally, or nationally, by entities such as Fundación Puerto Rastrojo, Fundación Omacha, Frankford Zoological Society (FZS), WWF, IAvH and WCS. Accordingly to the objective of the Eje Territorial[79] of the REM PANI-Cahuinarí: the consolidation of the environmental ordering of the territory (PANI & PNN-Cahuinari, 2022), the REDD++ PANI project monitoring plan is defines complementary activities such as:

- Implement the monitoring program linking indigenous communities, that is, community and participatory monitoring.

[78] Conceptual and methodological guidelines for the Amazon Environmental Indicators System within the framework of the Regional Environmental Monitoring Program, with the collaboration of MADS, the support of the Coordinating Team of SIB Colombia - Humboldt Institute, the active participation of corporations for sustainable development within the Amazon region: CDA, Cormacarena and Corpoamazonia and, of the Special Administrative Unit of the System of National Natural Parks - Territorial Amazonia Orinoquia DTAO.

[79] Subdivision of PNN of Colombia in charge of REM PANI-Cahuinarí administration.

- Expand monitoring to other Comprehensive Conservation Priorities (PICs)
- Coordinate with the neighboring AATIs the regional management of the Charapa
- Involve families in consumption monitoring
- Permanently socialize the results of the monitoring seasons

In this way, the monitoring plan of the REDD+ PANI Project will specifically contribute to the development of monitoring actions to other PICs, and threatened species will be prioritized (Table 35):

Table 35. Relationship between the Comprehensive Conservation Priorities (PIC) and the conservation objects prioritized for monitoring within the REDD++ PANI project.

Comprehensive Conservation Priorities (PIC)	Conservation targets to be monitored in the REDD+PANI project
Animals that are part of the territory, associated with the use, exploitation and economic sustainability	• The Charapa Turtle (*Podocnemis expansa*), • The Jaguar (*Panthera onca*), • Large and medium-sized ungulates, (such as the deer, *Mazama americana;* the Lowland Tapir, *Tapirus terrestris*; and peccaries). • Pintadillo tigre (*Pseudoplatystoma tigrinum*) and other catfish
Diversity of plants present in the territory associated with the use and exploitation	• Structure and floristic composition of the forests and salt licks

Source: Prepared by Biotrade SAS (2022).

5.4.1.1 Ecosystems and flora

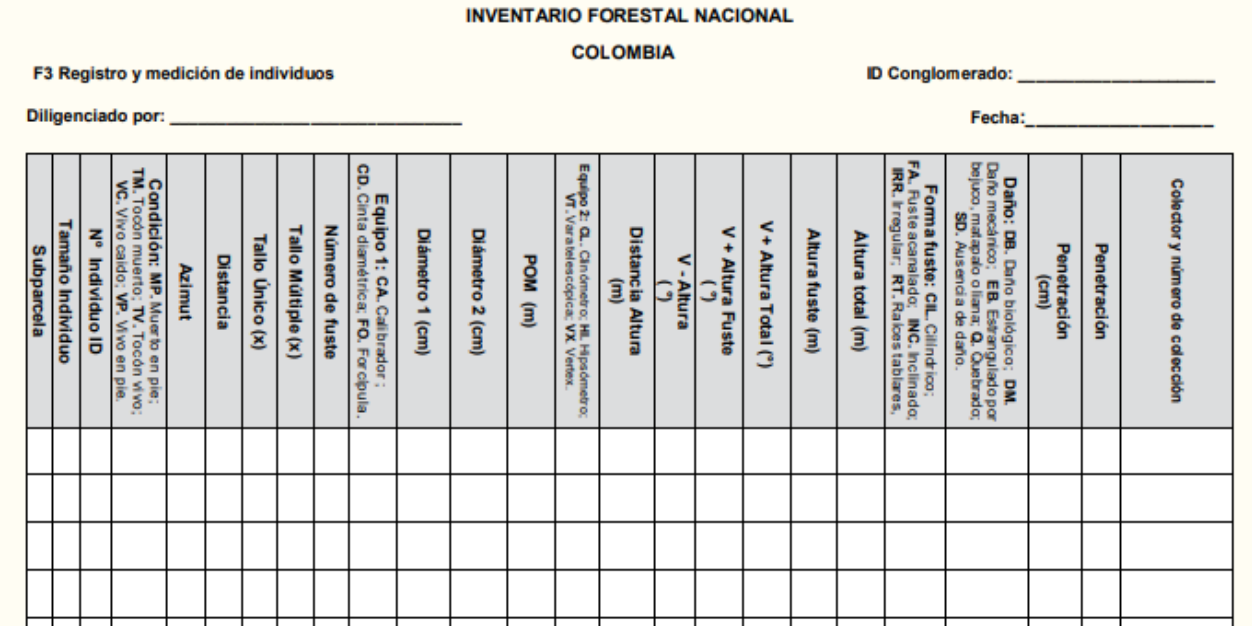
The monitoring of ecosystems and flora in the REDD++ PANI project will focus on forest and salty ecosystems. Monitoring design follows the guidelines of the Territorial Environmental Information System of the Colombian Amazon SIAT-AC (López, 2007), the National Forest Inventory Protocol (IFN[80], by its acronyms in Spanish) of Colombia, and the Network of Permanent Plots[81] of the SINCHI Institute.

For the context of the project area, the vegetation sampling methods are adjusted based on the research by Sánchez, et al. (2007). Floristic inventories will be carried out through permanent plots of 50x20 m, and information will be taken from all individuals of vascular plants (DBH > 2.5 cm), and transects with a length from 2 to 5 km to describe the changes that were occurring in the vegetation, the landscape and the soils (Sánchez, et al., 2007), for the registration of the information the formats established in the IFN of Colombia will be used (Figure 28). Species diversity and richness indices will be estimated to determine the composition and structure of plant communities. The reference for the identification and records of the

[80] The National Forest Inventory (IFN, Instituto Forestal Nacional) of Colombia comprises the statistical methodology of variables of national interest in the natural forests of Colombia. It provides methodology information about the monitoring and follow-up of the ecosystems in their composition, structure, degradation. The ICF has an emphasis on the analysis of the state, result, and impact indicators, which are fundamental for making policy decisions. Developed by IDEAM. Available at: http://www.ideam.gov.co/web/Bosques/inventario-forestal-nacional

[81] Program created in 2007 by the SINCHI Institute Available at: https://sinchi.org.co/coah/red-de-parcelas-permanentes

species will be the collection of the Colombian Amazon Herbarium - COAH. The information obtained from these samples will be used to calculate the indicators described in Table 36.



INVENTARIO FORESTAL NACIONAL

COLOMBIA

F3 Registro y medición de individuos **ID Conglomerado:** _____

Diligenciado por: _____ **Fecha:**_____

Subparcela	Tamaño Individuo	Nº Individuo ID	Condición: MP. Muerto en pie; TM. Tocón muerto; TV. Tocón vivo; VC. Vivo caído; VP. Vivo en pie.	Azimut	Distancia	Tallo Único (x)	Tallo Múltiple (x)	Número de fuste	Equipo 1: CA. Calibrador; CD. Cinta diamétrica; FO. Forcípula.	Diámetro 1 (cm)	Diámetro 2 (cm)	POM (m)	Equipo 2: CL. Clinómetro; HL Hipsómetro; VT. Varatelescópica; VX. Vertex.	Distancia Altura (m)	V - Altura (°)	V + Altura Fuste (°)	V+ Altura Total (°)	Altura fuste (m)	Altura total (m)	Forma fuste: CIL. Cilíndrico; FA. Fuste acanalado; INC. Inclinado; IRR. Irregular; RT. Raíces tablares.	Daño: DB. Daño biológico; DM. Daño mecánico; EB. Estrangulado por bejuco; matapalo o liana; Q. Quebrado; SD. Ausencia de daño.	Penetración (cm)	Penetración	Colector y número de colección

Figure 28. Format for registration and measurement of individuals of the National Forest Inventory of Colombia. Taken from: FAO, MADS and IDEAM, (2018).

Table 36. Indicators for monitoring ecosystems and flora in the REDD++ PANI project.

Indicator	Objective of the indicator	Calculation frequency	Estimation method
Percentage of ecosystem area	It allows identifying the existence and coverage of the ecosystems present in a region.	Every three (3) years	GIS analysis
Percentage of change in the surface of ecosystems	Measure the rate of transformation of the ecosystems in the area of interest. It allows identifying areas with accelerated processes of ecosystem loss.	Every three (3) years	
Species richness of the tree stratum and other key species (threatened, endemic)	Generate a diagnosis of the state of richness in flora and natural resources in the region. The identification of conservation areas and sustainable use of resources.	Every six (6) years	Floristic structure and composition through permanent plots

Source: Prepared by Biotrade SAS (2022).

This section does not include the guidelines for the monitoring plan for avoided deforestation in the project area, as these are described in Section 3.3.3.

5.4.1.2 Fauna

The REDD++ PANI project prioritizes species that are of great importance to the territory, not only environmentally but socioculturally, such as the Charapa Turtle (*Podocnemis expansa)*, the Jaguar or Butterfly Tiger (*Panthera onca)* (see section 5.1.2), and ungulates (like the peccary or lipped peccary, *Tayassu pecari)*. These species are defined as High Conservation Values by the regional and national environmental authorities (National Natural Parks and the Ministry of the Environment and Sustainable Development), and by the indigenous communities of the PANI Association. The community monitoring actions carried out by the community, mainly women, of Manacaro in association with the Amazon Conservation Team (ACT) (Figure 29) will also be taken into account, and it will be evaluated to extend the monitoring surveys to other communities in the project area. REDD++ NIBP. The monitoring actions of the REDD++ PANI project will be focused on the following species (Table 37):

Figure 29. Women from the Manacaro community of the PANI territory taking species monitoring tours. Taken from: Amazon Conservation Team (2020)[82].

Table 37. Fauna species prioritized for monitoring in the PANI territory area

Taxonomic group	Scientific name	Common name	Threat Category	
			Global	National
Reptiles	*Podocnemis expansa*	Charapa Turtle	CD	EN
Mammals[83]	*Tapirus terrestris*	Lowland Tapir	VU	VU
	Panthera onca	Jaguar o Tigre	NT	VU
	Tayassu pecari	Cerrillo or White-lipped Peccary	VU	-
	Pecari tajacu	Puerco or Collared Peccary	LC	-

[82]Available at: https://www.elespectador.com/ambiente/mujeres-amazonas-las-guardianas-de-la-biodiversidad-article/

[83]Available at: https://mammalogynotes.org/ojs/index.php/mn/article/view/109/93

Taxonomic group	Scientific name	Common name	Threat Category	
			Global	National
	Mazama americana	Venado Colorado or Red Brocket	DD	-
Fish	*Pseudoplatystoma tigrinum*	Pintadillo tigre	-	VU
	Brachyplatystoma filamentosum	Lechero (catfish)	-	VU
	Brachyplatystoma rousseauxii	Dorado (catfish)	-	VU
	*Zungaro zungaro**	Amarillo	LC	VU

Source: MADS Resolution 1912 of 2017 and IUCN Red List.

5.4.1.2.1 Charapa turtle (Podocnemis expansa)

In the REDD++ PANI project, the proposed monitoring actions are based on giving continuity to the design proposed in the Monitoring and Community Control Program for the Charapa turtle (*Podocnemis expansa)* in the PNN Cahuinarí, by the Frankfurt Zoological Society (FZS). in English), who have been in charge of monitoring in recent seasons, together with the families linked to community monitoring (Bermúdez-Romero, et al., 2010). These actions are: monitoring of postures and hatching, marking of adult individuals, and monitoring and follow-up tours. Likewise, the sampling sites will be in the Special Protection Zones - ZPE for the spawning and reproduction of Charapa and Taricaya turtles, in the El Bernardo, Tres Islas and Cahuinarí sites, and in border areas, towards the northwest of the PNN Cahuinarí, the Special Management Zone "El Engaño-Tintín" is located (zoned by the Nonuya reservation of Villa Azul); and to the southeast, “Puerto Caimán” which is a monitoring and conservation zone (zoned by the Curare los Ingleses reserve) (Figure 30) (Bermúdez-Romero, 2019). The possibility and necessity of exploring new sampling sites will be evaluated to expand the information on *P. expansa*.

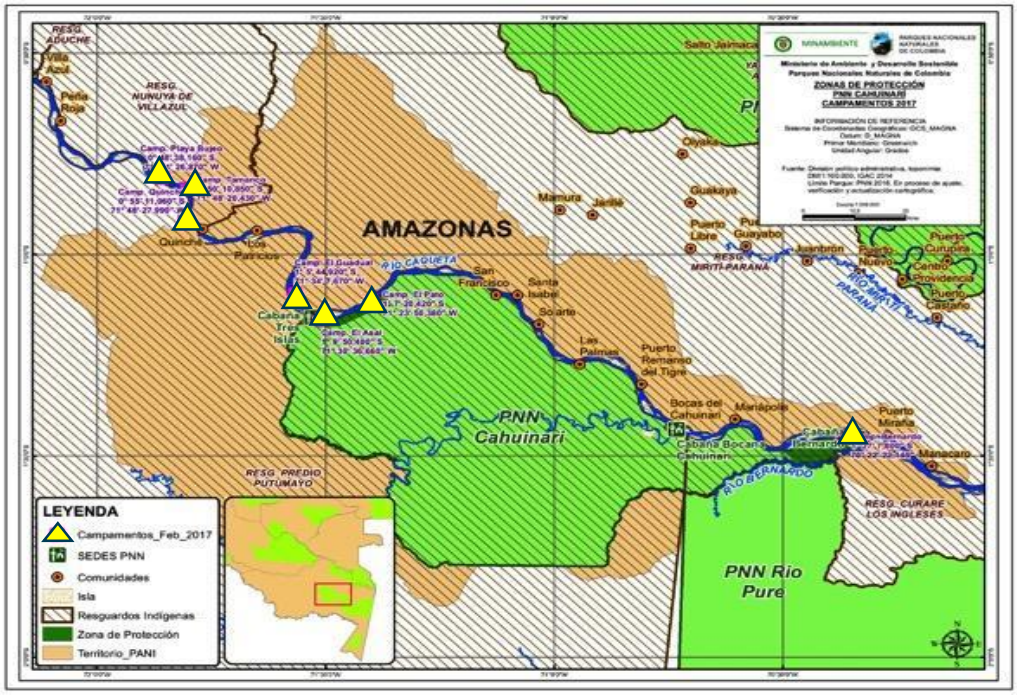


Figure 30. Monitoring zones for the 2017-2018 season of the Charapa turtle (identified with a yellow triangle) established in the monitoring program in charge of PNN Cahuinarí and SZF (Bermúdez, 2018).

For the monitoring of laying and hatching, during the spawning season daily and nightly visits are made to the beaches to record (in pre-established formats) data such as: new laying, flooded, looted, damaged nests, or taken advantage of by the communities (for potential flood hazard); and in the hatching season the hatches are recorded. The postures (individual or massive) will be registered in the format of postures and hatchings elaborated by PNN Cahuinarí and FZS (Figure 31) (Bermúdez-Romero, 2019). The marking of individuals of the carapace of Charapa turtles (adults) will be carried out with reflective paint for heavy traffic, which allows the identification of individuals at a long distance, and thus identify movements or migrations of individuals during the season. The capture of individuals for this activity will be done on the spawning beaches, basic morphological data of the individuals will be recorded, and once marked they will be released on the same beach (Leal, 2018)(Figure 32).

Parques Nacionales Naturales de Colombia

Formato de Posturas y Eclosiones - Estrategia de Monitoreo Comunitario

Zona de Protección Especial	Nombre Playa	Fecha de postura (D/M/A)	Especie		Tipo de Postura		Postura control	Nido Trasladado					Codigo de nido	Número de nidos estimados en postura masiva	Fecha seguimiento (D/M/A)	Estado de nido					Eclosión								Familia que hace el registro	Observaciones
			Charapa	Terecaya	Individual	Masiva	NO	SI	NO	SI	Número de huevos bueno	Número de huevos malos sin trasladar	fecha de traslado	Playa a la cual se trasladó				Liberados	Inundado	Entregado	Saqueado	Dañado	Número Total huevos	Número tortugallos vivos	Número tortugallos muertos	Número huevos no eclosionados	Número huevos con embrión muerto	Número huevos con embrión vivo	Número huevos dañados		

Figure 31. Field record format for laying and hatching of Charapa and Tericaya in the Monitoring Zones, established by the PNN Cahuinarí and FZS. Source: Bermúdez-Romero (2019)

Figure 32. Measurement of Charapa turtle specimens as part of the community monitoring activities carried out in the REDD++ PANI project area. Taken from: PNN Colombia (2020).

Finally, the monitoring and follow-up tours of the Charapas will be carried out with the support of the families, and during the low water season, these tours will be concentrated in the areas surrounding the spawning beaches, to prevent nest looting or capture of reproductive females. The tours in times of high waters will contribute to the identification of animals marked during the spawning season, in order to determine: the distribution of the species during this season, lakes and other bodies of water (such as streams) of importance for *P. expand* (Leal, 2018). The format for recording sightings is the one established by PNN Cahuinarí and FZS (Figure 33and Figure 34). The information obtained from these samples will be used to calculate the indicators described in Table 38.

Fecha del turno de monitoreo y control (inicio y final):

Familia responsable:

Formato de avistamientos

ZPE Zona de Monitoreo o comunidad	Lugar ó punto de avistamiento	Fecha de avistamiento	Hora del avistamiento inicial y final	Número de charapas avistadas marcadas con pintura	Número de charapas avistadas sin pintura	Tamaño de las charapas avistadas sin pintura			El avistamiento se realiza en peke, a remo ó punto fijo	Observaciones (alimentación, comportamiento, clima y otras)
						G	M	P		

Figure 33. Field record format for Charapas sightings in the high water season, established by the PNN Cahuinarí and FZS. Source: Bermúdez-Romero (2019).

Formato Recorridos Monitoreo

Zona de monitoreo	Fecha	Hora de inio	Hora final	Recorrido de donde a donde	Presiones observadas	Familia que realiza el recorrido

Figure 34. Field record format for Charapa turtle monitoring tours, established by PNN Cahuinarí and FZS. Source: Bermúdez-Romero (2019).

Table 38. Indicators for monitoring the Charapa turtle (P. expansa) in the REDD++ PANI project.

Indicator	Objective of the indicator	Calculation frequency	Estimation method
Proportion of successful clutches	Estimate the reproductive success of the species. A nest is considered successful, with at least 1 egg hatching.	Annual	Registration of postures and hatching, marking of adult individuals, and follow-up tours
Proportion of poached nests	Evaluate the effectiveness of care or protection measures for the species, such as agreements not to poach nests.	Annual	
Number of reproductive females	Estimate the status, trends and viability of the populations of the species in the area of interest.	Annual	

Source: Prepared by Biotrade SAS (2022).

5.4.1.2.2 Jaguar or Tiger butterfly (Panthera onca) and ungulates

The monitoring of the jaguar (*P. onca*) and ungulates in the REDD++ PANI project area will be carried out through direct and indirect evidence, with the recording of tracks, photo trapping, and semi-structured interviews. Following the guidelines of the study carried out by Zapata-Rios & Aragullin (2013), the sampling design consists of randomly selecting some areas or cells of at least 50 km ^{2} with available habitat for jaguars and ungulates, within the Project area. Reconnaissance tours will be carried out in these cells (if possible during peak hours of activity of the species) and transects will be established to take track records and install camera traps. The camera traps must have a distance of at least 500 m from each other, and the duration of the sampling must be a minimum of 2 to 3 months, and the data will be recorded in the formats designated by the Photo trapping Manual in Colombia (Figure 35), and will also conform to the requirements of the Tropical Ecological Assessment and Monitoring Network (Díaz-Pulido & Payán Garrido, 2012)(TEAM) databases[84].

FORMATO DE REGISTRO DE FOTOS

No. Foto	Fecha	Estación	Cámara	Especie	Nombre común	Número de Individuos	Hora	Código de la fotografía	Observaciones adicionales

Figure 35. Photograph information record format. Source: Diaz-Pulido & Payan Garrido (2012).

The semi-structured interviews will be carried out with the indigenous communities that live in the territory, and will evaluate the presence of the different species of interest in the area, the perception about the changes in abundance of the species during the last 10 years, and determine the main threats. that can affect these species (Zapata-Ríos & Aragullin, 2013). The information obtained from these samples will be used to calculate the indicators described in Table 39.

[84] Available at: https://www.wildlifeinsights.org/team-network

Table 39. Indicators for monitoring jaguar (P. onca) and ungulates in the REDD++ PANI project

Indicator	Objective of the indicator	Calculation frequency	Estimation method
Occupation of *P. onca* , and ungulates such as peccaries (*Pecari tajacu* and *Tayassu pecari)*, Tapir (*Tapirus terrestris)*, deer (*Mazama americana)*, among others	Estimate the proportion of the area occupied by the species. It is also possible to assess whether habitat conditions, conservation agreements or other variables influence the presence of the species	Every three (3) years	Direct and indirect evidence: track records, camera traps, and semi-structured interviews
Abundance and distribution of *P. onca prey*	Evaluate the availability of resources for predators (such as the jaguar)	Every three (3) years	
Percentage of habitat available for *P. onca*	It allows establishing if the area of interest has the environmental conditions required by the species	Every three (3) years	GIS analysis

Source: Prepared by Biotrade SAS (2022).

The previously proposed indicators related to *P. onca* are proposed within the Jaguar Plan 2020-2030 [85] (WWF, 2020). However, indicators related to the size or population density of jaguars are not included, since the information for estimating these indicators requires a different monitoring design, which exceeds the financial capacities of the project.

5.4.1.2.3 Tiger paintfish (Pseudoplatystoma tigrinum) and other catfish

The catfish species that will be monitored in the REDD++ PANI project are described in Table 37, with particular emphasis on the Pintadillo tigre catfish (*P.tigrinum)* because it is in the "Vulnerable" threat category at the national level. The sampling estimation method will be based on fishing records (individuals collected directly by fishermen, or stored in markets or collection points), and semi-structured interviews with fishermen and the community. Data will be taken on morphometric and meristic measurements of the specimens of each species, such as total length and standard length, and when possible weight and sex. The semi-structured interviews will determine the degree of knowledge about the biology of the species, the current regulations, and the perceptions regarding the current and historical state of the resource. For the identification and records of the species, the Ichthyological Collection of the Colombian Amazon - CIACOL will be used as a reference[86], and the records will be compiled in a general format (Table 40), adjusted to the Protocol for capturing fishing, biological and socioeconomic information in Colombia

[85]The Jaguar 2030 Plan is a wide-ranging effort that unites the governments of countries within the range of the species, non-governmental and intergovernmental organizations, local communities and the private sector around a common vision to conserve the jaguar and its valuable ecosystems. Colombia is a participant in this strategy.

[86] Available at: https://www.sinchi.org.co/ciacol

(Agudelo, et al., 2011). The information obtained from these samples will be used to calculate the indicators defined in Table 41.

Table 40. Format for the registration of catfish species in the REDD++ PANI project.

Consigned variable	Description
Date (DD/MM/YYYY)	
geographic coordinate	
landing site	
Fishing zone	
Body of water (name)	
hydroclimatic period	High waters ( ) High to low ( ) Low ( ) Low to high ( )
Species (common name)	
Species (scientific name)	
Total Length – TL (cm)	
Standard Length – LS (cm)	
Weight (g)	
Sex	Male ( ) Female ( ) Juvenile ( )
Observations	

Source: Prepared by Biotrade SAS (2022).

Table 41. Indicators for monitoring the Pintadillo tigre and other catfish in the REDD++ PANI Project.

Indicator	Objective of the indicator	Calculation frequency	Estimation method
Mean size at sexual maturity – TMM[87]	Evaluate the state of the populations, and the impact of fishing on these species. The MMR is also related to the Minimum Regulated Size (MRS).	Every three (3) years	Direct and indirect evidence: fishing records and semi-structured interviews
Richness and abundance, with an emphasis on small fish (mainly Characins)	Estimate the diversity of fish fauna, and evaluate the availability of prey, as an approximation of catfish habitat conditions	Every three (3) years	

Source: Prepared by Biotrade SAS (2022).

[87] Together with this indicator, the estimation of the index of individuals below the regulatory size (IDT_m) will be made, which is an important indicator for the analysis of the commercial catfish fishery in the Colombian Amazon (Agudelo-Córdoba, et al., 2012), and which has been estimated since 2000 by CIACOL.

5.4.1.3 Monitoring and evaluation of the use of natural resources, and community agreements

Within the strategic line "Monitoring and control", the REDD++ PANI project proposes to generate a participatory community monitoring strategy for nature and social management (section xxx). This monitoring strategy will include the follow-up and evaluation of the use of the natural resources of the PANI territory, and the follow-up of community agreements. This strategy will be aligned and will seek to articulate with the natural resources program of the PNN Cahuinarí Management Plan, the regulations for the use of resources of the REM PANI-PNN, and community agreements.[88] (PANI & PNN-Cahuinari, 2022).

The community agreements in the PANI territory on natural resources cover the regulation of the consumption (for use or sale) of species such as the Charapa (*P. expansa*) and the tapir (*T. terrestris*), the management of special protection sites, regulation of the places allowed for the extraction, arts and methods of hunting and fishing, times of restriction of use and allowed quotas of use (PANI & PNN-Cahuinari, 2022). The types of use of natural resources in the REDD++ PANI project area, which will be monitored, are: hunting, fishing, forestry (timber and palm trees), and chagra.

5.4.1.3.1 Hunting

The monitoring and control activities related to hunting will be based on the study carried out in 2000 in the PNN Cahuinarí: " *Characterization of subsistence hunting in the Miraña-Bora indigenous communities, Cahuinarí National Natural Park"* (Bermúdez-Romero, 2019), where the subsistence hunting of mammals, fish, birds, reptiles and amphibians and other groups of exploited species. The REDD++ PANI project will continue to collect this type of information, and those species used for trade will be added. With the information collected in this follow-up, compliance with the community agreements in force in the PANI territory will be evaluated.

Table 42. Characterization of hunting for subsistence and trade in the REDD++ PANI project. Note: per hunter format

Consigned variable	Description
Date (DD/MM/YYYY) and time	
geographic coordinate	.
Community	
Hunting site (extraction site)	
hydroclimatic period	High waters ( ) High to low ( ) Low ( ) Low to high ( )
Species (common name)	
Species (scientific name)	
Weight (kg)	
age class	Breeding ( ) Juvenile ( ) Adult ( )
Sex	Male ( ) Female ( ) Juvenile ( )
Reproductive status *	No ( ) Yes ( ) Pregnant ( ) Lactating ** ( )
Weight (kg)	

[88]Since 1992 and 1995, the first agreements for the use and exploitation of hunting and fishing resources were established between the PANI and PNN Cahuinari communities.

Consigned variable	Description
Methods and techniques used	
Duration of the day (hours)	
Use	Subsistence ( ) Commercial ( )
Sales weight (Kg)	
Sale value (COP)	
Sampling (if applicable)	Skull ( ) Skin ( ) Reproductive tracts ( ) Other ( )
Observations	

* Reproductive status in birds was considered non-reproductive status and reproductive status, reproductive status in reptiles and amphibians was determined by the presence or absence of eggs in females)

** This category only applies to mammals

Source: Prepared by Biotrade SAS (2022).

5.4.1.3.2 Chagra

In accordance with the guidelines set forth in the "PIC Chagra Monitoring Design" proposal (Bermúdez, 2017), a characterization of the PANI Chagras will be carried out through participatory monitoring with the families of the communities. These chagras will be monitored in all their stages, and the family in charge of the chagra will be the one who takes the information collection forms (Table 43). It is important to spatially locate the chagras in each community, and in the PANI territory, in order to be able to monitor plant succession in these areas, and fauna records (Table 45).

Table 43. Characterization of chagras in the REDD++ PANI project.

Consigned variable	Description
Date (DD/MM/YYYY) and time	
Community	
Family in charge of the chagra	
chagra code	
geographic coordinate	
Chagra size (ha)	
Chagra type	Firm mount ( ) Stubble ( ) Shore ( )
Date (DD/MM/YYYY) Beginning stage	
Date (DD/MM/YYYY) Planting stage	
Date (DD/MM/YYYY) Harvest stage	
Date (DD/MM/YYYY) end chagra	
Fauna observed in the chagra	
Observations	

Source: Prepared by Biotrade SAS (2022).

Table 44. Characterization of vegetable succession of chagras, and presence of fauna, in the REDD++ PANI project.

Consigned variable	Description
Date (DD/MM/YYYY) and time	
Community	
chagra code	
Chagra stage	Start ( ) Sowing ( ) Use ( ) End ( )
Fauna observed in the chagra	
Observations	

VEGETATION									
Species (common name)	Species (scientific name)	Class by height (m) (mark X)			DBH [89](cm)	Phenology (mark X)			
		>0.2 - 1	>1 - 5	>5 - 10		Outbreak	flowering	fructification	None

FAUNA					
Species (common name)	Species (scientific name)	No. ind. by age class			Observations
		Breeding	Youth	Adult	

Source: Prepared by Biotrade SAS (2022).

Semi-structured interviews will also be carried out to learn about some characteristics of the chagras, such as the floristic composition and perception of the fauna associated with the chagras:

Guiding questions
What is the size of the chagras, according to the type of chagra?
What is the color of the earth, where will the planting take place?
What is the approximate percentage of silt, clay, and sand content in the soil?
What is the depth at which the planting will be carried out?
Who performs the opening of the chagra (tomb and burning)?
Who does the planting of crops in the chagra? How long does this activity take?
Who makes the use of the products of the chagra? How long does this activity take?

[89]Diameter at breast height (DBH).

Guiding questions
Have you had problems with pests lately? Which? In what kind of crops?

Source: Prepared by Biotrade SAS (2022). Taken from: "PROPOSAL FOR THE MONITORING DESIGN OF THE INDIGENOUS CHAGRA PIC" by PNN Cahuinarí (Bermúdez, 2017)

5.4.1.3.3 Forestry for domestic and commercial use

Since 2018, the Cahuinarí National Natural Park and the PANI association have agreed to start dialogues with the communities, on a Forest Regulation, as a conservation strategy for the forest resources used in the territory. Finally, in 2021, the FOREST REGULATION IN THE TRADITIONAL TERRITORY OF PANI AND CAHUINARÍ NATIONAL PARK (2021) is created, which contains the guidelines for the use of forest resources for domestic and commercial uses in the area. To monitor and control this type of activity, the communities will collect some data (Table 45). With the information collected in this follow-up, compliance with the community agreements in force in the PANI territory will be evaluated.

Table 45. Characterization of the use of forest resources in the REDD++ PANI project.

Consigned variable	Description
Date (DD/MM/YYYY) and time	
Community	.
Extraction site	
Geographic coordinate	
Hydroclimatic period	High waters ( ) High to low ( ) Low ( ) Low to high ( )
Species (common name)	
Species (scientific name)	
Weight (Kg)	
Methods and techniques used	
Duration of the day (hours)	
Use	Domestic ( ) Commercial ( )
Sale weight (Kg)	
Sale value (COP)	
Observations	

Source: Prepared by Biotrade SAS (2022).

5.4.2 Dissemination of the monitoring plan (B4.3)

The monitoring plan and the documents associated with it will be disseminated to the community according to the guidelines described in sections 2.3.2 and 3.3.4 . Additionally, biodiversity records will be made available to the biological collections of the Amazon, by the SINCHI Institute, the SiB System, the Global Biodiversity Information Platform (GBIF) and the Evaluation Network and Tropical Ecology Monitoring (TEAM).

5.5 Optional Criterion: Outstanding Biodiversity Benefits

5.5.1 High Conservation Priority (GL3.1)

In the REDD++ PANI project area there are populations of threatened species that require priority conservation actions, such as the charapa turtle (*Podcnemis expansa)* (EN), and the jaguar or butterfly tiger (*Panthera onca)* (VU), which are established as High Conservation Values. There are also records of other threatened species such as: the tapir or tapir (*Tapirus terrestris)*, the peccary or Cerrillo (*Tayassu pecari)*, the Tigre-painted tiger (*Pseudoplatystoma tigrinum)*, and other catfish. Additionally, many of these species, in addition to being threatened, globally (IUCN, Red List of the International Union for Conservation of Nature) or nationally (Resolution 1912 of 2017 of the Ministry of the Environment and Sustainable Development - MADS), are also listed in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). In other words, in the project area, there is the presence of at least 18 species on the Red List of the International Union for Conservation of Nature (IUCN) and MADS. For a total of one (1) "Critically endangered" (CR) species (*Aburria pipile*), four (4) "Endangered" (EN), 12 species in the "Vulnerable" (VU) category, and one as "Near Threatened" (NT) (Table 46).

Table 46. Endangered fauna species in the REDD++ PANI project area

Scientific name	Common name	Threat Category		CITES [90] Appendix	
		Global	National	I[91]	II[92]
Podocnemis expansa	Charapa	CD	**EN**	-	X
Podocnemis unifilis	Tericaya	VU	**EN**	-	X
Melanosuchus niger	Caimán negro	NE	**VU**	X	-
Tapirus terrestris	Danta o Tapir	VU	**VU**	-	X
Panthera onca	Jaguar o tigre mariposo	NT	**VU**	X	-
Pteronura brasiliensis	Perro de agua (nutria)	VU	**VU**	X	-
Lontra longicaudis	Lobo de agua (nutria)	**NT**	-	X	-
Tayassu pecari	Saíno o pecarí labiado	**VU**	-	-	X
Priodontes maximus	Armadillo trueno	VU	**EN**	X	-
Lagothrix lagothricha	Mono churuco o lanudo	**VU**	-	-	-
Cebuella pygmea	Pygmy marmoset	**VU**	-	-	-
Pseudoplatystoma tigrinum	Pintadillo tigre	-	**VU**	-	-
Brachyplatystoma filamentosum	Lechero (bagre)	-	**VU**	-	-
Brachyplatystoma rousseauxii	Dorado (bagre)	-	**VU**	-	-
*Zungaro zungaro**	Amarillo	LC	**VU**	-	-
Crax globulosa	Paujil amazónico	EN	**EN**		X
Aburria pipile	Pava cuyubí	**CR**	-	-	-
Ramphastos tucanus	Tucán pechiblanco	**VU**	LC	-	X

Source: MADS Resolution 1912 of 2017 and IUCN Red List.

[90] Available at: https://cites.org/esp/app/appendices.php

[91] Appendix I: most endangered species on the CITES list, threatened with extinction. CITES prohibits international trade.

[92] CITES Appendix II: Species not necessarily threatened with extinction, but may be unless trade is tightly controlled.

The Convention on Biological Diversity (CBD) establishes that protected areas are essential components for national and global biodiversity conservation strategies. In this way, the REDD++ PANI project is of great importance for the conservation of the species and ecosystems of the Amazon region, since the project's work area covers a large part of the Cahuinarí National Natural Park.

It is important to highlight that the monitoring plan for the impact on biodiversity of the REDD++ PANI project will contribute directly to the regional monitoring program for an "Endangered" (EN) species, the Charapa tortoise (*P. expansa)* in the PNN Cahuinarí (Bermúdez-Romero, 2019). Additionally, within the monitoring of the jaguar (*P. onca)* and the Pintadillo tigre (*P. tigrinum)* and other catfish, it will be possible to record population dynamics or trends of other threatened species, such as ungulates and catfish listed in the previous table. In this way, the REDD++ PANI project contributes to the conservation of biodiversity through the implementation of national monitoring programs and protocols.

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

In general, it is expected that the population trends of the threatened species found within the REDD+ PANI project area will be maintained or increased, depending on the specific case of each species, and their ecological dynamics. Next, the trends of the species selected as High Conservation Values are evaluated, as an approximation to the rest of the threatened species in the project area.

Trigger Species	**Charapa turtle *(Podocnemis expansa)***
Population Trend at Start of Project	The spawning beaches on the Caquetá river, and the Cahuinarí river lake system are part of the habitat of the Charapa, and one of the most important areas for the species since it is one of the areas with the least pressure on *P. expansa*, compared to other areas (PANI & PNN-Cahuinari, 2022). Although the Charapa population in the REDD++ PANI project area is in better condition than other populations in the country, this population has suffered strong hunting pressure in the past (1970-1980) (Prieto-C & Arias-G, 2007), therefore its conservation status remains at risk. , either as an effect of the threat dynamics to which it was subjected, or because they may occur in the future.
Without-project Scenario	The breach of the agreements established under the REM PNN Cahuinarí-PANI is presented, where the Charapa turtle is overexploited. It is estimated that throughout the PANI, a total of 1,366 Charapas are used in a year, of which 1,184 are for consumption and 182 for sale (PANI & PNN-Cahuinari, 2022).
With-project Scenario	The activities of the project will allow knowing the conservation status of the Charapa populations in the PANI territory, through monitoring. In a complementary way, the strengthening of the governability of the indigenous communities and the efficient relationship with the national entities, will allow the communities to develop and establish an appropriate local management strategy for the conservation of the Charapa.

Trigger Species	**Jaguar or butterfly tiger (*Panthera onca*)**
Population Trend at Start of Project	It is estimated that the PNN Cahuinarí has an area of 5,569 km ^{2} with the presence of jaguars, and around 9,882 jaguars[93] (Payán Garrido, et al., 2016). This is due to the ecosystems present in this area, such as the tropical moist lowland forests, which are conserved and have important attributes for *P. onca*, such as landscape homogeneity and connectivity (Payán Garrido, et al., 2016). Although the REDD++ PANI project area has stable conditions for jaguar populations (Payán Garrido, et al., 2016), the situation of the jaguar at a national and global level is not the best, and the threats to its conservation are increasing (WWF, 2020). Illegal trade and poaching have increased in recent years due to demand in the illegal market (Arias, 2021). This situation, in addition to the loss of its habitat, is accelerating the risk of extinction of the species (WWF, 2020; Jędrzejewski, et al., 2018). Additionally, conflicts over jaguar attacks on community dogs seem to have increased in recent years in the PANI REDD+ project area, which often ends in jaguar retaliation hunting.
Without-project Scenario	Global rates of jaguar extirpation continue to rise, primarily from habitat alteration (Jędrzejewski, et al., 2018). Jaguars in particular tend to move away from severely logged areas, and with high hunting rates, due to the lack of prey availability (de Oliveira, 2002). Failure to comply with the agreements established under the REM PNN Cahuinarí-PANI is reflected in the overexploitation of natural resources, which has impacted the abundance of animals such as Tapirs, Borugas and Charapas, among others (PANI & PNN-Cahuinari, 2022). These overexploited resources are preyed upon by *P. onca,* and therefore affect the quality of its habitat. In addition, the areas surrounding the project area present strong pressures of forest loss and degradation, so it is possible that jaguar populations are being corralled into protected forests, such as the PANI territory area. The proximity of *P. onca* populations to indigenous communities can increase jaguar attacks, whether on dogs or even humans, and this can trigger hunting pressure on the species.
With-project Scenario	The jaguar will benefit from the actions of the REDD+ PANI project through two mechanisms: i) it is expected that by controlling the overexploitation of hunting resources or mediating hunting pressure on some species that are prey for this feline, the

[93]Under a conservative density of three jaguars in 100 km ^{2} (Payán Garrido, et al., 2016)

	decrease in prey, thus maintaining optimal conditions for the populations of *P. onca* (González Maya, et al., 2018); ii) according to the diagnosis, analysis and management proposals for the conflict between the jaguar and the communities, it will be possible to implement actions both for the care of the jaguar, as well as for the interests of the communities, avoiding the retaliatory hunting of individuals of *P. onca* or any other feline.

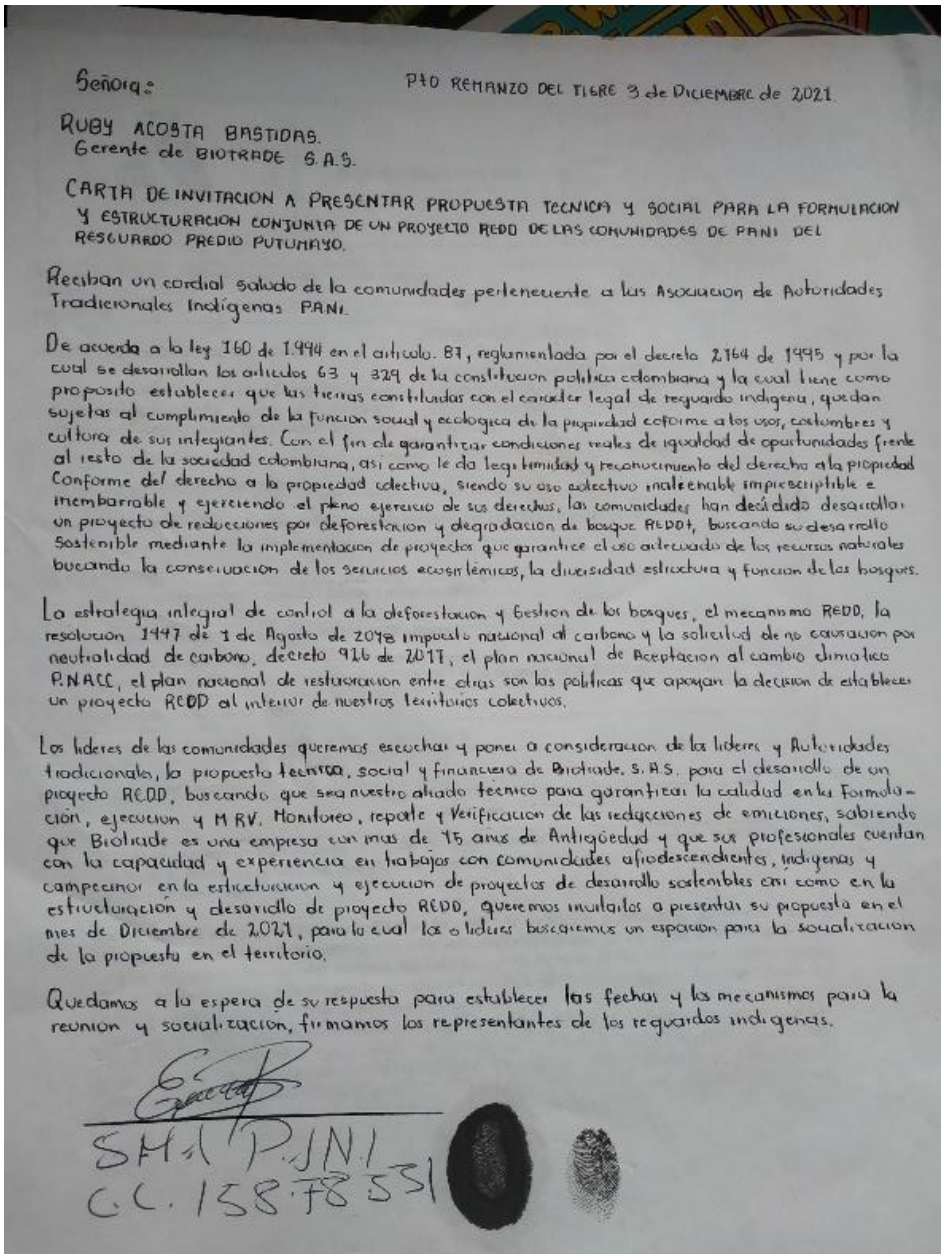
Trigger Species	**Lowland Tapir (*Tapirus terrestris)***
Population Trend at Start of Project	The poaching of 1950 generated a considerable decrease in the population of tapirs in the area of the REDD++ PANI project (PANI & PNN-Cahuinari, 2022). The tapir's vulnerability is mainly due to characteristics such as its low reproductive rate, low number of offspring per gestation (normally a single offspring) (Brooks & Eisenberg, 1999), and high protein content (bush meat), which makes it a very popular and desirable prey. Currently, the tapir (*T. terrestris*) and the Boruga (*A. paca*) are the forest species most used for trade in the PANI territory (PNN Cahuinarí, 2017). Although, in recent years, the exacerbated hunting of tapir seems to have been regulated, and there are community agreements in the REM PANI-PNN (PANI & PNN-Cahuinari, 2022) for the use of tapir, it is not really known how the populations of *T. terrestris* are found in the PANI territory. The PANI communities have a positive perception of the tapir, and wish to conserve it, since many consider that the tapir population has decreased in recent years.
Without-project Scenario	The monitoring and evaluation efforts of the community agreements established between the PNN Cahuinarí and the PANI for tapir use have not been sufficient. In 2017, the "Report on the use of species by the Bernardo and Cahuinarí rivers" reported that the agreements were not being complied with, and tapir hunting was being carried out outside the established regulations. The tapir meat trade is an important resource for the economic income of many families in the PANI communities (PNN Cahuinarí, 2017). Therefore, it is possible that the perception of the decline of tapir in the forests is due to the recent unsustainable hunting pressure on the species. Within the framework of the REM (2022), it is planned to generate a proposal for the specific monitoring of the Tapir (*Tapirus terrestris*) and the Boruga (*Cuniculus paca*), with the objective of "*knowing and analyzing the current state of the natural populations of the Tapir and Boruga*" (PANI & PNN-Cahuinari, 2022). However, this type of strategy is subject to the planning of National Natural Parks, and it is possible that the design and implementation of this strategy will take some time to be executed.

With-project Scenario	Within the framework of the strategic lines and programs of the REDD++ PANI project, the development of sustainable strategies and actions will be carried out, which will allow the PANI communities to generate more income, meet most of the needs, and thus effectively comply with the use of fauna agreements. On the other hand, in the highly conserved regions of the Amazon, tapirs do not use habitats uniformly. In contrast, the tapir makes selective use of certain elements of the landscape, especially for food resources (González Delgado, 2016). In this way, the REDD++ PANI project will contribute not only to the conservation of the tapir's habitat, but will also allow knowing the state of conservation of the species, and additionally evaluating its consumption, and guaranteeing the conservation and permanence of the Lowland Tapir in PANI territory.

Trigger Species	**Pintadillo tigre** *(Pseudoplatystoma tigrinum)*
Population Trend at Start of Project	There is no information on the population trends of the Pintadillo tigre (*P. tigrinum*), nor of other species of catfish in the REDD++ PANI project area. General information on the Amazon is known, thanks to the study "*Scientific bases to contribute to the management of the commercial fishery of Catfishes (Family Pimelodidae) in the Colombian Amazon and its border areas*" (Agudelo, 2015), which analyzes the records of the Amazonian catfish fishery between 2001-2010. With values above 90% of the catches of these fish below the minimum catch size, Agudelo (2015) reports that the Pintadillos have suffered the greatest impact in the Amazon.
Without-project Scenario	Restrictions in the mobility of reproductive migratory species, such as the spotted catfish (*Pseudoplatystoma* sp.), are a serious problem that endangers the populations. Due to the lack of basic information to determine the status of the *P. tigrinum populations,* it is possible that the species is being affected by exploitation, both for local consumption (subsistence) and for trade.
With-project Scenario	Through monitoring and control actions, the fishermen of the PANI territory will be able to make decisions on use, management and conservation, which guarantees the economic and environmental sustainability of the fishing resources. In this way, the fish wealth of the water bodies in the REDD++ PANI project area will be recovered. It is important to note that because *P. tigrinum* is a migratory species (like most large catfish), the population status of the species may be influenced by conditions in the areas where it moves. Even so, it is a priority that, at least in the PANI area, management actions and sustainable use of the Pintadillo catfish be carried out, and thus contribute to the conservation of the species.

APPENDICES

Appendix 1. Letter of invitation to present a technical and social proposal for the formulation and joint structuring of a REDD project of the PANI communities of the Predio Putumayo land reservation



Señora:

PTO REMANZO DEL TIGRE 3 de DICIEMBRE de 2021

RUBY ACOSTA BASTIDAS.
Gerente de BIOTRADE S.A.S.

CARTA DE INVITACION A PRESENTAR PROPUESTA TECNICA Y SOCIAL PARA LA FORMULACION Y ESTRUCTURACION CONJUNTA DE UN PROYECTO REDD DE LAS COMUNIDADES DE PANI DEL RESGUARDO PREDIO PUTUMAYO.

Reciban un cordial saludo de la comunidades perteneciente a las Asociacion de Autoridades Tradicionales Indigenas PANI.

De acuerdo a la ley 160 de 1.994 en el articulo. 87, reglamentada por el decreto 2164 de 1995 y por la cual se desarrollan los articulos 63 y 329 de la constitucion politica colombiana y la cual tiene como proposito establecer que las tierras constituidas con el caracter legal de resguardo indigena, quedan sujetas al cumplimiento de la funcion social y ecologica de la propiedad coforme a los usos, costumbres y cultura de sus integrantes. Con el fin de garantizar condiciones reales de igualdad de oportunidades frente al resto de la sociedad colombiana, asi como le da legitimidad y reconocimiento del derecho a la propiedad Conforme del derecho a la propiedad colectiva, siendo su uso colectivo inalienable imprescriptible e inembargable y ejerciendo el pleno ejercicio de sus derechos, las comunidades han decidido desarrollar un proyecto de reducciones por deforestacion y degradacion de bosque REDD+, buscando su desarrollo Sostenible mediante la implementacion de proyectos que garantice el uso adecuado de los recursos naturales buscando la conservacion de los servicios ecosistémicos, la diversidad estructura y funcion de los bosques.

La estrategia integral de control a la deforestacion y gestion de los bosques, el mecanismo REDD, la resolucion 1447 de 1 de Agosto de 2018 impuesto nacional al carbono y la solicitud de no causacion por neutralidad de carbono, decreto 926 de 2017, el plan nacional de Aceptacion al cambio climatico P.N.A.C.C, el plan nacional de restauracion entre otras son las politicas que apoyan la decision de establecer un proyecto REDD al interior de nuestros territorios colectivos.

Los lideres de las comunidades queremos escuchar y poner a consideracion de los lideres y Autoridades tradicionales, la propuesta tecnica, social y financiera de Biotrade. S.A.S. para el desarrollo de un proyecto REDD, buscando que sea nuestro aliado tecnico para garantizar la calidad en la Formulacion, ejecucion y M.R.V. Monitoreo, reporte y Verificacion de las reducciones de emisiones, sabiendo que Biotrade es una empresa con mas de 15 años de Antigüedad y que sus profesionales cuentan con la capacidad y experiencia en trabajos con comunidades afrodescendientes, indigenas y campesinos en la estructuracion y ejecucion de proyectos de desarrollo sostenibles asi como en la estructuracion y desarrollo de proyecto REDD, queremos invitarlos a presentar su propuesta en el mes de Diciembre de 2021, para lo cual los o lideres buscaremos un espacion para la socializacion de la propuesta en el territorio.

Quedamos a la espera de su respuesta para establecer las fechas y los mecanismos para la reunion y socializacion, firmamos los representantes de los resguardos indigenas.

SM: PANI
C.C. 1587851

REFEFERENCES

Agudelo-Córdoba, E. y otros, 2012. Evolución de las longitudes corporales para la pesquería comercial de bagres en la Amazonia colombiana (período 2001-2010). *Revista Colombia Amazónica,* Issue 5, pp. 177-195.

Agudelo, E., 2015. *Bases científicas para contribuir a la gestión de la pesquería comercial de bagres en Amazonia colombiana y sus zonas de frontera,* s.l.: Tesis de Maestría. Universitat Autònoma de Barcelona.

Agudelo, E. y otros, 2011. *Protocolo de captura de información pesquera, biológica y socio-económica en Colombia.* Bogotá: Ministerio de Agricultura y Desarrollo Rural - Dirección de Pesca y Acuicultura - Subgerencia de Pesca y Acuicultura INCODER - Conservación Internacional.

Arias, M., 2021. *El comercio ilegal del Jaguar (Panther onca),* s.l.: CITES.

Arrignon, J., 1979. *Ecología y Piscicultura de aguas dulces.* Madrid: Ediciones Mundi-Prensa.

Bermúdez, A. L., 2017. *PROPUESTA PARA EL DISEÑO DE MONITOREO DE LA PIC CHAGRA INDÍGENA PARQUE NACIONAL NATURAL CAHUINARI,* s.l.: Parques Nacionales Naturales de Colombia.

Bermúdez, A. L., 2018. *Informe parcial Fortalecimiento de una estrategia de conservación comunitaria en el Parque Nacional Natural Cahuinarí como parte del manejo de las Tortugas Charapa (Podocnemis expansa) y Taricaya (P. Unifilis) Temporada 2017-2018,* s.l.: Frankfurt Zoological Society.

Bermúdez-Romero, A. L., 2019. *Programa de Monitoreo del Parque Nacional Natural Cahuinarí. Dirección Territorial Amazonía,* Leticia, Amazonas (Colombia): Parques Nacionales Naturales de Colombia. 121 pp.

Bermúdez-Romero, A. L. y otros, 2010. Tortugas Charapa y Taricaya (Podocnemis expansa y Podocnemis) un Recurso de Conservación Prioritario. En: B. A.L., y otros edits. *Retos locales y regionales para la conservación de la fauna acuática del sur de la Amazonia colombiana.* Bogotá: Corpoamazonia, Instituto SINCHI, Fundación OMACHA, Fundación NATURA, p. 150.

Brooks, D. & Eisenberg, J., 1999. Estado y biología de los tapires neotropicales: perspectiva general. En: T. Fang, O. Montenegro & R. Bodmer, edits. *Manejo y Conservación de Fauna Silvestre en América Latina.* La Paz: Instituto de Ecología.

Cárdenas, D., Castaño, N. & Cárdenas-Toro, J., 2011. *Plantas introducidas, establecidas e invasoras en Amazonia colombiana.* Primera ed. Bogotá (Colombia): Instituto Amazónico de Investigaciones Científicas –Sinchi.

Castellanos, D. & Ramírez, M. C., 2007. Conservación de la biodiversidad biólogica y cultural. In: L. Ramos, ed. *Diversidad biológica y cultural del sur de la Amazonia colombiana - Diagnóstico.* Bogotá D. C.: Corpoamazonia, Instituto Humboldt, Instituto Sinchi, UAESPNN, pp. 401-451.

Cochrane, T. T. et al., 1985. *Land in Tropical America. CIAT..* Cali: EMBRAPA·CPAC.

CORPOAMAZONIA, n.d. *CORPOAMAZONIA region de la amazonía colombiana.* [Online] Available at: https://www.corpoamazonia.gov.co/region/Reg_Locaglobal.htm

Cruz, P. y otros, 2014. Daily activity patterns and habitat use of the lowland tapir (Tapirus terrestris) in the Atlantic Forest. *Mammalian Biology,* 79(6), pp. 376-383.

de la Torre, J. A. y otros, 2017. The jaguar's spots are darker than they appear: assessing the global conservation status of the jaguar Panthera onca. *Oryx,* Volumen 52, pp. 300-315.

de Oliveira, T. G., 2002. Evaluación del estado de conservación del jaguar en el este de la Amazonia y noreste de Brasil. En: R. A. Medellín, y otros edits. *El jaguar en el nuevo milenio.* México: Fondo de Cultura Económica/Universidad Nacional Autónoma de México / Wildlife Conservation Society, pp. 419-439.

Departamento Nacional de Planeación, 2019. *Bases del Plan Nacional de Desarrollo 2018-2022: Pacto por Colombia, pacto por la equidad,* Bogotá, D. C.: s.n.

Díaz-Pulido, A. & Payán Garrido, E., 2012. *Manual de fototrampeo: una herramienta de investigación para la conservación de la biodiversidad en Colombia.* Primera ed. Bogotá: Instituto de Investigaciones de Recursos Biológicos Alexander von Humboldt y Panthera Colombia.

Dominguez, C. A., 1985. *El clima amazónico y su influencia sobre el regimen hidrográfico y la utilización de los suelos.* Bogotá D.C.: s.n.

Doorenbos, J. & Pruitt, W., 1977. *Guidelines for predicting crop water requirements.* Rome: FAO.

Duivenvoorden, J. F. & Lips, J. M., 1993. *Landscape Ecology of the Middle Caqueta Basin.* Colombia: TROPENBOS Colombia.

Eden, M., McGregor, D. & Morelo, . J., 1982. *Geomorphology of the middle Caqueta basin of eastern Colombia.* s.l.:Z. Geomorph.

Emmons, L. & Stark, N. M., 1979. Elemental Compo-sition of a Natural Mineral Lick in Amazonia. *Biotrópica,* 11(4), pp. 311-313.

Etter, A. y otros, 2006. Characterizing a Tropical Deforestation Wave: A Dynamic Spatial Analysis of a Deforestation Hotspot in the Colombian Amazon. *Global Change Biology,* Volumen 12, pp. 1409-1420.

FIP & ADELPHI, 2021. *UN CLIMA PELIGROSO: Deforestación, cambio climático y violencia contra los defensores ambientales en la Amazonía colombiana [Resumen Ejecutivo].,* Berlin: WWF Alemania.

Galeano, S. y otros, 2006. Los anfibios de Colombia, diversidad y estado del conocimiento. En: M. Chaves & M. Santamaría, edits. *Informe sobre el avance en el conocimiento y la información de la biodiversidad 1998-2004.* Bogotá (Colombia): Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, pp. 106-118.

Garcia, M. J. y otros, 2012. Distribution, habitat and adaptability of the genus Tapirus. *Integrative zoology,* 7(4), pp. 346-355.

González Delgado, T. M., 2016. *Movimiento de Tapirus terrestris en la parte media del Río Caquetá-Amazonia,* Bogotá, Colombia: Tesis de Maestría. Universidad Nacional de Colombia.

González Maya, J. F., Balaguera, S., Zárrate, C. & Trujillo, F., 2018. Jaguar and Prey Monitoring in South American Llanos, Vichada-Colombia. *Jaguar News,* Volumen 19, pp. 1-2.

Gónzalez Maya, J. F. y otros, 2008. Modelación de hábitat potencial e influencia humana para el jaguar (Panthera onca). *Mesoamericana,* 12(3), p. 118.

González, T. M., Florez, F. K. & Armenteras, D., 2014. Aportes al uso de coberturas de la danta de tierras bajas, Tapirus terrestris colombianus Hershkovitz 1954 (perissodactyla: tapiridae) en la Sierra Nevada de Santa Marta en las cuencas Río Ancho y Palomino–Norte de Colombia. *Boletín Científico. Centro de Museos,* 18(1), pp. 125-137.

Guio Rodríguez, C. & Rojas Suárez, A., 2019. *Amazonia colombiana, dinámicas territoriales.,* Bogotá (Colombia): Ideas verdes - Fundación Heinrich Böll.

Hoorn, C., 1990. *Evolución de los ambientes sedimentarios durante el Terciario y el Cuaternario en la Amazonia Colombiana.* Bogotá: Colombia Amazónica.

IDEAM, IAvH, INVEMAR & IGAC, 2017. *Memoria técnica. Mapa de ecosistemas continentales, costeros y marinos de Colombia (MEC), escala 1:100.000,* Bogotá (Colombia): IDEAM.

IDEAM, et al., 2017. *Resumen ejecutivo Tercera Comunicación Nacional De Colombia a La Convención Marco De Las Naciones Unidas Sobre el Cambio Climático (CMNUCC).,* Bogotá D. C., Colombia: IDEAM, PNUD, MADS, DNP, CANCILLERÍA, FMAM.

IUCN, 2021. *The IUCN Red List of Threatened Species. Version 2021-3..* [Online] Available at: https://www.iucnredlist.org/ [Accessed Enero 2022].

Jędrzejewski, W. et al., 2018. Estimating large carnivore populations at global scale based on spatial predictions of density and distribution – Application to the jaguar (Panthera onca). *PLoS ONE,* 13(3), p. e0194719.

Khobzi, J., Kroonenberg, S., Faivre, P. & Weeda, A., 1980. *Aspectos geomorfol6gicos de la Amazonia y Orinoquia Colombianas.* Bogotá: Revista CIAF.

Lasso, C. A. & Sánchez-Duarte, P., 2015. Capítulo 1. CONSERVACIÓN GRANDES PECES EN COLOMBIA: Conservación de grandes peces de agua dulce en áreas no protegidas de Colombia. En: E. Payán, C. A. Lasso & C. Castaño-Uribe, edits. *Conservación de vertebrados en áreas no protegidas de Colombia, Venezuela, y Brasil.* Bogotá, Colombia: Serie Editorial Fauna Silvestre Neotropical. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt (IAvH), pp. 27-52.

Latham, J. E., Trivedi, M., Amin, R. & D'Arcy, L., 2014. *Manual de Referencia: Monitoreo de la biodiversidad para REDD+.* s.l.:Sociedad Zoológica de Londres, Reino Unido.

Leal, E., 2018. FZS en la Amazonía Colombiana. En: I. Chalán, ed. *Andes Amazonía.* Lima: FZS Perú, pp. 44-45.

López, M., 2007. *Sistema de Información Ambiental Territorial de la Amazonia colombiana SIAT-AT: Lineamientos conceptuales y metodológicos del Sistema de Indicadores Ambientales Amazonia en el marco del Programa Regional de Monitoreo Ambiental.* Primera ed. Bogotá: Instituto Amazónico de Investigaciones.

López, R. & Cardenas, D., 2002. *Manual de identificación de especies maderables objeto de comercio en la Amazonia colombiana.* Primera ed. Bogotá (Colombia): Instituto Amazónico de Investigaciones Científicas, SINCHI.

Lozano Barrero, C. M., 2006. Características químicas de salados utilizados por dantas (Tapirus TerrestrisLinneo, 1768) en el sureste amazónico colombiano. *Tecnogestión: Una mirada al ambiente,* 3(1), pp. 39-46.

MADS, 2005. *Programa Nacional para la conservación del Género Tapirus en Colombia.* Primera ed. Bogotá: Ministerio de Ambiente, Vivienda y Desarrollo Territorial.

MADS, 2020. *Cuarto resumen de información de Salvaguardas de REDD+ (RIS IV),* Bogotá (Colombia): UNFCCC.

Martínez, M., 2014. *Plan de Investigación y Monitoreo de la Reserva del Hombre y la Biosfera del Río Plátano 2014-2025,* Comayagüela, Honduras: ICF y Proyecto USAID, ProParque.

Miraña, B. J. & Guiro, Y. A., 2013. *Diagnostico Socioeconómico Piine Aiiyveju Niimue Iachi-mua (PANI),* Bogotá: Secretaria de Medio Ambiente, Proyecto Incentivos a la Conservación. Fondo Patrimonio Natural.

Montenegro, O., 1998. *The Behaviour of Iowland Tapir (Tapirus terrestris) at a Natural Mineral Lick in the Peruvian Amazon,* Gainesville: Master's Thesis. University of Florida.

Montenegro, O., 1999. Observaciones sobre la estructura de una población de tapires (Tapirus terrestris) en el sureste de la Amazonia Peruana. In: T. Fang, O. Montenegro & R. Bodmer, eds. *Manejo y Conservación de Fauna Silvestre en América Látina.* La Paz: Instituto de Ecología, pp. 437-442.

Morales-Betancourt, M. A., Páez, V. P. & Lasso, C. A., 2015. *Conservación de las tortugas continentales de Colombia: evaluación 2012-2013 y propuesta 2015-2020.* Bogotá: nstituto de Investigación de Recursos Biológicos Alexander von Humboldt, Asociación Colombiana de Herpetología y Ministerio de Ambiente y Desarrollo Sostenible.

Muñoz, D. L., Leal, E. & Castro, E., 2009. *Línea base para la planeación de acciones en el Parque Nacional Natural Cahuinarí ,* Leticia (Amazonas): Parques Nacionales Naturales de Colombia, Dirección Territorial Amazonia-Orinoquia. .

Murcia, U. G. et al., 2007. *Balance anual sobre el estado de los ecosistemas y el ambiente de la Amazonia 2006.* Primera ed. Bogotá: Instituto Amazónico de Investigaciones Científicas - Sinchi.

Ochoa, D., Rojas, A. & Ortiz, N., 2011. *Retos para un desarrollo sostenible: Transformaciones en la Amazonia colombiana.* Primera ed. Bogotá (Colombia): Fundación Alisos.

OPIAC, 2022. *Organizaciones indígenas del Amazonas.* [Online] Available at: https://opiac.org.co/opiac/organizaciones

Otero-Durán, I. & Piniero, M., 2019. Avances y retos en el accionar del Ministerio de Ambiente y Desarrollo Sostenible para controlar la deforestación en la Amazonía colombiana. *Espacio y Desarrollo,* Issue 33, pp. 91-116.

PANI & PNN-Cahuinari, 2010. *Régimen Especial de Manejo Intersititucional PNN-Cahuinari.* Primera ed. Bogotá: Autoridades Tradicionales, líderes y miembros de las comunidades pertenecientes a la Asociación PANI, Unidad Administrativa Especial del sistema de Parques Nacionales Naturales de Colombia, Parque Nacional Natural Cahuinarí.

PANI & PNN-Cahuinari, 2022. *Régimen Especial de Manejo Intersititucional PNN-Cahuinari.* Leticia (Colombia): Autoridades Tradicionales, líderes y miembros de las comunidades pertenecientes a la Asociación PANI, Unidad Administrativa Especial del sistema de Parques Nacionales Naturales de Colombia, Parque Nacional Natural Cahuinarí.

Payán Garrido, E. & Soto Vargas, C., 2012. *Los felinos de Colombia.* Primera ed. Bogotá: Ministerio de Ambiente y Desarrollo Sostenible, Instituto de Investigaciones de Recursos Biológicos Alexander von Humboldt, y Panthera Colombia.

Payán Garrido, E. et al., 2016. Unidades de conservación, conectividad y calidad de hábitat del jaguar en Colombia. In: R. A. Medellín, et al. eds. *El jaguar en el siglo XXI. La perspectiva continental.* México, D. F.: Fondo de Cultura Económica, pp. 240-274.

Payán, E. & Escudero-Páez, S., 2015. Densidad de jaguares (Panthera onca) y abundancia de grandes mamíferos terrestres en un área no protegida del Amazonas colombiano.. In: E. Payán, C. A. Lasso & C. Castaño-Uribe, eds. *Conservación de grandes vertebrados en áreas no protegidas de Colombia,*

Venezuela y Brasil.. s.l.:Instituto de investigación de Recursos Biológicos Alexander von Humboldt, pp. 225-242.

Payán, E. & Trujillo, L. A., 2006. The tigrilladas in Colombia. *Cat news,* 44(1), pp. 25-28.

PNN Cahuinarí, 2017. *Informe de aprovechamiento de especies por los ríos Bernardo y Cahuinarí,* Dirección territorial Amazonía: Parques Nacionales Naturales de Colombia.

Prieto-C, A. & Arias-G, J. C., 2007. Diversidad biológica del sur de la Amazonía colombiana. In: I. H. I. S. U. Corpoamazonia, ed. *Diversidad biológica y cultural del sur de la Amazonia colombiana - Diagnóstico.* Bogotá D. C.: s.n., pp. 73-197.

Riaño & Salazar, 2016. *SUBREGIONES DE LA AMAZONIA COLOMBIANA.* [Online] Available at: https://sinchi.org.co/subregiones-de-la-amazonia-colombiana

Rocha, O., Calvache, E., Cetina, G. & Bernal, A., 1990. *Estudio general de suelos de los municipios de Santiago, Colo San Francisco, Sibundoy, Mocoa, Villa Garzón, Puerto Asís, Orito y la parte norte de La Hormiga..* Bogotá D.C.: Ministerio de Hacienda y Crédito Público. Instituto Geográfico Agustín Codazzi..

Rodríguez, C. A. y otros, 2010. *Análisis de la participación en la implementación de las estrategias especiales de manejo: perspectiva local y análisis de redes sociales,* s.l.: Fundación Tropenbos Internacional Colombia.

Romero Picón, Y., 2010. *Informe de investigación del programa de arqueología preventiva y plan de manejo arqueológico del bloque Bunganviles.,* Bogotá D.C.: ICANH.

Ruiz, S. L. y otros, 2007. *Diversidad biológica y cultural del sur de la Amazonia colombiana - Diagnóstico.* Primera ed. Bogotá (Colombia): Corpoamazonia, Instituto Humboldt, Instituto Sinchi, UAESPNN.

Ryan, J. & Sambula, R., 2016. *Terminal Evaluation UNDP/GEF TE La Moskitia Honduras - Final report: Conservation of Biodiversity in Productive Landscapes of the Honduran Moskitia,* s.l.: UNDP/GEF TE La Moskitia Honduras.

Salaman, P., Donegan, T. & Caro, D., 2007. Listados de avifauna colombiana. *Conservación Colombiana,* Volumen 2 Sumplemento , p. 85.

Salazar Cardona, C. A. y otros, 2019. *Minería: Impactos sociales en la Amazonia. Bogotá: Instituto Amazónico de Investigaciones Científicas SINCHI.* Bogotá (Colombia): Instituto Amazónico de Investigaciones Científicas SINCHI y Ministerio de Ambiente y Desarrollo Sostenible.

Sánchez, M., Miraña, P. & Duivenvoorden, J., 2007. Plantas, suelos y paisajes: ordenamientos de la naturaleza por los indígenas Miraña de la Amazaonía. *Acta Amazónica,* pp. 567-582.

Servicio Geológico Colombiano, 2015. *Atlas Geológico de Colombia 2015.* [En línea] Available at: https://www2.sgc.gov.co/MGC/Paginas/agc_500K2015.aspx#

SIMCI & UNODC, 2018. *Informe de monitoreo de territorios afectados por cultivos ilicitos 2017,* Bogotá: Oficina de las Naciones Unidas contra la Droga y el Delito (UNODC).

SINCHI, 2007. *Balance anual sobre el estado de los ecosistemas y el ambiente de la Amazonia 2006.* Primera ed. Bogotá: Instituto Amazónico de Investigaciones Científicas - Sinchi.

Soil Survey Staff, 1987. *Keys to soil taxonomy.* Ithaca: Cornell University.

Thornton, D. & Branch, L., 2019. Transboundary mammals in the Americas: asymmetries in protection challenge climate change resilience. *Diversity and Distributions,* 25(4), pp. 674-683.

Tobler, M. W., Carrillo-Percastegui, S. & Powell, G., 2009. Habitat use, activity patterns and use of mineral licks by five species of ungulate in south-eastern Peru. *Journal of Tropical Ecology,* 25(3), pp. 261-270.

USDA, 1999. *Soil Taxonomy. A Basic System of Soil Classification for Making and Interpreting Soil Surveys..* Washington. DC.: United States Department of Agriculture. Natural Resources Conservation Service..

Vélez, J., Espelta, J. M., Rivera, O. & Armenteras, D., 2017. Effects of seasonality and habitat on the browsing and frugivory preferences of Tapirus terrestris in north-western Amazonia. *Journal of Tropical Ecology,* 33(6), pp. 395-406.

Walschburger, T., Monje, C. & Muñoz, D., 1990. *Importancia de los bosques inundables para el recurso pesquero en la Amazonia Colombiana,* s.l.: Fundación Puerto Rastrojo / Colciencias.

Wultsch, C. y otros, 2016. Genetic diversity and population structure of Mesoamerican jaguars (Panthera onca): implications for conservation and management.. *PLoS ONE,* 11(10), p. e0162377.

WWF, 2020. *WWF Jaguar Strategy 2020-2030.* s.l.:s.n.

WWF-Colombia & FPR, 2018. *Análisis de Servicios ecosistémicos en el territorio de Azicatch, Amazonia Colombiana: Resultados de la caracterización y mapeo de servicios ecosistémicos y evaluación del riesgo de su eventual pérdida para las comunidades indígenas.* Primera ed. s.l.:WWF-Colombia & Fundación Puerto Rastrojo.

Zapata-Ríos, G. & Aragullin, E., 2013. Estado de conservación del jaguar y el pecarí de labio blanco en el Ecuador Occidental. *Rev. Biodivers. Neotrop.,* 3(1), pp. 21-29.